EUROPEAN ENERGY AND TRANSPORT

Scenarios on energy efficiency and renewables

Directorate-General for Energy and Transport

EUROPEAN COMMISSION

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European Commission

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Executive Summary

Energy efficiency and renewables are central to EU and Member States' energy and climate policies as they contribute substantially towards reducing CO2 emissions, helping to meet EU's international obligations, either through curbing energy demand or through providing alternative carbon free supplies. Similarly they improve energy security and can contribute to enhanced competitiveness. Energy efficiency, as set out in the 2005 Green Paper on energy efficiency,[1] has become a cornerstone of EU energy policy contributing to all three main energy policy objectives: competitiveness, energy security and environment protection. The importance of energy efficiency and renewables policies is further emphasised in the recently published Green Paper on a European strategy for sustainable, competitive and secure energy.[2]

Therefore the Commission has undertaken a number of policies and measures towards improving energy efficiency and increasing the contribution of renewable energy sources. The following alternative scenarios simulate the possible outcomes of strengthened policies at both Community and Member State levels to achieve better energy efficiency and a higher share of renewables. These scenarios illustrate possible alternative pathways for the evolution of the EU energy system in the horizon to 2030. For this purpose three different cases have been examined:

- The "Energy efficiency" case takes into account all energy efficiency policies tabled by the European Commission. The modelling assumes that through Community and national/local action energy consumers improve their perception of energy costs so that more efficient energy solution are chosen despite of higher initial costs overcoming also to a large extent issues related to lack of information.
- The "High renewables" case assumes that additional incentives are provided both to energy consumers and energy producers so that the global indicative target of a 12% contribution from renewable energy sources to gross energy consumption in 2010 is reached. Furthermore, strengthening of these incentives beyond 2010 is assumed towards achieving a contribution from renewable energy sources to gross energy consumption close to 20% in 2020.
- The "Combined high renewables and efficiency" case, which combines the assumptions of the two cases mentioned above, explores their aggregate effect on the evolution of the EU-25 energy system and allows for an in depth analysis of their possible synergies as well as any trade-offs.

These scenarios are distinct from the Baseline approach[3], where the indicative targets, as set out in various Directives (e.g. renewables electricity Directive 2001/77, Directive 2003/30 on biofuels in transport) will not be necessarily met. The numerical values for these indicators are outcomes of the modelling; they reflect implemented policies rather than targets. In the following energy efficiency and renewables scenarios, the modelling starts from the assumption that agreed policies will be vigorously implemented in the Member States and that certain new targets on the overall share of renewables in 2020 will be broadly achieved. These scenarios explore the consequences of such achievements for all sectors of the energy economy and address also the issue of possible synergies and overlaps between policies on energy efficiency and on renewables.

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1 Green Paper of the European Commission on Energy Efficiency "Doing more with less", COM (2005) 265 final of 10 June 2005.

2 Green Paper of the European Commission: "A European Strategy for Sustainable, Competitive and Secure Energy", COM (2006) 105 final of 08 March 2006.

3 European energy and transport: Trends to 2030 – update 2005 (2006).

In addition, two variants to the above cases have been examined, namely the "12% renewables share in 2010" case, in which additional incentives towards promoting renewable energy forms remain at 2010 levels up to 2030, and the "Combined 12% renewables share in 2010 and efficiency" case, which combines the assumptions of the "Energy efficiency" case with those of the above mentioned renewables variant.

Energy efficiency case

Assumption

The Energy Efficiency Green Paper of 2005 stated that with today's technology, it is possible to save around 20% of our energy consumption by an increase in energy efficiency on a cost-effective basis. Several Directives have been adopted that will help to exploit large parts of this potential when fully implemented. The modelling for the "Energy efficiency" scenario assumes the full implementation of these Directives, notably the Directive on building performance and the Directive on end-use energy efficiency and energy services as well as energy efficiency improvements stemming from the eco-design Directive. As a result, efficiency improvements are more important in the household and services sector. In transport, capturing the existing high efficiency potentials for aviation would be facilitated by the inclusion of air transport into the European emission trading scheme. In addition cogeneration becomes much more important in the "Energy efficiency" case compared with Baseline. In the modelling of the "Energy efficiency" case, energy consumers improve their perception of energy costs taking advantage of cost-effective and energy efficient solutions in their purchase and investment choices. Energy efficiency labelling is instrumental in this respect. Other ongoing action at EU, national and local level, such as RTD policies, information campaigns, regional and cohesion policy as well as transport policy contribute to better energy efficiency.

The other assumptions, such as population, GDP and sectoral development as well as energy import prices remain the same as in the Baseline. With the same GDP and sectoral production, any improvements in energy intensity (the quotient of energy consumption and GDP) from the modelling of the "Energy efficiency" case can be attributed to improved energy efficiency as distinct from effects stemming from structural change of the economy.

Overall results

The energy efficiency policies and measures of the "Energy efficiency" case show substantial results in terms of curbing energy demand. Total EU-25 energy consumption in the "Energy efficiency" case comes virtually back to the 2000 level in 2020 (there is just a marginal increase of 0.5 % over 20 years from 1653 Mtoe in 2000 to 1662 Mtoe in 2020). In 2030, total energy consumption would be even as low as it had been in 1990 (there would be even a slight decrease of 0.8% over 40 years to reach 1544 Mtoe in 2030). This is a reversal of the trend towards ever increasing energy consumption seen for many decades. This development is the more remarkable as GDP is expected to continue growing by 2% per year on average. The increase in economic activity between 2000 and 2020 by a total 53% would be fuelled with essentially the same amount of energy. Over the period 2000 to 2030, there would be even a decline of energy consumption by 7% with GDP increasing by 79%.

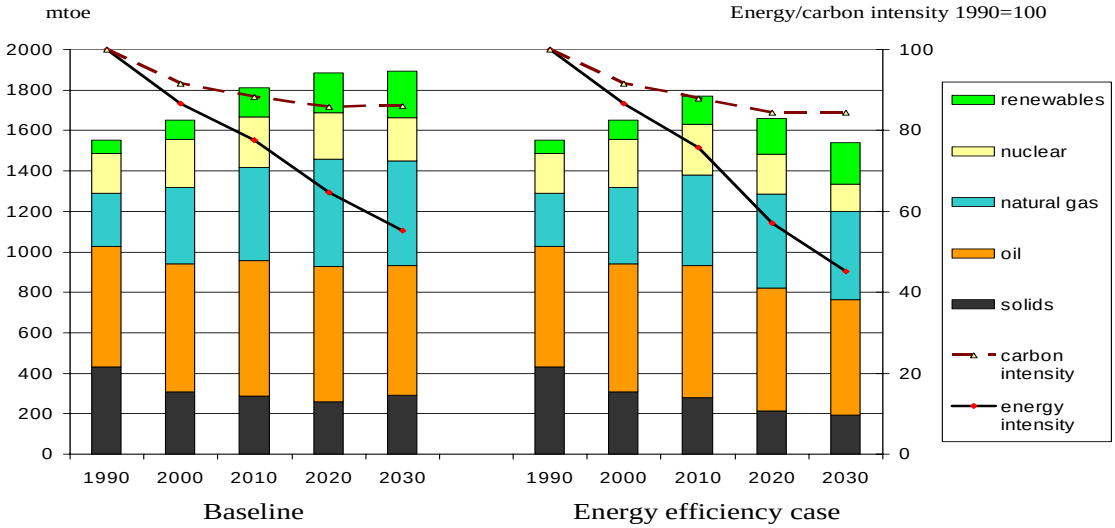
Consequently, energy intensity would decrease by 2.1% pa between 2000 and 2020 (even 2.2% pa between 2000 and 2030). These are 0.6 percentage points per year more than in the Baseline (0.7 percentage points for the period to 2030), which is due to energy efficiency policies and measures.

Demand for all energy forms declines compared to Baseline. The biggest fall is projected for nuclear and solid fuels, reaching -35.0% and -34.2% respectively in 2030 compared to Baseline. The main reason for this is the marked slowdown in electricity demand growth, due to greater energy efficiency, and the higher exploitation of co-generation in the power generation sector. Nuclear is exclusively used for electricity generation and solid fuels are a major input for power

stations. Nuclear is no option for CHP, which will be predominantly based on natural gas given the size of cogeneration units. As a result, both nuclear and solid fuels lose market share in primary energy needs.

On the contrary, other energy forms gain market shares in total energy consumption (compared with Baseline) with the most significant increase in the long run occurring for oil, the share of which reaches 36.9% in 2030 (+3.1 percentage points from Baseline levels in 2030), followed by renewables (13.3% in 2030; +1.1 percentage points from Baseline levels) and natural gas (28.3% in 2030; +1.0 percentage points from Baseline levels).

Gross energy consumption by fuel and energy and carbon intensities: Energy Efficiency case versus Baseline



Better energy efficiency makes a small contribution towards increasing the share of renewables in the medium and long term (about one percentage point more) due to reduced overall energy demand. On the other hand, through limiting the growth of electricity demand, energy efficiency curtails somewhat the potential for electricity generation from renewables (notably wind).

As a result of these changes in the fuel mix, carbon intensity (CO2 emissions divided by energy consumption) develops slightly more favorable than in the Baseline. On the other hand, there is a substantial improvement in energy intensity compared with Baseline and therefore CO2 emissions are much lower in the “Energy efficiency” case (3% below Baseline in 2010 and even 20% lower in 2030). Compared with the Kyoto base-year 1990, CO2 emissions come back to the 1990 level in 2010 and decrease thereafter to reach minus 16% in 2030, after having reached minus 10% in 2020.

Following demand reduction through energy efficiency measures, indigenous energy production decreases - however, at a somewhat slower pace than gross energy consumption up to 2020. Consequently the import dependency of the EU drops slightly below baseline levels (e.g. 63.1% in 2020 instead of 63.8% in the Baseline). Given that energy efficiency also reduces strongly electricity demand produced from nuclear and (indigenous) solid fuels, especially in the long term, there is a slight increase in import dependency in 2030 (65.5% in the efficiency case compared with 64.9% in the Baseline).

Final energy demand develops at a significantly slower pace compared to the Baseline scenario under the “Energy efficiency” case assumptions (-2.6% in 2010, -11.5% in 2020 and -15.7% in 2030). The biggest decline occurs in the tertiary sector, where energy consumption is 31.4% lower than in the Baseline in 2030. Energy needs in the residential and transport sectors are also projected to decrease significantly from Baseline levels (-26.0% and -10.9% in 2030

respectively) whereas the impact of the policies considered in this case is rather limited in industry (-0.6% in 2010, -2.4% in 2030).

The availability of more efficient new vehicle technologies, combined with greater incentives to consumers that encourage better understanding of technology costs, are the key drivers for the decline in transport sector energy requirements (-2.1% in 2010, -10.9% in 2030). Energy efficiency improves further compared with Baseline for all modes, especially for aviation and trucks. By comparison efficiency improvements over Baseline are somewhat smaller for passenger cars as the CO_2 agreement with the European car industry, which is essentially a fuel efficiency agreement, is already included in the Baseline.

The focus of efficiency policies towards improvements in buildings' thermal integrity and demand side management, but also the labelling of electric appliances, is reflected in the projected changes in tertiary and household sector demand. The structure of energy demand in services and households is quite similar because the bulk of energy consumption takes place in buildings (like office blocks, hospitals, schools, dwellings etc) and for the same purposes, namely heating, cooling, cooking, lighting and appliances. The decline is significantly higher for consumption by electric appliances (-50.4% in 2030 for the tertiary sector; -33.0% in households) reflecting the large scope for action towards more rational use of energy and the benefits of appliance labelling. As a result electricity demand in both sectors exhibits the largest decline among all energy forms over the projection period.

Besides considerably more cogeneration, the supply side shifts towards more efficient technologies in the long run driven by faster technological progress especially in power generation, which leads to improvements in terms of new equipment efficiency.

Overall, the "Energy efficiency" case gives rise to a much more favourable development compared to the Baseline scenario. Primary energy needs decline significantly (-18.6% compared to the Baseline in 2030), so that in 2030 total energy consumption would be as low as it had been in 1990. In 2020, total energy needs would have come back to the level of 2000. However, the import dependency of the EU-25 energy system exhibits a slight worsening from Baseline levels (65.5% in 2030 compared to 64.9% in the Baseline) as the significant decline of electricity requirements in the long term limits the need for new investment in nuclear power plants and the come back of solids in power generation. On the other hand changes in the fuel mix allow for a further improvement of carbon intensity in the EU-25 energy system, which in combination to the decreasing energy requirements brings about a much more favourable development in terms of CO_2 emissions. CO_2 emissions in 2010 come back to their 1990 level instead of increasing by 3% in the Baseline. In 2020, emissions are 10% below the 1990 level and in 2030 CO_2 emissions are projected to reach minus 16 % below the 1990 level – a substantial improvement compared to an increase of CO_2 emissions by +5% from 1990 to 2030 in the Baseline scenario.

"High renewables" case

Assumptions

The EU has been supporting renewable energy sources for some time notably through Directives on electricity from renewables and on biofuels. The Communication on "The share of renewable energy in the EU" of 2004 and the Biomass Action Plan of 2005 have underlined the key role of renewables in ensuring sustainable energy supplies for the Community, reinforcing social and economic cohesion, developing European industry and contributing to job creation. The ratification of the Kyoto Protocol and the process of integrating the environment into energy policy will both underpin a greater role of renewables. The "High renewables" scenario includes not only the implementation of the renewables electricity and the biofuels Directives, but it also assumes a significant biomass/waste contribution especially in industry and considerable penetration of solar water heating in the household and tertiary sectors.

The long-standing objective to reach a renewables share of 12% in gross energy consumption may be complemented by a target for 2015 and/or 2020. The conclusions of the European Council of March 2006 mention a share of renewables of 15% in 2015, and a share of 20% for 2020 is under discussion. The "High renewables" scenario has an orientation to come close to these shares under discussion, starting from the achievement of a renewables share of 12% in 2010. Apart from the assumptions on much stronger support for renewables, all other assumptions (e.g. GDP, energy import prices, etc) remain unchanged from Baseline.

Overall results

Strong action on renewables in the "High renewables" case lead to significant changes in the future evolution of the fuel mix while overall primary energy demand remains essentially unchanged from Baseline levels in 2010, exhibiting a limited decline thereafter of -1.8% below the Baseline in 2030. In this scenario energy efficiency follows Baseline trends, thus the limited further energy intensity gains occurring in the long run reflect mainly the higher exploitation of wind and other intermittent renewables (with an efficiency of 100% according to Eurostat conventions[4]). However, there are significant changes in the fuel mix with demand for renewables growing at rates well above those in the Baseline scenario (5.2% pa in 2000-2030 compared to 3.0% pa in the Baseline), a growth that occurs to the detriment of all other energy forms.

In 2010, renewables account for 11.6% of primary energy needs (a rise of +3.6 percentage points from Baseline levels). This increase on top of Baseline occurs mainly to the detriment of solid fuels (accounting for 14.2% of primary energy needs, -1.6 percentage points from Baseline levels) as well as oil and gas (34.9% and 24.5%, respectively, both declining by -1.0 percentage point compared to the Baseline). Nuclear remains unchanged as no investment decisions on new nuclear would be affected in the short term.

Shares in gross energy consumption in the "High renewables" case in EU-25 (in %):

	2000	2010	2020	2030	Change from Baseline		
					2010	2020	2030
Solids	18.5	14.2	10.5	10.7	-1.6	-3.3	-4.7
Oil	38.4	35.9	33.8	31.4	-1.0	-1.7	-2.4
Natural gas	22.8	24.5	25.8	26.2	-1.0	-2.3	-1.1
Nuclear	14.4	13.7	10.5	7.5	0.0	-1.6	-3.6
Renewables	5.8	11.6	19.3	24.0	+3.6	+8.9	+11.8

In 2020, the use of renewables in the EU-25 energy system increases by 84% from Baseline levels with their share reaching 19.3% compared to 10.4% in the Baseline scenario. An even higher renewables share can be achieved with the same intensity of renewables promotion if renewables policies are combined with energy efficiency policies (this case is developed further below). Demand for solid fuels exhibits again the strongest decline from Baseline levels (-24.5%) followed by nuclear (-14.1%), natural gas (-8.9%) and oil (-5.8%). In 2020 solid fuels account for 10.5% of primary energy needs, oil for 33.8%, gas for 25.8% and nuclear for 10.5% (all loosing significant market shares to renewables in comparison with the Baseline scenario).

The further strengthening of promoting policies for renewables up to 2030 leads to an increase of the renewables share reaching 24.0% (+11.8 percentage point from Baseline). This further

[4] According to Eurostat conventions electricity generation from renewables such as wind, solar and hydro has an efficiency of 100%.

growth for renewables strongly affects nuclear energy and solid fuels (-33.5% and -31.8% respectively compared to Baseline). The effects on liquid fuels (-8.6%) and natural gas (-5.8%) are less pronounced. The share of nuclear falls to 7.5%. Nevertheless, the combined share of carbon free and indigenous fuels (renewables plus nuclear) reaches almost one third in 2030 compared with less than a quarter under Baseline conditions.

The higher exploitation of biomass and waste is the key driver for the substantial increase of the renewables share accounting for about 70% of incremental renewables demand. Biomass/waste deployment in 2030 is twice as high as in the Baseline. Besides the higher utilisation of biomass and waste in the power generation sector, the significant increase of the biofuels share in gasoline and diesel used in the transport sector contributes to this increase. A substantial increase in relative terms is also projected for the long-term contribution of solar energy and geothermal heat. The high penetration of wind energy, already achieved in the Baseline, is further enhanced, in the "High renewables" case with the increase for wind energy reaching 45.5% in 2030 from Baseline levels (63.8% in 2020).

The share of renewables (including waste) in electricity generation increases to 23.5% in 2010, 39.4% in 2020 and 45.6% in 2030 (5.4, 16.0 and 18.0 percentage points above Baseline levels, respectively). Biomass and waste account for 40.3% of renewable electricity in 2030, wind energy for 33.0% and hydro for 20.9% (from 18.3%, 33.1% and 46.0% respectively in 2010). The biofuels share in petrol and diesel consumption rises to 6.4% in 2010, to 14.2% in 2020 and to 19.1% in 2030.

These changes in the fuel mix entail significant improvements in carbon intensity (-5.4% from Baseline levels in 2010 and -13.7% in 2030). Along with some improvements in energy intensity, mainly due to the deployment of highly efficient renewables that replace less efficient fossil and nuclear technologies, this leads to pronounced reductions in CO2 emissions below Baseline levels (up to -15.2% in 2030). CO2 emissions remain below the 1990 level throughout the projections period reaching minus 3% in 2010, minus 9% in 2020 and minus 11% in 2030.

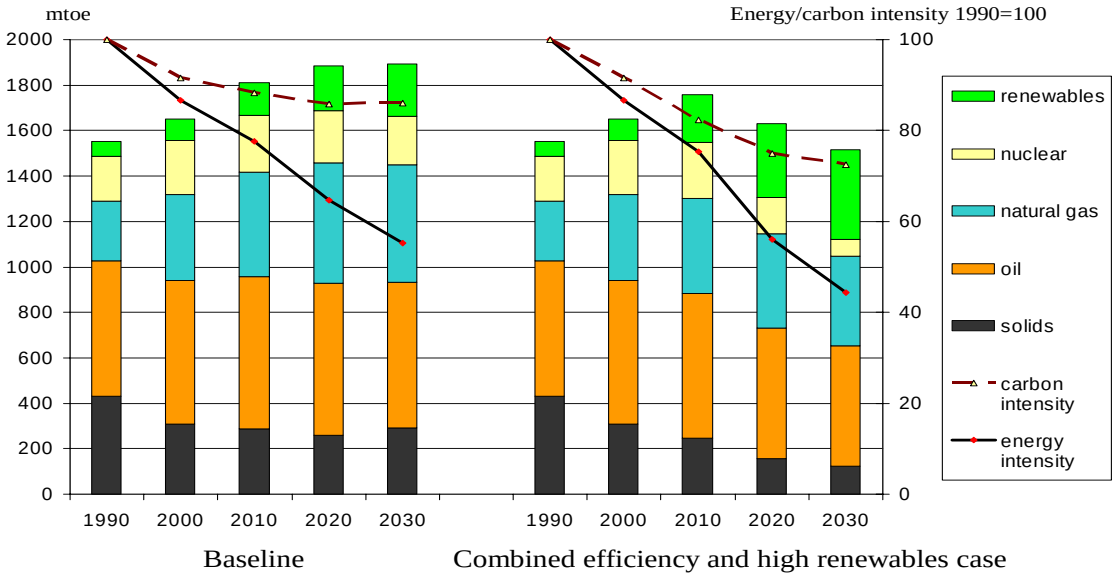
Following much higher renewables deployment and despite a certain decline in nuclear and fossil fuel production, indigenous energy supplies are higher in the "High renewables" case than in the Baseline. Consequently, import dependency falls below Baseline level so that the increase of import dependency is considerably moderated with strong renewables promotion. Import dependency in 2010 is limited to 52% - close to the current level – and increases only somewhat to reach 58% in both 2020 and 2030 instead of 64% and 65% in 2020 and 2030 respectively in the Baseline.

Combined high renewables and efficiency case

A higher renewables share is also supported by measures that reduce energy consumption through better energy efficiency. In the "combined high renewables and efficiency" case, the assumptions of both cases are introduced simultaneously in the modelling in order to explore the synergies and possible overlaps between both main policy areas. All other assumptions remain the same as in the Baseline.

Primary energy needs in 2010 in the combined case are projected 3% below Baseline levels. This decrease is even more pronounced in the long run (-20% in 2030). Beyond 2010, total energy consumption declines not only relative to Baseline but also in absolute terms (-0.7% pa in 2010-2030). In 2030, total energy requirements would be 2.5% lower than they had been in 1990 exceeding even slightly the decrease in the pure "Energy efficiency" case reflecting the higher transformation efficiency of e.g. wind in power generation.

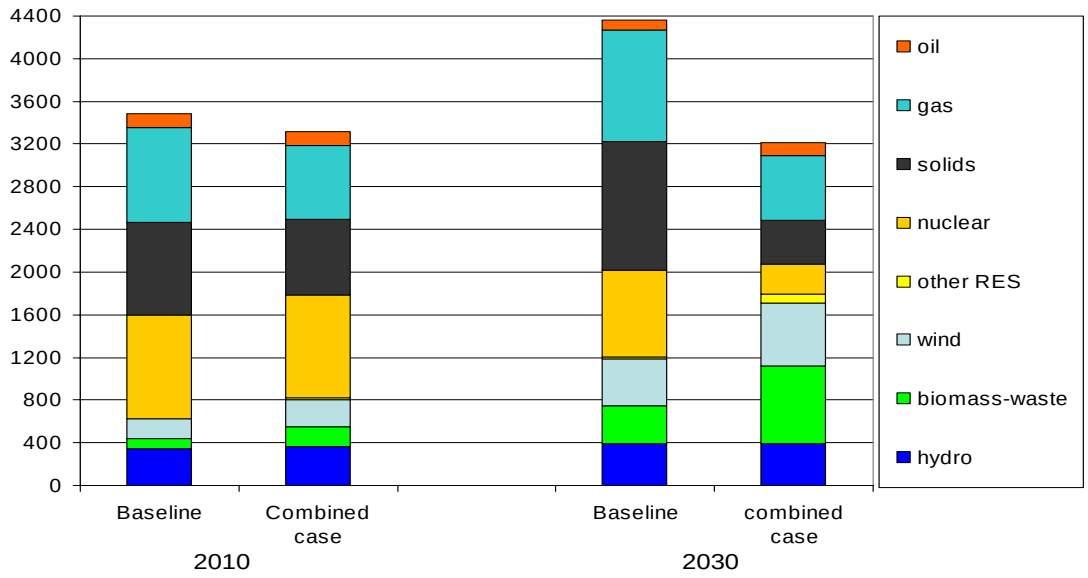
Gross energy consumption by fuel and energy and carbon intensities:
Combined energy efficiency and high renewables case versus Baseline



Lower energy requirements combined with renewables policies allow for a growth of the renewables share in primary energy needs at rates above those projected in the "High renewables" case, despite the less pronounced growth of renewables consumption in absolute terms (reaching 394 Mtoe in 2030 compared to 446 Mtoe in the "High renewables" case). Thus, in 2010 renewables are projected to account for 11.9% of primary energy needs and this share rises further to 19.9% in 2020 and reaches 25.9% in 2030 (compared with 11.6%, 19.3% and 24%, respectively, in the "High renewables" case). Demand for all other energy forms is projected to decline from Baseline levels with the impacts in the short run being more pronounced for solids and natural gas (-14.2% and -9.6% respectively from Baseline levels in 2010). In the long run, nuclear (-65.1% from Baseline levels in 2030) and solids (-57.5%) decline most following strong combined policies on energy efficiency and renewables. The substantial decline in nuclear, following the substantial reduction below Baseline in electricity demand due to better energy efficiency, limits the share of carbon free energy forms in primary energy needs to 30.8% in 2030, whereas in the "High renewables" case the share of carbon free energy forms increased to 31.5% in 2030.

In power generation, renewables reach a particular high share as a result of the combined effect of strong policies on renewables and on energy efficiency, which reduce electricity production by 26% below Baseline in 2030; the level of power generation in 2030 is only slightly higher than that of today. Consequently, the renewables share (including waste) in power generation in the combined case exceeds that in the pure high renewables scenario. The renewables contribution to power generation increases to 24.8% in 2020 and reaches 43.1% in 2020. In 2030, renewables would account for even 55.7% of electricity generation, compared with 46% in the pure renewables case. Most of this would come from biomass-waste (22.4% share in 2030), while the wind share amounts to 18.5%, the hydro share to 12.3% and solar, tidal, geothermal account for 2.5%. Fossil fuels and nuclear would lose market shares. The nuclear share would further fall to 8.9% in 2030, while gas accounts for 18.9%, solid fuels for 12.7 and oil for 3.9%.

Electricity generation in the Combined high renewables and efficiency case compared with Baseline (in TWh)



Better energy efficiency in the combined case leads also to slightly higher biofuels penetration in transport compared with the isolated high renewables case. The share of biofuels in petrol and diesel reaches 6.4% in 2010, 15.2% in 2020 and 20.9% in 2030.

Carbon intensity of the EU-25 energy system improves by up to 16% from Baseline levels in 2030 as a result of the changes in the fuel mix. In combination with the much lower energy requirements thanks to better energy efficiency, this leads to a strong decline of CO_2 emissions, which are projected to decrease by 9% from Baseline levels in 2010 and by even 32.5% in 2030. Compared to the 1990 level, CO_2 emissions fall by 7% in 2010, by 21% in 2020 and by 29% in 2030. Pursuing simultaneously strong policies towards energy efficiency and renewables allows for a much more favourable development of CO_2 emissions, especially in the long run.

In the "Combined high renewables and efficiency" case, import dependency is also projected to decrease markedly from Baseline levels. The EU dependency on imports stays at current levels up to 2010 (reaching 51%) with the further increase limited to 58% in 2020 and 59% in 2030 instead of rising to 65% under Baseline developments.

Overall, the "Combined high renewables and efficiency" case reveals a much more favourable EU-25 energy system outlook with energy requirements declining by 2030 to levels slightly below those observed in 1990. The share of renewables in gross inland consumption reaches 15% in 2015, 20% in 2020 and 26% in 2030. CO_2 emissions remain well below the 1990 level over the whole projection period (-6.7% in 2010, -21.4% in 2020 and -29.3% in 2030) contributing substantially to Kyoto objectives for 2010 and possible more ambitious ones for later periods. Furthermore, in the "Combined high renewables and efficiency" case import dependency improves from Baseline levels reaching 59.2% in 2030 (5.7 percentage points below Baseline levels).

Variants

The modelling includes also a variant, in which a 12% renewables share will be reached in 2010. In this variant, the level of support for reaching this renewables outcome is kept constant for the rest of the projection period and the effects of maintaining this level of supporting policies are investigated. Some salient results are: the further increase of the renewables share to reach 20% in 2030, the reduction of CO2 emissions to minus 7% below the 1990 level in 2030 and the more limited increase of import dependency to 60% in 2030, which are 5 percentage points less than in the Baseline.

This “12% renewables in 2010” case was also combined with the “Energy efficiency” case producing even more pronounced effects in terms of increasing renewables shares and in particular declining CO2 emissions, which fall 26% below the 1990 level thanks to better energy efficiency combined with promotional policies on renewables.

Scenarios on Energy Efficiency and Renewables

1.1. Introduction

Energy efficiency and renewables have become mainstream policy lines over the last few years following the EC Green Paper of 2000 on energy security.[5] The Green Paper recognised that - to enhance energy security and contribute to sustainable development in the EU - there exists wider scope for action on the demand side, i.e. energy efficiency, compared with supply side action. Energy efficiency, as set out in the 2005 Green Paper on energy efficiency,[6] has become a cornerstone of EU energy policy contributing to all three main energy policy objectives: competitiveness, energy security and environment protection. The importance of energy efficiency and renewables policies is further emphasised in the recently published EC Green Paper on a European strategy for sustainable, competitive and secure energy.[7] Enhanced penetration of renewables will contribute both to better energy security and reduced CO_2 emissions and therefore help to meet the EU's international obligations.

In that direction the European Commission has adopted a number of policies (expressed through directives and action plans) towards improving energy efficiency in the EU energy system and increasing the contribution of renewable energy sources in satisfying primary energy needs. In the Baseline scenario[8] the approach retained was that the indicative targets, as set out in various EC Directives (renewables electricity Directive 2001/77, Directive 2003/30 on renewable energy in transport and any additional follow-up Directives etc.) will not be necessarily met. The numerical values for these indicators are outcomes of the modelling; they reflect implemented policies rather than targets.

The following alternative scenarios simulate the possible outcome of strengthened policies at both Community and Member State levels to achieve greater energy efficiency and a higher share of renewables. These scenarios illustrate possible alternative pathways for the evolution of the EU energy system in the horizon to 2030. For this purpose three different cases have been examined:

- The "Energy efficiency" case takes into account all energy efficiency policies tabled by the European Commission. The modelling assumes that through Community and national/local action energy consumers improve their perception of energy costs so that more efficient energy solution are chosen despite of higher initial costs overcoming also to a large extent issues related to lack of information.
- The "High renewables" case assumes that additional incentives are provided both to energy consumers and energy producers so that the global indicative target of a 12% contribution from renewable energy sources to gross energy consumption

[5] Green Paper of the European Commission: "Towards a European strategy for the security of energy supply", COM (2000) 769 final of 29 November 2000.

[6] Green Paper of the European Commission on Energy Efficiency "Doring more with less", COM (2005) 265 final of 10 June 2005.

[7] Green Paper of the European Commission: "A European Strategy for Sustainable, Competitive and Secure Energy", COM (2006) 105 final of 08 March 2006.

[8] European energy and transport: Trends to 2030 –update 2005 (2006).

by 2010, referred to in the renewables electricity Directive,[9] is reached. Furthermore, strengthening of these incentives beyond 2010 is assumed towards achieving a contribution from renewable energy sources to gross energy consumption close to 20% by 2020.

- The "Combined high renewables and efficiency" case, which combines the assumptions of the two cases discussed above, explores their aggregate effect on the evolution of the EU-25 energy system and allows for an in depth analysis of their possible synergies as well as any trade-offs.

In addition, two variants to the above cases have been examined, namely the "12% renewables share in 2010" case, in which additional incentives towards promoting renewable energy forms remain at 2010 levels in the horizon to 2030, and the "Combined 12% renewables share in 2010 and efficiency" case which combines the assumptions of the "Energy efficiency" case with those of the above mentioned renewables variant.

In chapters 2 to 4, the impacts of the "Energy efficiency", the "High renewables" and the "Combined high renewables and efficiency" cases on the future evolution of the EU-25 energy system are discussed in detail. A briefer discussion of the impacts of the "12% renewables share in 2010" and the "Combined 12% renewables share in 2010 and efficiency" cases is also provided in chapter 3 and 4 respectively.

1.2. The "Energy efficiency" case

1.2.1. EC policies towards energy efficiency and modelling approach

The Energy Efficiency Green Paper of 2005 stated that with today's technology, it is possible to save around 20% of our energy consumption by an increase in energy efficiency on a cost-effective basis. Energy efficiency brings significant savings on household energy bills and thus has a direct impact on every-day lives of all European citizens.

Several Directives have been adopted that will help to exploit large parts of this potential when fully implemented. These Directives include the buildings Directive [10] of 2002, the CHP Directive [11] of 2004, the eco-design Directive [12] of 2005 and the Directive on end-use energy efficiency and energy services [13] of 2006, and various Directives on energy labelling. The effects of the implementation of these Directives in the Member States will take some time to come to the fore, but it is expected that full implementation will provide important results taking into account that ongoing energy efficiency programmes

[9] Directive 2001/77/EC of the European Parliament and of the Council on the Promotion of Electricity Produced from Renewable Energy Sources in the Internal Electricity Market. Brussels, 27 September 2001.
Also at: http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_283/l_28320011027en00330040.pdf

[10] Directive 2002/91/EC of the European Parliament and the Council on the energy performance of buildings of 16 December 2002; Official Journal of the European Communities L1/65 of 4 January 2003.

[11] Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC, Official Journal L 052, 21/02/2004

[12] Directive 2005/32/EC establishing a framework for the setting of eco-design requirements for energy-using products of 6 July 2005

[13] Directive 2006/32/EC on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC of 5 April 2006

at EU and Member States level and other "soft" measures will also contribute to better energy efficiency.

Taking into account all these agreed energy efficiency action and having regard to ongoing Climate Change activities with positive repercussions on energy efficiency as well as the Action Plan to Improve Energy Efficiency in the European Community[14] presented by the European Commission in 2000, the following energy efficiency scenario shows a development that exploits large parts of the above mentioned potential for energy efficiency in the EU.

In the absence of pertinent policy action, better energy efficiency is hampered by a large number of barriers to investment. These barriers include energy prices that still do not accurately reflect environmental externalities. There is lack of sufficient information on the use of cost-effective and energy-efficient technology. There are also numerous institutional and legal barriers. One example is the continued practice of selling energy in the form of kWh instead of as energy services (e.g. efficient heating and cooling, lighting and motive power) which is what the energy consumer ultimately wants. There are also many different technical barriers to energy efficiency, including the lack of harmonised and standardised components. Another important technical barrier is the lack of appropriate 'active' distribution and transmission infrastructures, to permit effective integration of greater volumes of small-scale, local generation. Financial barriers also exist including the short paybacks required for many demand-side investments compared with those for energy production.

The above mentioned Directives and other measures address these barriers. The EU Emission Trading Scheme and its possible extension to aviation deals with market based internalising environmental externalities. Information campaigns and energy labelling help overcoming the information and awareness problems. Institutional and legal barriers are addressed in the various Directives for buildings, energy efficiency in end-use and also for CHP. The continued practice of selling energy in form of kWh instead as energy services is addressed in the Directive on end-use energy efficiency and end services.

The modelling for the energy efficiency scenario assumes the full implementation of the Directives on building performance and the Directive of end-use energy efficiency and energy services as well as energy efficiency improvements stemming from the eco-design Directive. As a result, efficiency improvements are more important in the household and services sector. In transport, capturing the existing high efficiency potentials for aviation would be facilitated by the inclusion of air transport into the European emission trading scheme. In addition cogeneration becomes much more important in the efficiency case compared with baseline. In the modelling of the "Energy efficiency" case, energy consumers improve their perception of energy costs taking advantage of cost-effective and energy efficient solutions in their purchase and investment choices. Energy efficiency labelling is instrumental in this respect. Other ongoing action at EU, national and local level, such as RTD policies, regional and cohesion policy as well as transport policy contribute to better energy efficiency.

The "Energy efficiency" case investigates the effects of actions along these lines focusing on those actions that can be modelled. The modelling analysis quantifies expected results of energy efficiency action in areas such as building standards and certification, inspection of boilers and vehicles, correct metering and billing of energy consumption, promoting energy services, energy audits in industry, energy efficient public procurement, CHP, fuel efficiency in transport, labelling, etc. The modelling

[14] Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, COM (2000) 247 final of 26 April 2000.

includes in particular a considerably improved perception of real costs of energy, which leads to the adoption of more energy efficient solutions by economic actors. It is assumed that the policies would be implemented vigorously in the Member States. Useful energy (energy services such as heat, light, cooling, motion, communication) is supplied in a more efficient way following consumer choices based on perceived costs that take into account more fully the advantages of higher energy efficiency. Moreover, energy related equipment has somewhat better efficiency characteristics (compared with Baseline) brought about by e.g. efficiency standards that force the least efficient energy consuming items out of the market. Improvements in terms of building construction lead to significant gains in thermal integrity and reduced energy requirements. In addition to such improvements on the demand side, the "Energy efficiency" case also incorporates improvements on the supply side. The use of co-generated steam and electricity is encouraged, resulting in higher shares of CHP in electricity and steam generation following the Directive on the promotion of cogeneration. Other than more cogeneration, the supply side also shifts towards more efficient equipment in the long run driven by faster technological progress. This leads to higher efficiency and lower equipment costs compared with the Baseline.

1.2.2. "Energy efficiency" scenario results for EU-25[15]

1.2.2.1. Overview of main results

Modelling the above energy efficiency policies and measures leads to a significantly different evolution of the EU-25 energy system in comparison to the Baseline scenario. In 2010, primary energy needs in the "Energy efficiency" case are projected to be 2.3% below Baseline levels. This decrease becomes more pronounced in the long run reaching -11.9% in 2020 and -18.6% in 2030 (see Table 1.2-1). Beyond 2010 total energy consumption is projected to decline by -0.7% pa over the period 2010 to 2030. In 2030 total EU-25 energy consumption in the "Energy efficiency" case is even lower in absolute terms than it had been in 1990 (-0.9% from 1990 levels, -6.7% below 2000 levels).

Energy intensity decreases at the same rates given that no changes in GDP have been assumed. Moreover, given that the sectoral production patterns also remain unchanged in both the "Energy efficiency" case and the Baseline, these energy intensity gains can be attributed to energy efficiency measures. Energy intensity improves by 0.7 percentage points more per year than in the Baseline to reach 2.2% pa up to 2030.

Demand for all energy forms declines compared to Baseline. The biggest fall is projected for nuclear and solid fuels, reaching -35.0% and -34.2% respectively in 2030 compared to Baseline. As a result both these energy forms lose market share in primary energy needs. The slowdown in electricity demand growth due to greater energy efficiency and the higher exploitation of co-generation options in the power generation sector are the key drivers for this result. Nuclear is exclusively used for electricity generation and solid fuels are a major input for power stations. Nuclear is no option for CHP, which will be predominantly based on natural gas given the size of cogeneration units.

On the contrary, other energy forms gain market shares in total energy consumption (compared with Baseline) with the most significant increase in the long run occurring for liquid fuels, the share of which reaches 36.9% in 2030 (+3.1 percentage points from Baseline levels in 2030), followed by renewable energy forms (13.3% in 2030; +1.1 percentage points from Baseline levels) and natural gas (28.3% in 2030; +1.0 percentage points from Baseline levels).

[15] Aggregate results by group of countries (EU-25, EU-15, NMS, EU-27, EU28 and Europe-30) can be found in Appendix 1.

Table 1.2-1: Primary Energy Demand in EU-25 in the "Energy efficiency" case

	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid Fuels	306.5	279.2	214.3	192.8	-2.7	-17.4	-34.2
Liquid Fuels	634.7	655.0	606.7	569.8	-2.1	-9.4	-11.0
Natural Gas	376.3	446.9	462.8	436.9	-3.3	-12.6	-15.6
Nuclear	237.7	248.8	200.6	137.1	0.0	-12.3	-35.0
Renewable En. Sources	96.5	138.2	175.2	204.9	-3.9	-10.4	-11.2
Total	**1653.8**	**1770.3**	**1661.7**	**1543.5**	**-2.3**	**-11.9**	**-18.6**
EU-15	1456.9	1551.3	1438.4	1320.7	-2.3	-11.4	-17.9
NMS	196.9	219.0	223.2	222.8	-2.9	-14.6	-22.3
Mt CO_2 emitted	**3674.1**	**3775.3**	**3404.1**	**3156.3**	**-2.7**	**-13.4**	**-20.2**
EU-15	3127.0	3202.4	2866.8	2641.5	-2.7	-13.2	-20.2
NMS	547.1	572.9	537.3	514.8	-3.1	-14.4	-20.1

Source: PRIMES.

The combined effect of lower energy demand and changes in the fuel mix is clearly reflected in the projected trend in CO_2 emissions. In 2010 CO_2 emissions are projected to come back to the 1990 levels (compared to a +2.8% growth from 1990 levels in the Baseline scenario). Furthermore, CO_2 emissions are projected to experience a strong decline in the period to 2030, falling -16.4% from 1990 levels. This is a substantial improvement compared to Baseline developments (+4.7 in 2030 from 1990 levels). Thus, in addition to pronounced energy intensity gains, the "Energy efficiency" case is further characterised by significant carbon intensity gains in comparison to the Baseline scenario. This is especially so in the long run, as carbon intensity is 2.0% below Baseline in 2030 compared with an improvement of 0.4% from Baseline in 2010.

Table 1.2-2: Import dependency in EU-25 in the "Energy efficiency" case

	%				percentage points difference from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid fuels	30.8	45.3	50.1	54.2	-0.8	0.6	-4.8
Liquid fuels	76.4	83.4	92.2	93.1	-0.3	-0.5	-0.7
Natural gas	49.6	61.9	78.8	82.0	-0.8	-2.6	-2.6
Total	**47.2**	**54.5**	**63.1**	**65.5**	**-0.5**	**-0.4**	**0.6**
EU-15	49.5	56.1	64.9	67.5	-0.4	-0.5	0.7
NMS	30.1	42.9	51.5	52.9	-1.1	-0.6	-0.8

Source: PRIMES.

However, in the "Energy efficiency" case import dependency in the long run is projected to be slightly higher compared to the Baseline scenario (+0.6 percentage points in 2030, see Table 1.2-2) as the lower exploitation of indigenous energy sources, such as solid fuels and nuclear energy, which decrease most, more than counterbalances the decline in primary energy needs. However, this is not the case for the short to medium term with import dependency being 0.5 percentage points lower than in the Baseline scenario in 2010 and 0.4 percentage points lower in 2020.

1.2.2.2. Final energy demand

Energy requirements on the demand side of the EU-25 energy system develop at a significantly slower pace compared to the Baseline scenario under the "Energy efficiency" case assumptions (-2.6% in 2010, -11.5% in 2020 and -15.7% in 2030). The biggest decline occurs in the tertiary sector, where energy consumption is 31.4% lower than in the Baselines in 2030 (see Table 1.2-3). Energy needs in the residential and transport sectors are also projected to decline significantly from Baseline levels (-26.0% and -10.9% in 2030 respectively) whereas the impact of the policies considered in this case is rather limited in industry (-0.6% in 2010, -2.4% in 2030).

Table 1.2-3: Final Energy Demand and CO_2 emission by Sector in EU-25 in the "Energy efficiency" case

	Mtoe				*% change from baseline*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Industry	330.1	354.1	370.5	382.3	-0.6	-3.1	-2.4
Residential	273.3	302.3	279.9	260.0	-3.1	-17.4	-26.0
Tertiary	159.0	175.9	166.1	154.6	-6.7	-21.6	-31.4
Transports	333.0	373.0	367.7	358.4	-2.1	-9.3	-10.9
Total	**1095.4**	**1205.3**	**1184.2**	**1155.4**	**-2.6**	**-11.5**	**-15.7**
EU-15	970.7	1058.6	1026.7	989.9	-2.6	-11.1	-15.0
NMS	124.7	146.7	157.5	165.5	-3.0	-14.1	-19.9
	Mt CO_2 emissions				*% change from baseline*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Industry	567.7	576.3	568.8	558.0	-0.1	-4.4	-2.1
Residential	452.1	468.2	414.4	372.5	-3.0	-16.3	-23.5
Tertiary	244.6	246.6	232.9	221.1	-5.8	-15.6	-21.6
Transports	969.9	1050.9	1002.8	962.8	-2.2	-10.1	-11.9
Total	**2234.3**	**2341.9**	**2218.9**	**2114.3**	**-2.3**	**-10.6**	**-13.0**
EU-15	1985.3	2066.5	1935.4	1819.9	-2.3	-10.5	-12.9
NMS	249.0	275.5	283.5	294.4	-2.2	-11.3	-14.0

Source: PRIMES.

The limited energy intensity gains in industrial sectors are partly explained by the fact that macro-economic assumptions remain unchanged from Baseline levels, i.e. no further changes towards less energy intensive activities is included in the assumptions for this policy case. In addition, EU-25 industry already experiences significant energy intensity gains under Baseline assumptions (7.8% in 2000-2010, 30.2% in 2000-2030). These gains arise through industrial restructuring but also by adoption of more efficient production techniques. Thus there is only limited scope for further improvements. CO_2 emissions from EU-25 industry are projected to follow a similar pace of decline (-0.1% in 2010, -2.1% in 2030) to that of energy demand with changes in the fuel mix leading, however, to a slight worsening of carbon intensity compared to the Baseline scenario.

The focus of efficiency policies towards improvements in buildings' thermal integrity and demand side management, but also the labelling of electric appliances, is reflected in the projected changes in tertiary and household sector demand. The structure of energy demand in services and households is quite similar because the bulk of energy consumption takes place in buildings (like office blocks, hospitals, schools, dwellings etc) and for the same purposes, namely heating, cooling, cooking, lighting and appliances.

The technologies determining energy efficiency in services and households are also largely the same. However, differences in terms of energy related equipment size, especially for heating and cooling purposes, results in significant differences as regards consumers' behaviour. The average size of this equipment for a government building or an office block is significantly larger than that for a dwelling. Consequently, technologies that benefit from economies of scale in energy use are much more likely to be adopted in the services sector than by households. In addition, decisions to invest in energy efficiency are taken by firms in the tertiary sector but by individual people (or house builders) in the household sector. Their perceptions of capital costs and opportunity costs of capital naturally differ, in a way that investment in energy efficiency is often more easily adopted by firms than by individuals.

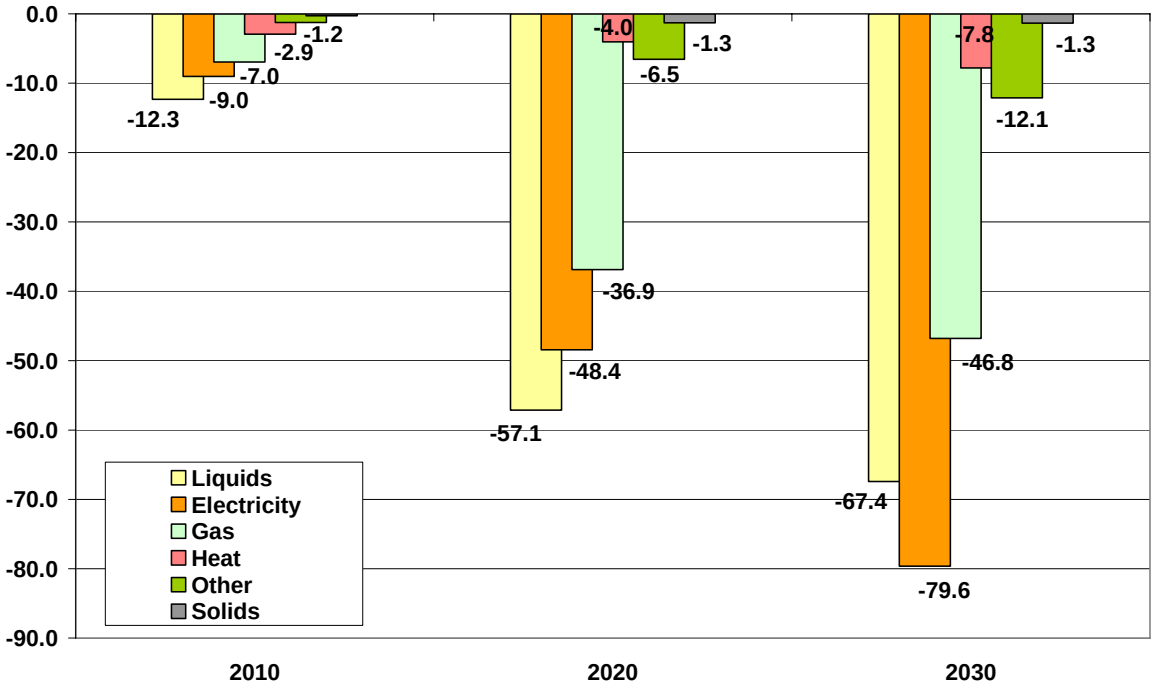
The above factors explain the higher response of the tertiary sector in comparison to households to the introduction of the policies examined here. Energy needs for heating purposes in 2030 decline by -27.8% from Baseline levels in the tertiary sector and by -24.1% in households. The decline is significantly higher for consumption by electric appliances (-50.4% in 2030 for the tertiary sector; -33.0% in households) reflecting the large scope for action towards more rational use of energy and the benefits of appliance

labelling. As a result electricity demand in both sectors exhibits the largest decline among all energy forms over the projection period. But electricity's lower market share in total energy needs leads to a worsening of carbon intensity both in the tertiary and the households sectors, as CO_2 emissions related to electricity are attributed to the power generation sector. Thus, the projected decline in CO_2 emissions in 2030 is limited to -21.6% below Baseline levels in the tertiary sector and -23.5% in households.

The availability of more efficient new vehicle technologies, combined with greater incentives to consumers that encourage better understanding of technology costs, are the key drivers for the decline in transport sector energy requirements (-2.1% in 2010, -10.9% in 2030). Energy efficiency improves further compared with Baseline for all modes, especially for aviation and trucks. By comparison efficiency improvements over Baseline are somewhat smaller for passenger cars as the CO_2 agreement with the European car industry, which is essentially a fuel efficiency agreement, is already included in the Baseline. The fall in CO_2 emissions is even more pronounced in the long run (-2.2% in 2010, -11.9% in 2030) than the decline of transport energy consumption, as the share of biofuels in gasoline and diesel increases above Baseline levels reaching 9.1% in 2030 (+0.8 percentage points in comparison to the Baseline scenario).

As already discussed, in the "Energy efficiency" case the fuel mix in EU-25 demand side undergoes significant changes in comparison to the Baseline scenario. In the short to medium term oil decreases most in absolute terms. Changes in the transport sector are the key driver for this projected decline (see Figure 1.2-1), accounting for 66% of the overall reduction in final oil demand in 2010 and 65% in 2030. However, in percentage terms demand for oil decreases at rates below the decline of total final energy demand over the projection period (-2.4% in 2010 from Baseline levels, -13.2% in 2030). Consequently, the market share of oil in final energy demand increases under the "Energy efficiency" case assumptions to reach 38.5% in 2030 (+1.2 percentage points in comparison to the Baseline scenario).

Figure 1.2-1: Changes in final energy demand by fuel in EU-25 (diff. from Baseline in Mtoe) in the "Energy efficiency" case



Source: PRIMES.

The fall in electricity use becomes increasingly important in the long run (accounting in 2030 for 37% of final energy demand reduction compared to the Baseline). In the presence of supporting policies for energy efficiency the share of electricity in final energy demand grows at a much slower pace than in the Baseline scenario, reaching 22.0% in 2030 (from 24.4% in the Baseline scenario). The decline in electricity demand is moderated by the fact that electricity is needed for many energy efficient ways of providing energy services.

Natural gas consumption is also significantly affected by strong policies on energy efficiency, but in absolute terms to a smaller extent than oil and electricity. By 2030, natural gas accounts for 23.8% of energy requirements in the demand side (0.3 percentage points above Baseline levels). The demand for distributed heat declines at rates well below average (-8.2% from Baseline levels in 2030). Thus its share in final energy demand side increases to reach 7.6% in 2030 compared to 6.9% in the Baseline scenario, consistent with the aim of promoting cogeneration. In the absence of additional promotional policies for renewables (in addition to those already included in the Baseline), there is lower renewables use on the demand side. The bulk of the decline (close to 90% in 2030) arises from the lower use of biomass and waste in industry as an increasing share of steam needs is satisfied from distributed heat. Finally demand for solid fuels declines only slightly from Baseline levels (-3.9% in 2030) as solids even under Baseline assumptions become a process specific (in heavy industries) energy form in the demand side.

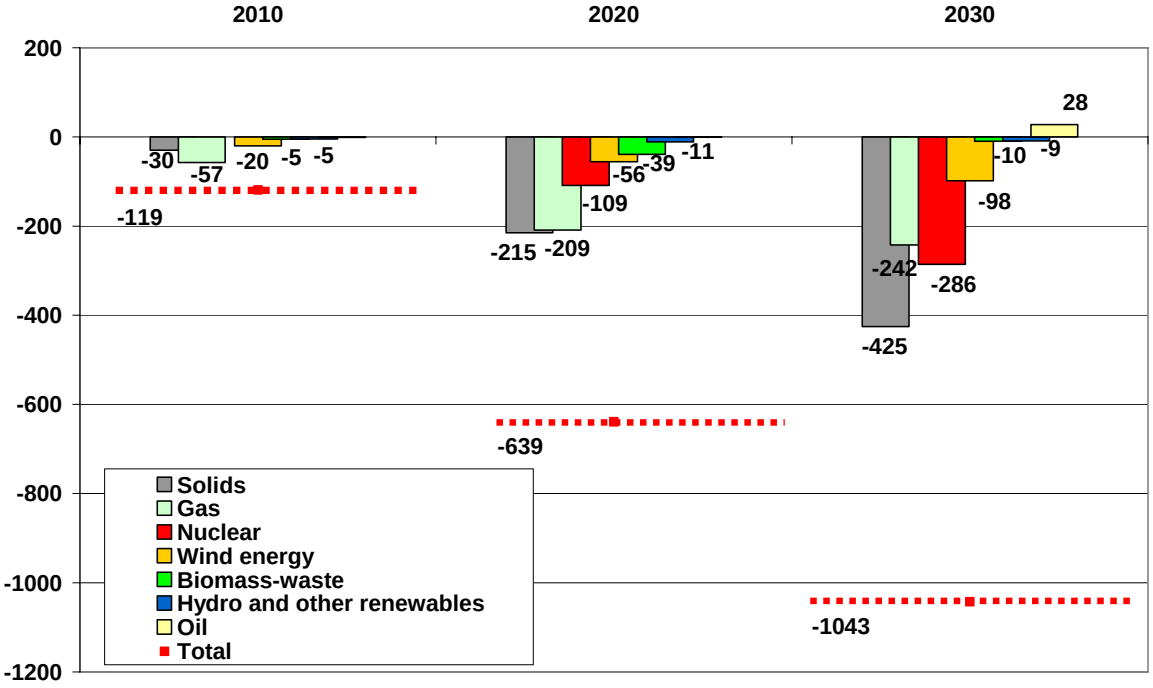
Following these changes in the fuel mix of final demand, the projected decline in CO_2 emissions from the demand side is lower than that of energy needs (-13.0% from Baseline levels in 2030 for CO_2 emissions compared with -15.7% for energy consumption). In particular, carbon intensive fuels such as solid fuels decline below average and electricity demand is much lower than in the Baseline. According to statistical conventions, CO_2 emissions related to electricity are accounted for in the power generation sector. Lower levels of electricity demand lead to lower “exports” of emissions from final demand to power generation so that in total carbon intensity of final demand worsens compared with Baseline, whereas carbon intensity of the whole energy system improves slightly due to developments in power generation.

1.2.2.3. Electricity and steam generation

Policies towards energy efficiency cause significant changes for the electricity and steam generation sector. As a result of actions undertaken on the demand side, overall electricity production is projected to fall by 3.4% from Baseline levels in 2010 and 23.9 in 2030 (see Figure 1.2-2).

In the short term the decline, both in absolute and percentage terms, is more pronounced as regards electricity generation from natural gas (-6.5% from Baseline levels in 2010). Solid fuels and renewable energy forms lose similar amounts of electricity generation in absolute terms; their percentage decline amounts to -3.4% and -4.8% from Baseline levels respectively. About 66.5% of the reduction in electricity generation from renewable energy forms compared to the Baseline scenario arises from the slower development of wind turbines in the EU-25 energy system following lower requirements for new investment due to lower electricity demand, whereas 17.5% corresponds to lower electricity generation from biomass and waste. This leads to a slightly declining renewables share compared with Baseline (17.8% compared to 18.1% in the Baseline scenario) in the short term.

Figure 1.2-2: Changes in electricity generation by energy form in EU-25 (diff. from Baseline in TWh) in the "Energy efficiency" case



Source: PRIMES.

From 2020 onwards, electricity generation from solid fuels (which is projected to make a strong comeback in the power sector under Baseline assumptions) experiences the largest decline from Baseline levels (-24.0% in 2020, -35.4% in 2030). The decline in the use of natural gas is less pronounced (-17.7% in 2020, -23.1% in 2030). Nuclear energy is also affected (-12.3% in 2020, -35.0% in 2030) as slower electricity demand growth compared to Baseline limits the needs for investment in new nuclear power plants to replace those being decommissioned over this period.

Beyond 2010, electricity generation from renewable energy forms declines at rates below average (-11.3% in 2020, -9.7% in 2030). Thus, in the "Energy efficiency" case the share of renewable energy forms in electricity generation grows on top of Baseline levels in the long run to reach 32.7% in 2030 (+5.1 percentage points from Baseline). This marked increase in the share of renewable energy forms more than counterbalances the projected decline in the share of nuclear energy in the long run. In 2030, 48.7% of electricity generation is projected to be satisfied by carbon free energy forms (+2.4 percentage points up from Baseline levels).

Another important change in the power sector concerns the higher exploitation of cogeneration options, and the adoption of more efficient generation technologies in the long run. Production from cogeneration units reaches 38.4% of electricity and 93.5% of distributed steam (i.e. excluding industrial and refinery boilers) generation by 2030 (24.3% and 88.6% respectively under Baseline scenario assumptions).

The more pronounced role of cogeneration in the "Energy efficiency" case is clearly reflected in the evolution of installed capacity in the EU-25 energy system (see Table 1.2-4). With overall installed capacity reaching levels well below those in the Baseline scenario (-3.0% in 2010, -21.7% in 2030), cogeneration capacity exhibits even a slight increase in the long run (+5.3% from Baseline levels in 2030) accounting for 30.4% of total installed capacity in 2030 from 22.6% in the Baseline scenario.

Table 1.2-4: Installed capacity by plant type in EU-25 in the "Energy efficiency" case

	GW installed				*change from baseline (in GW)*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Nuclear energy	141.1	136.4	108.0	65.2	0.0	-8.9	-36.0
Renewable energy (excl. biomass-waste)	110.1	176.4	219.8	262.7	-7.9	-21.7	-43.2
Hydro (pumping excluded)	97.2	102.7	106.3	110.6	-1.2	-2.3	-1.6
Lakes	52.2	56.0	57.3	58.5	0.0	-0.5	0.0
Run of river	45.0	46.7	49.0	52.1	-1.2	-1.8	-1.6
Wind power	12.8	71.7	108.2	141.4	-6.6	-19.4	-41.6
Wind on-shore	12.8	64.3	95.2	107.2	-5.7	-13.8	-31.4
Wind off-shore	0.0	7.4	13.1	34.1	-0.9	-5.6	-10.1
Solar	0.2	1.7	4.8	10.4	0.0	0.0	0.0
Other renewables (tidal etc.)	0.0	0.2	0.4	0.4	0.0	0.0	0.0
Thermal power	410.5	473.9	478.1	530.7	-16.2	-106.5	-158.9
Solids fired	188.9	154.5	122.3	147.5	-2.1	-34.5	-63.8
Oil fired	74.3	63.6	48.5	39.0	-2.4	0.5	4.0
Gas fired	131.9	234.3	259.1	263.0	-11.1	-62.1	-97.1
Natural gas	119.2	222.5	249.0	255.2	-11.1	-62.7	-96.8
Derived gasses	12.7	11.8	10.1	7.8	0.0	0.6	-0.4
Biomass-waste fired	14.5	20.2	46.7	79.7	-0.5	-10.4	-1.9
Fuel cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal heat	1.0	1.4	1.5	1.5	0.0	0.0	-0.2
Total	**661.7**	**786.7**	**805.9**	**858.6**	**-24.0**	**-137.1**	**-238.1**
EU-15	588.1	702.9	712.3	733.2	-21.5	-116.2	-196.8
NMS	73.7	83.8	93.6	125.5	-2.6	-20.9	-41.3
of which CHP	***113.0***	***144.8***	***201.8***	***261.3***	***-6.1***	***-7.2***	***13.3***
EU-15	*88.5*	*119.1*	*169.3*	*206.5*	*-5.6*	*-6.3*	*12.5*
NMS	*24.4*	*25.7*	*32.5*	*54.8*	*-0.5*	*-0.9*	*0.9*

Source: PRIMES.

The two power generation technologies most strongly affected are solids fired and natural gas fired power plants. The installed capacity of solids fired power plants falls to just 147.5 GW in 2030 with a share of 17.2% in total installed capacity, compared to 211.2 GW and 19.3% in the Baseline scenario. The fall in natural gas fired plant capacity reaches -27.5% below Baseline levels in 2030, limiting their share to 29.7% of total installed capacity (2.4 percentage points below Baseline levels). Nuclear capacity is also affected accounting in 2030 for 7.6% of total installed capacity from 9.2% in the Baseline scenario. As regards installed capacity of intermittent renewable energy forms, wind turbines capacity declines by 41.6 GW from Baseline levels in 2030 (accounting for 96.3% of the total capacity decline for renewables without biomass/waste). Biomass-waste fired capacity exhibits only a limited decline from Baseline levels in the long run (-2.3% in 2030). Both the shares of intermittent renewable energy forms and biomass-waste fired plants capacities are projected to increase on top of Baseline levels reaching 30.6% and 9.3% of total installed capacity in 2030 (+2.7 and +1.8 percentage points from Baseline levels, respectively).

The changes discussed above are also clearly reflected in the projected evolution of fuel inputs in the electricity and steam generation sector (see Table 1.2-5). The consumption of solid fuels in 2030 is some 40% lower than in the Baseline scenario. The input of gas falls close to 19% below the Baseline level. On the other hand, the use of biomass and waste exhibits only a limited decline in the long run (-2.5% from Baseline levels in 2030). In addition to the reduction in fossil fuel use, strong policies on energy efficiency lead to lower nuclear input to power generation mainly due to lower electricity demand (-35% from Baseline levels in 2030).

The decline of inputs to power generation in the "Energy efficiency" case arises both as a result of lower electricity needs but also because of the adoption of more efficient power generation technologies in the EU-25 energy system. Overall power generation efficiency

reaches 50.7% in 2030 (from 48.6% in the Baseline scenario) with the efficiency of thermal power plants at 48.6% (+1.1 percentage points from Baseline).

Table 1.2-5: Fuel input in the EU-25 power generation sector in the "Energy efficiency" case

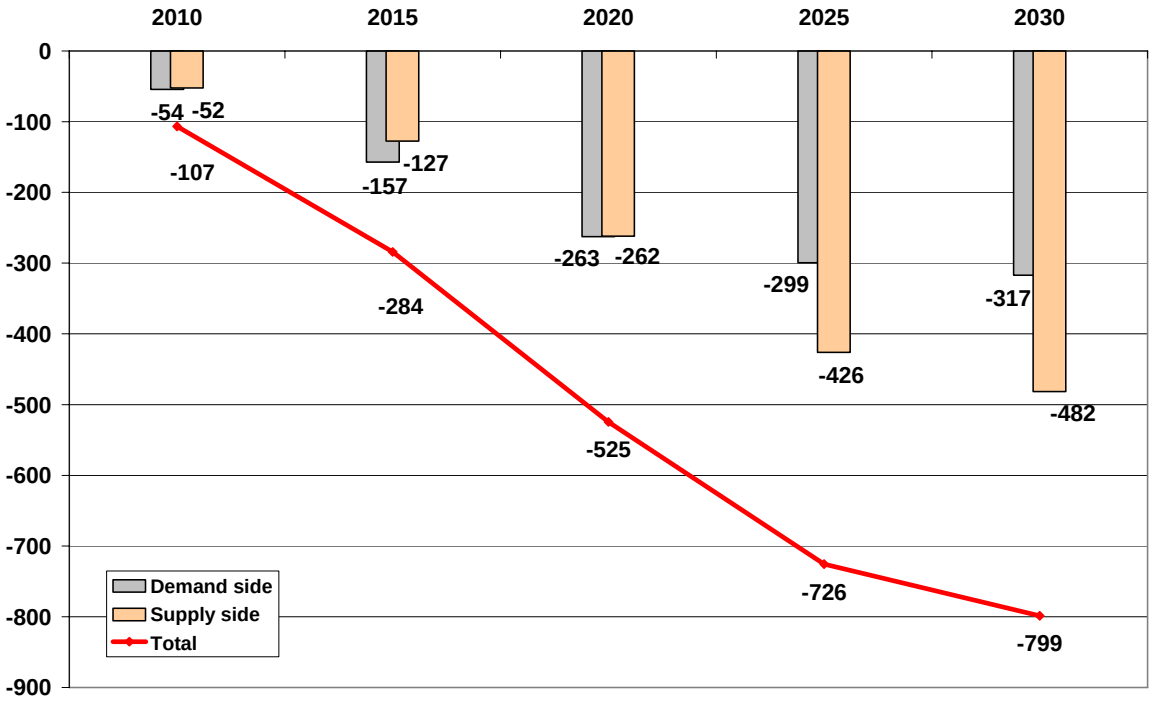
	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solids	214.5	208.0	155.9	142.2	-3.2	-21.4	-40.8
Oil products	41.9	31.8	21.9	22.7	0.6	-5.9	14.8
Gas	105.5	143.9	157.8	126.1	-5.8	-13.6	-18.7
Biomass-waste	21.2	27.0	46.7	67.7	-7.3	-12.8	-2.5
Nuclear energy	237.7	248.8	200.6	137.1	0.0	-12.3	-35.0
Geothermal heat	2.9	3.7	4.6	4.7	0.0	0.0	-10.8
Total	**623.7**	**663.3**	**587.7**	**500.6**	**-2.6**	**-15.0**	**-28.6**
EU15	542.2	572.7	498.6	417.7	-2.5	-14.7	-28.4
NMS	81.5	90.5	89.1	82.8	-3.2	-16.8	-29.6
Mt CO_2 emitted	**1250.0**	**1280.0**	**1070.0**	**942.4**	**-3.6**	**-17.9**	**-32.3**
EU-15	997.8	1017.5	839.8	744.8	-3.6	-18.4	-33.8
NMS	252.2	262.5	230.3	197.6	-3.7	-16.2	-26.2

Source: PRIMES.

1.2.2.4. CO_2 emissions and concluding remarks

The slower growth of electricity requirements, combined with the shift towards carbon free energy forms and the more efficient production of electricity and steam, leads to much lower CO_2 emissions from the power generation sector. CO_2 emissions from this sector decline over the projection period (-3.6% from Baseline levels in 2010 and -32.3% in 2030). In terms of carbon intensity (t of CO_2 emitted per MWh of electricity and steam) improvements reach 0.6% from Baseline levels in 2010 and 15.9% in 2030.

Figure 1.2-3: Changes in CO_2 emissions in EU-25 (diff. from Baseline in Mt CO_2) in the "Energy efficiency" case



Source: PRIMES.

The distribution of CO_2 emissions reduction between the demand and the supply side is illustrated in Figure 1.2-3. In the short to medium term, somewhat higher CO_2 emissions reductions are achieved in the demand side as a result of efficiency measures towards

reducing energy requirements. However, beyond 2020 the role of the supply side becomes increasingly important accounting in 2030 for 60% of overall CO_2 emissions reductions. This result relates to the strong decline for electricity needs in the long term arising from the improved efficiency characteristics and the more rational use of electric appliances under the "Energy efficiency" case assumptions, which in turn allows for a significantly less pronounced comeback of solid fuels in power generation and a higher contribution of carbon free energy forms for power generation compared with Baseline developments.

Concluding, the higher exploitation of energy efficiency options in the EU energy system gives rise to a much more favourable development in the horizon to 2030 compared to the Baseline scenario. Both the demand and the supply side contribute to this direction with primary energy needs declining significantly (-18.6% compared to the Baseline in 2030). However, the import dependency of the EU-25 energy system exhibits a slight worsening from Baseline levels (65.5% in 2030 compared to 64.9% in the Baseline) as the significant decline of electricity requirements in the long term limits the need for new investment in nuclear power plants and the come back of solids in the power generation sector. On the other hand changes in the fuel mix allow for a further improvement of carbon intensity in the EU-25 energy system (+2.0% from Baseline levels in 2030), which in combination to the decreasing energy requirements brings about a much more favourable development in terms of CO_2 emissions in the short and long run. CO_2 emissions in 2010 come back to their 1990 level instead of increasing by 3% in the Baseline. In 2020, emissions are 10% below the 1990 level and in 2030 CO_2 emissions are projected to reach minus 16.4% below the 1990 level – a substantial improvement compared to an increase of CO_2 emissions by +4.7% from 1990 to 2030 in the Baseline scenario.

1.3. The "High renewables" case

1.3.1. EC policies promoting renewable energy forms and modelling approach

In November 1997 the European Commission adopted the Communication "Energy for the Future: Renewable Sources of Energy", a White Paper for a Community Strategy and Action Plan. The purpose of this White Paper is to contribute, by promoting renewable energy sources, to the achievement of overall energy policy objectives: security of supply, environment and competitiveness, and to improve and reinforce environment protection and sustainable development. The White paper put forward the long standing indicative objective of increasing the share of renewables in gross inland consumption to 12% in 2010. The White Paper identified a number of priority actions in the regulatory sectors aimed at overcoming obstacles and redressing the balance in favour of renewable energy, to reach the indicative objective of 12% penetration by 2010. Key areas for promoting renewables include electricity from renewables, biofuels in transport, use of renewables for heating and cooling, economic and fiscal measures, integration of renewables in buildings, and standardisation.

Since the publication of the White Paper, important policy developments, including the Communication on "The share of renewable energy in the EU"[16] of 2004 and the Biomass Action Plan[17] of 2005 have underlined the key role of renewable energy in

[16] Communication from the Commission "The share of renewable energy in the EU", COM(2004) 366 final of 26 May 2004

[17] Communication from the Commission "Biomass action plan", COM(2005) 628 final of 7 December 2005

ensuring sustainable energy supplies for the Community, reinforcing social and economic cohesion, developing European industry and contributing to job creation. The ratification of the Kyoto Protocol and the process of integrating the environment into energy policy will both underpin a greater role of renewables and international co-operation in this field. A renewable energy contribution to sustainability is broadly endorsed at the international level.

Community policies on renewables have resulted in the adoption of the Directives on the promotion of electricity produced from renewable energy sources and on the promotion of biofuels in transport.

The Directive on the promotion of electricity from renewable energy sources in the internal electricity market[18] of 2001 has established a Community framework for electricity from renewable energy sources. The objective is to support a significant medium-term increase of electricity from renewable energy, or "green electricity", in the EU and to facilitate its access to the internal electricity market. The Directive aims to create regulatory certainty for stakeholders, while at the same time respecting the principle of subsidiarity by providing for a wide degree of autonomy to each Member State to allow for their particular circumstances. Member States are obliged to establish national targets for the future consumption of green electricity. These national targets should lead to a 21% indicative share of electricity produced from renewable energy sources in total Community (EU-25) electricity consumption by 2010. A 21% share of electricity from renewables will contribute substantially towards the global indicative target of 12% renewables in gross national energy consumption by 2010. The Directive establishes a basis for the promotion of renewables in the internal electricity market and tackles a number of technical issues, which are fundamental to the further development of green electricity. It thus obliges Member States:

- to introduce accurate and reliable certification of green electricity,
- to assure priority access for green electricity to the electricity grid,
- to check how administrative procedures applicable to the installation of generation plants for green electricity could be streamlined and simplified, and
- to ensure that the calculation of costs for connecting new producers of green electricity to the electricity grid is transparent and non-discriminatory.

The biofuels[19] Directive of 2003 sets out an indicative target that 5.75% of petrol and diesel consumptions come from biofuels in 2010. Other measures on biomass are put forward in the "Biomass Action Plan" and the Commission has announced in its recent Green Paper on sustainable, competitive and secure energy that it will table a Directive on heating and cooling as part of an effective EU policy on renewables. Other ongoing renewables action include RTD, the follow-up of the Biomass Action Plan and considerations of which renewables targets are necessary beyond 2010.

A higher renewables share is also supported by all those measures that reduce energy consumption through higher energy efficiency such as the Directive on the energy performance of buildings, the Directive on the promotion of cogeneration, the Directive on end use energy efficiency and energy services and other measures on energy efficiency including product labelling. Such synergies can be reinforced by amending the

[18] Directive 2001/77/EC of 27 September 2001 on the promotion of the electricity produced from renewable energy sources in the internal electricity market with later additions for accommodating indicative targets for new Member States.

[19] Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels and other renewable fuels for transport (OJEU L123 of 17 May 2003)

buildings Directive to increase incentives for the use of renewable energy. The "Intelligent Energy for Europe Programme" (2003-2006) provides assistance for the better deployment of renewables and energy efficiency in the Community including in the transport sector and extends to developing countries, too. This programme also covers renewables use outside of the electricity and transport sectors, for which no Directive so far exists.

Renewables market penetration is, on average, growing within the EU but it is not yet sufficient. The available statistics show the undeniable take-off of wind energy. They also highlight that expansion rates, higher than the EU average, have been achieved in those Member States with proactive renewable energy policies. Though progress has been made, considerable further efforts will be necessary to achieve the 12% objective.

The biomass sector represents the largest potential in RES. Therefore, specific attention needs to be given to biomass, and the framework conditions should be further improved. The Biomass Action Plan addresses these issues. Solar energy also offers a big potential for further increasing renewables' deployment through solar thermal use, especially for water heating, in the short/medium term and solar photovoltaic in the longer term.

Therefore the "High renewables" scenario analysed in this chapter includes not only the implementation of the electricity and the biofuels Directives, but it also assumes a significant biomass/waste contribution in industry and considerable penetration of solar water heating in the household and tertiary sectors. This scenario aims at quantifying energy system implications of imposing as mandatory a certain numerical target about penetration of renewable energy in the EU energy system at a future period of time, more specifically a 12% renewables share in 2010 further increasing towards the achievement of a renewables share close to 20% in 2020.

In order to reach such a renewables share in the PRIMES modelling, it is necessary to proceed with iterative model runs. Instead of imposing directly an overall target for renewables, it is assumed that a certain positive monetary value is associated with any unit of energy produced by a renewable energy source. Such a monetary value does not necessarily involve direct transfer of payments but its presence alters the economic optimality calculations of the agents (either demanders or producers of energy). This monetary value could be interpreted as a "virtual" subsidy and enters in calculations as a negative unit cost, which is called here a "renewables value"[20]. Being a virtual subsidy, the renewables value does not make energy cheaper but just influences the optimal fuel mix as considered by each economic agent. Renewables values are applied for power generation and all final demand sectors except for transport. In power generation, these values impact on investment and dispatching decisions as they are virtually subtracted from costs for investment, which leads to higher renewables investment and dispatching. However, the costs of renewables are passed on to electricity and heat prices, which are higher in this policy scenario compared with baseline. Compared with the baseline scenario, energy would generally become more expensive, as it is the case with feed-in tariff systems or other ways of renewables promotion. The presence of the renewables value alters the optimality of decisions exactly as if the additional renewables constraint was added to the baseline case. In modelling transport in this scenario, renewables penetrate through enhanced biofuels deployment in a way compatible with the developments in the other sectors.

Model iterations proceed as follows: start with a certain level of renewables value, insert this value into the economic objectives of every agent and country, and run the model for

[20] A similar methodology has been used to simulate global carbon emission constraints with models such as Primes; in these cases a "carbon value" has been used.

all EU countries; calculate the level of overall penetration of renewable energy in the EU and compare against the level of target; if the renewables penetration is lower than the target, then increase renewables value, otherwise decrease; repeat this cycle of model run and compare against target until convergence is reached. Endogenous dynamics of renewable technologies and economies of scale associated with biomass supply infrastructure are taken into account in the modelling, which lead to lower specific biomass supply costs with greater biomass penetration. [21] At convergence, the scenario assumptions are identical with baseline except for the renewable value. By comparing with baseline, evaluation of energy systems implications of the overall EU renewables target is obtained. The marginal cost of the renewables target is exactly equal to renewables value; if plotted against different levels of targets, a marginal renewables penetration cost curve is obtained. Total energy system cost under the high renewables scenario is expected to be higher than at baseline, as explained above.

Following the above described methodology a "renewables value" of 25 €05 per MWh of renewable energy was estimated as the additional incentive needed for both demanders and producers of energy so as to achieve the 12% renewables share in total primary energy needs for 2010. Reaching close to a 20% renewables share in 2020 implies a further increase of this renewables value at 32.5 €05 per MWh. For 2030 the renewables value was set at 35 €05 per MWh in this scenario, reflecting a further intensification of effort in the EU-25 energy system towards the exploitation of renewable energy options.

1.3.2. "High renewables" scenario results for EU-25[22]

1.3.2.1. Overview of main results

The introduction of additional policies and measures for renewables, expressed through the "renewables values" aimed at achieving the 12% and 20% renewables share in 2010 and 2020 respectively lead to significant changes in the future evolution of the fuel mix in the EU-25 energy system. Yet overall primary energy demand remains essentially unchanged from Baseline levels in 2010, exhibiting a limited decline thereafter of -1.8% from Baseline levels in 2030 (see Table 1.3-1). In this scenario energy efficiency follows Baseline trends, thus the limited energy intensity gains occurring in the long run reflect mainly the higher exploitation of wind and other intermittent renewable energy forms (with an attributed efficiency of 100% according to Eurostat conventions). However, there are significant changes in the fuel mix with demand for renewables growing at rates well above those projected in the Baseline scenario (5.2% pa in 2000-2030 compared to 3.0% pa in the Baseline), a growth that occurs to the detriment of all other energy forms.

In 2010, renewable energy forms account for 11.6% of primary energy needs (a rise of +3.6 percentage points from Baseline levels). This increase on top of Baseline occurs mainly to the detriment of solid fuels (accounting from 14.2% of primary energy needs, -1.6 percentage points from Baseline levels) as well as oil and gas (34.9% and 24.5%, respectively, both declining by -1.0 percentage point compared to the Baseline). Nuclear remains unchanged as no investment decisions on new nuclear would be affected in the short term.

[21] If technicoeconomic and fuel supply assumptions were kept identical to those used for baseline scenario, then there would be no additional technology progress as higher penetration levels for renewables are reached. This means that despite higher deployment of renewables unit costs of renewable technologies remain equal to their values as in baseline. Such an assumption would be unrealistic as higher deployment of renewable technologies will enable more technology progress (lower capital costs and higher efficiency in collecting, transporting and processing biomass) as compared with baseline trends.

[22] Aggregate results by group of countries (EU-25, EU-15, NMS, EU-27, EU28 and Europe-30) can be found in Appendix 2.

Table 1.3-1: Primary Energy Demand in EU-25 in the "High renewables" case

	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid Fuels	306.5	257.7	195.8	200.0	-10.2	-24.5	-31.8
Liquid Fuels	634.7	651.6	630.8	585.1	-2.6	-5.8	-8.6
Natural Gas	376.3	443.9	482.3	488.0	-4.0	-8.9	-5.8
Nuclear	237.7	248.8	196.4	140.2	0.0	-14.1	-33.5
Renewable En. Sources	96.5	209.8	359.5	446.3	45.9	83.9	93.3
Total	**1653.8**	**1813.9**	**1866.8**	**1861.7**	**0.1**	**-1.0**	**-1.8**
EU-15	1456.9	1586.0	1607.1	1579.3	-0.1	-1.0	-1.8
NMS	196.9	227.9	259.7	282.3	1.1	-0.7	-1.5
Mt CO_2 emitted	**3674.1**	**3673.9**	**3449.0**	**3352.9**	**-5.4**	**-12.2**	**-15.2**
EU-15	3127.0	3120.6	2940.7	2844.4	-5.2	-10.9	-14.1
NMS	547.1	553.3	508.3	508.5	-6.4	-19.0	-21.0

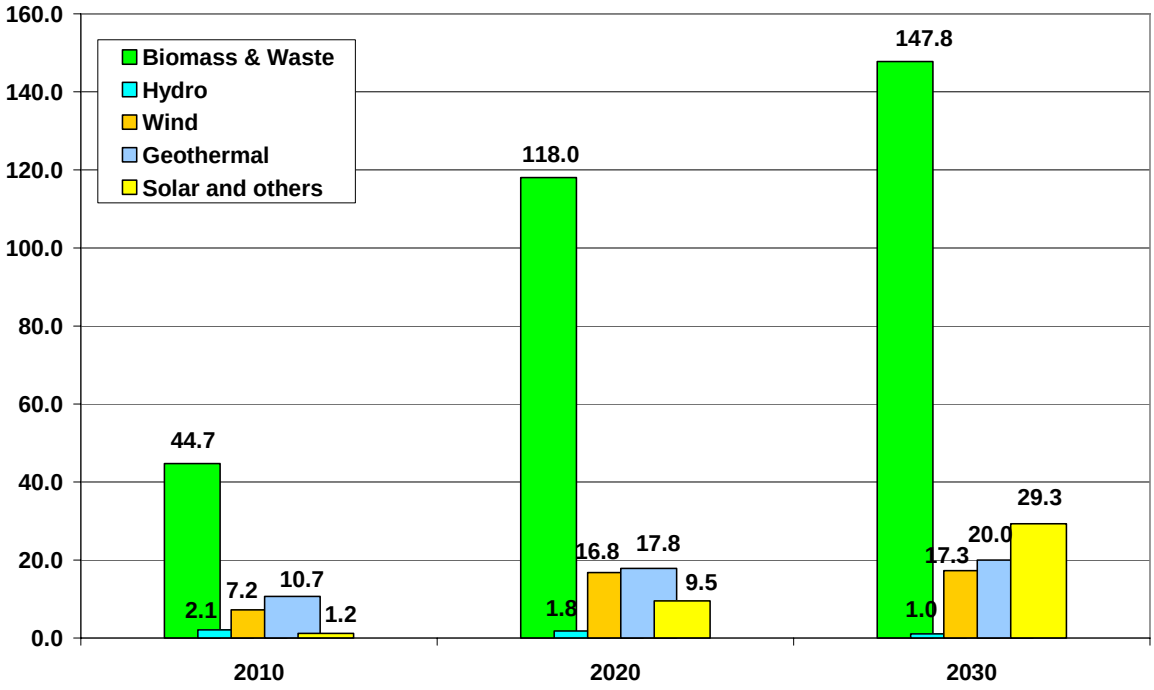
Source: PRIMES.

In 2020, the use of renewables in the EU-25 energy system increases by 84% from Baseline levels with their share reaching 19.3% compared to 10.4% in the Baseline scenario. Demand for solid fuels exhibits again the strongest decline from Baseline levels (-24.5%) followed by nuclear energy (-14.1%), natural gas (-8.9%) and liquid fuels (-5.8%). In 2020 solid fuels account for 10.5% of primary energy needs, liquids for 33.8%, gas for 25.8% and nuclear for 10.5% (-3.3, -1.7, -2.3 and -1.6 percentage points respectively compared to the Baseline scenario).

The assumed further strengthening of promoting policies for renewable energy forms in the horizon to 2030 leads to an increase of their share in primary energy needs up to 24.0% (+11.8 percentage point from Baseline levels in 2030). This further growth for renewables strongly affects nuclear energy and solid fuels (-33.5% and -31.8% respectively compared to the Baseline). The effects on liquid fuels (-8.6%) and natural gas (-5.8%) are less pronounced. The share of nuclear energy in primary energy needs falls to 7.5% (3.6 percentage points below Baseline). The share of solids sinks to 10.6% (-4.7 percentage points), the oil share to 31.4% (-2.4 percentage points) and that of natural gas to 26.2% (-1.1 percentage points).

The higher exploitation of biomass and waste is the key driver for the substantial increase of the renewables share in the "High renewables" case accounting for 67.8% of incremental renewables demand in 2010, 72% in 2020 and 68.6% in 2030 (see Figure 1.3-1). Biomass/waste deployment in the "High renewables" case in 2030 is twice as high as in the Baseline. Besides the higher utilisation of biomass and waste in the power generation sector, the significant increase of biofuels share in gasoline and diesel oil used in the transport sector contributes to this increase. A substantial increase in the long run is also projected for solar energy and geothermal heat, reaching in 2030 levels that are 6.7 and 3.5 times higher than those reached in the Baseline scenario, respectively. The high exploitation of wind energy, already achieved in the Baseline, is further enhanced, in the "High renewables" case with the increase for wind energy reaching 45.5% in 2030 (63.8% in 2020) from Baseline levels. Finally, hydro energy increase by just 3.1% from Baseline levels in 2030 (5.7% in 2020) as a result of environmental restrictions and the already high exploitation of suitable sites in the EU-25 energy system.

Figure 1.3-1: Changes in primary energy demand by renewable energy form in EU-25 (diff. from Baseline in Mtoe) in the "High renewables" case



Source: PRIMES.

The increase in the share of renewable energy forms more than counterbalances the strong decline for nuclear energy in the long run with the share of carbon free energy forms in the EU-25 energy system reaching 25.3% in 2010, 29.8% in 2020 and 31.5% in 2030 (up +3.6, +7.3 and +8.2 percentage points from Baseline levels respectively). In combination to the strong impact that promoting policies for renewable energy forms have on the comeback of solid fuels in the EU-25 energy system, projected to occur under Baseline assumptions in the long run, the "High renewables" case is characterised by significant improvements in carbon intensity (-5.4% from Baseline levels in 2010, -11.3% in 2020 and -13.7% in 2030). In that context CO_2 emissions are projected to decrease by -2.7% from 1990 levels in 2010 (i.e. remaining stable compared to 2000 levels), by -8.7% from 1990 levels in 2020 and by -11.2% from 1990 levels in 2030.

Table 1.3-2: Import dependency in EU-25 in the "High renewables" case

	%				percentage points difference from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid fuels	30.8	43.2	51.1	50.2	-2.9	1.7	-8.8
Liquid fuels	76.4	83.3	92.3	93.3	-0.3	-0.4	-0.5
Natural gas	49.6	61.4	79.7	83.6	-1.3	-1.7	-1.0
Total	**47.2**	**52.1**	**58.2**	**57.8**	**-3.0**	**-5.3**	**-7.1**
EU-15	49.5	53.8	60.3	60.0	-2.7	-5.1	-6.8
NMS	30.1	39.4	45.2	44.9	-4.7	-6.9	-8.8

Source: PRIMES.

The higher exploitation of renewable energy forms (which are indigenously produced in the EU-25) has also a strong impact on the evolution of import dependency for the EU-25 energy system (see Table 1.3-2). In 2010, import dependency is limited to 52.1% compared to 55.1% in the Baseline, increasing to 58.2% in 2020 and declining thereafter to 57.8% in 2030 (5.3 and 7.1 percentage points below Baseline levels, respectively).

1.3.2.2. Final energy demand

In the absence of additional policies towards energy efficiency improvements compared with Baseline, final energy demand in the EU-25 energy system exhibits a slight worsening from Baseline levels (+0.2% in 2010, +0.5% in 2030) as a result of the higher exploitation of biomass and waste options with somewhat lower efficiencies than e.g. gas and electricity at the useful energy level in the demand side but also increasing electricity and steam tariffs (see Table 1.3-3).

Table 1.3-3: Final Energy Demand and CO_2 emission by Sector in EU-25 in the "High renewables" case

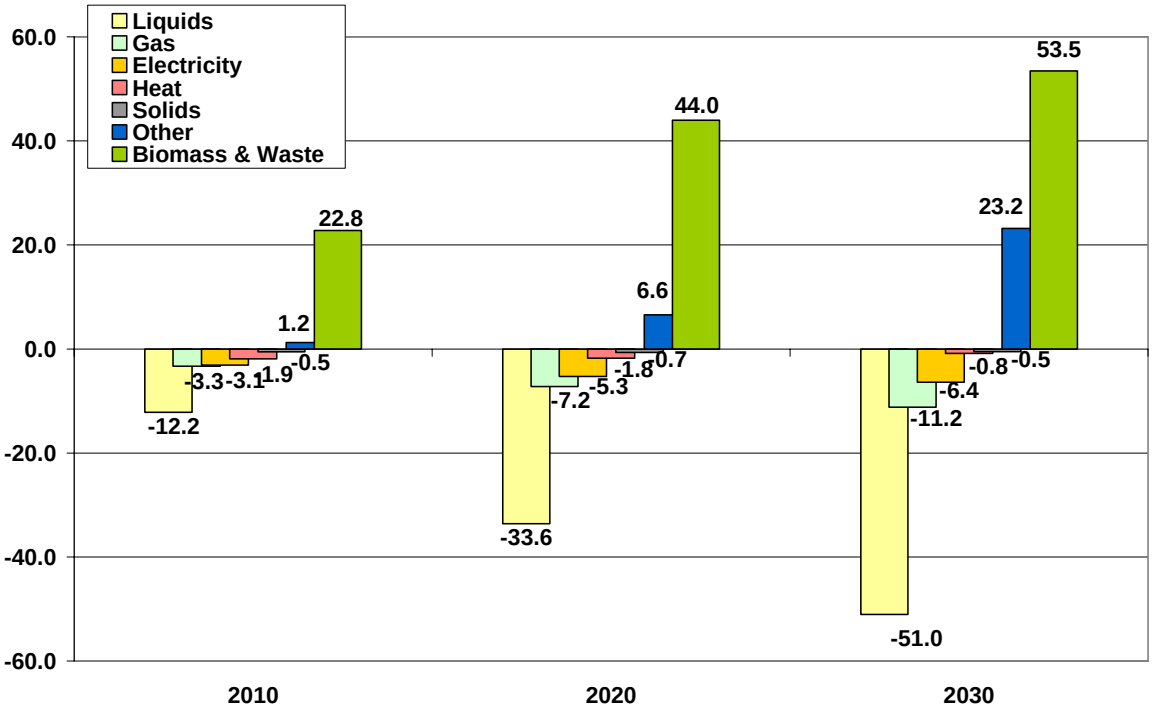
	Mtoe				*% change from baseline*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Industry	330.1	358.9	384.9	393.5	0.7	0.7	0.5
Residential	273.3	312.9	339.9	352.8	0.3	0.3	0.4
Tertiary	159.0	188.0	210.2	228.4	-0.3	-0.8	1.4
Transports	333.0	381.2	405.5	402.3	0.0	0.0	0.0
Total	**1095.4**	**1240.9**	**1340.5**	**1377.1**	**0.2**	**0.1**	**0.5**
EU-15	970.7	1089.4	1157.3	1170.0	0.2	0.2	0.5
NMS	124.7	151.5	183.1	207.1	0.2	-0.1	0.3
	Mt CO_2 emissions				*% change from baseline*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Industry	567.7	558.8	566.7	544.3	-3.2	-4.8	-4.5
Residential	452.1	479.2	490.8	481.9	-0.7	-0.8	-1.0
Tertiary	244.6	260.0	261.2	237.0	-0.7	-5.3	-15.9
Transports	969.9	1051.9	1043.3	986.9	-2.1	-6.5	-9.7
Total	**2234.3**	**2349.9**	**2362.0**	**2250.2**	**-1.9**	**-4.8**	**-7.4**
EU-15	1985.3	2071.3	2053.9	1928.6	-2.0	-5.0	-7.7
NMS	249.0	278.5	308.1	321.6	-1.1	-3.6	-6.1

Source: PRIMES.

Higher use of biomass and waste mainly in industry and of solar thermal panels for water heating in services and households leads to significant changes in the fuel mix (see Figure 1.3-2). Both changes occur mainly to the detriment of natural gas (-1.2% from Baseline levels in 2010, -3.5% in 2030) and liquid fuels (-2.4% in 2010, -10.0% in 2030). Natural gas and liquid fuels lose market share in both industry (mainly through biomass/waste use in industrial boilers) and in services and households (where, for water heating, conventional fuels are replaced by solar thermal panels). In 2030, consumption of biomass and waste is 78.8% higher than in the Baseline scenario (41.8% in 2010). The increase for solar energy is even more pronounced reaching 88.5% in 2010 and it is 7.3 times higher than in the Baseline scenario by 2030. By 2030, biomass and waste account for 8.8% of energy requirements in the demand side (from 5.0 in the Baseline scenario) and solar energy for 1.9% (from 0.3% in the Baseline scenario). The share of liquid fuels (including biofuels blended in gasoline and diesel) is limited to 33.5% (3.9 percentage points below Baseline levels in 2030), the gas share to 22.5% (-0.9 percentage points) and that of electricity to 23.8% (-0.6 percentage points).

Furthermore, the share of biofuels increases significantly in this "High renewables" scenario. Biofuels, blended in gasoline and diesel used in the transport sector, reach a share of 6.4% in 2010, 14.2% in 2020 and 19.1% in 2030 (+2.4 percentage points from Baseline levels in 2010, +7.3 in 2020 and +10.8 in 2030). Taking into account this increased share of biofuels the decline in oil consumption becomes even more pronounced reaching close to -18% from Baseline levels in 2030 with their share limited to 28.9% from 35.4% in the Baseline scenario. In other words the share of biofuels in total final energy demand increases from 2.0% in 2030 under the Baseline scenario assumptions to 4.6% in the "High renewables" case.

Figure 1.3-2: Changes in final energy demand by fuel in EU-25 (diff. from Baseline in Mtoe) in the "High renewables" case



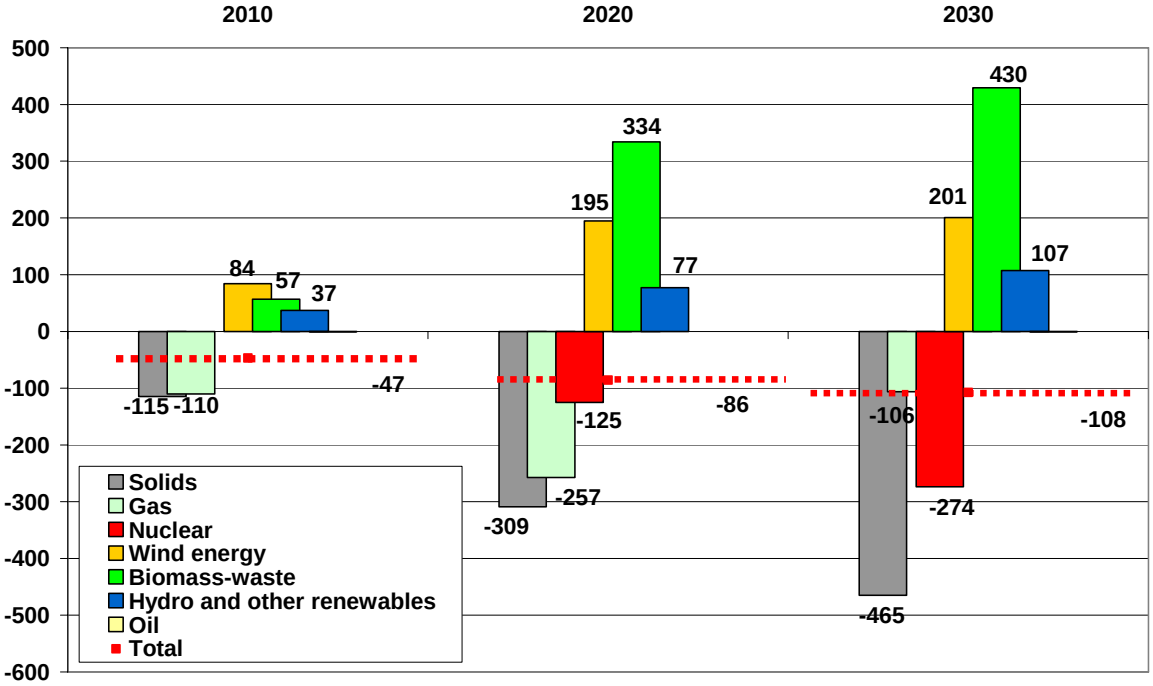
Source: PRIMES.

This trend is also clearly reflected on the evolution of CO_2 emissions in the transport sector, which exhibit a strong decline in the "High renewables case (-2.1% from Baseline levels in 2010, -9.7% in 2030) despite the fact that energy requirements in transport remain unchanged from Baseline levels. An even more pronounced decline of CO_2 emissions is projected for the tertiary sector (-15.9% from Baseline levels in 2030) reflecting the large scope for exploitation of solar energy options, whereas the decline is limited to -4.5% in industry and -1.0% in the residential sector. Total CO_2 emissions in the EU-25 demand side decrease by -1.9% from Baseline levels in 2010, -4.8% in 2020 and -7.4% in 2030.

1.3.2.3. Electricity and steam generation

Significant changes also occur in the electricity and steam generation sector (see Figure 1.3-3). Renewable energy forms increase their market share to the detriment of gas and solid fuels in the "High renewables" case, while overall electricity requirements exhibit a limited decline from Baseline levels (-1.3% in 2010 up to -2.5% in 2030). In absolute terms the most pronounced growth above Baseline levels is projected for the use of biomass and waste in electricity generation (+62.5% in 2010, +121.6% in 2030). The further expansion of wind energy beyond baseline levels is also substantial: +45.9% in 2010 and +45.5% in 2030. Other renewable energy forms exhibit substantial improvement on top of Baseline levels in relative terms with electricity generation from solar energy in 2030 being 9.4 times higher than in the Baseline scenario and that for geothermal heat 4.0 times higher. However, their share in total electricity generation remains rather small (1.9% for solar energy in 2030, 0.7% for geothermal heat). In total, the share of renewable energy forms (including waste) in electricity generation increases to 23.5% in 2010, 39.4 in 2020 and 45.6% in 2030 (5.4, 16 and 18 percentage points above Baseline levels, respectively), with biomass and waste accounting for 40.3% of renewable electricity in 2030, wind energy for 33.0% and hydro for 20.9% (from 18.3%, 33.1% and 46.0% respectively in 2010).

Figure 1.3-3: Changes in electricity generation by energy form in EU-25 (diff. from Baseline in TWh) in the "High renewables" case



Source: PRIMES.

In the short term the increased use of renewable energy forms for electricity generation occurs to the detriment both of natural gas (-12.6% in 2010) and solid fuels (-13.2%). In the long term the decline in solid fuels use becomes significantly more pronounced reaching -38.7% in 2030 compared to -10.4% for natural gas. Electricity generation from nuclear energy is also strongly affected in the long run exhibiting a decline of -33.5% from Baseline levels in 2030.

The above changes are also reflected in the evolution of the installed capacity in EU-25 power generation sector (see Table 1.3-4) with capacity for intermittent renewable energy forms reaching close to 450 GW in 2030 (37.7% of total installed capacity compared to 27.9% in the Baseline scenario). Furthermore biomass-waste fired power plants capacity exceeds 155 GW in 2030 (74 GW more than in the Baseline scenario). In total, power generation capacity using renewable energy forms is projected to account for 50.8% of total installed capacity in 2030 compared to 35.3% in the Baseline (in 2010: 29.7% compared to 25.3%). The most pronounced increase is projected for wind turbines capacity which reaches 275 GW in 2030 (+92.2 GW from Baseline levels accounting for 42.9% of incremental renewables capacity in 2030 compared to 34.5% for biomass-waste power plants). Given that wind energy accounts for just 27.2% of incremental renewable electricity compared to 58.2% for biomass and waste, it is clear that in the context of the "High renewables" case, high cost wind energy options are exploited (involving lower utilisation rates compared to wind energy options undertaken under Baseline assumptions). In combination to the strong growth for solar capacity, this gives rise to a strong increase of overall installed capacity on top of Baseline levels despite the lower electricity requirements projected in the "High renewables" case. As a result the load factor of the power generation sector exhibits a worsening from Baseline levels reaching 41.0% in 2030 (4.4 percentage points lower than in the Baseline scenario).

Table 1.3-4: Installed capacity by plant type in EU-25 in the "High renewables" case

	GW installed				*change from baseline (in GW)*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Nuclear energy	141.1	136.4	111.4	66.9	0.0	-5.5	-34.3
Renewable energy (excl. biomass-waste)	110.1	220.8	348.4	446.6	36.6	106.9	140.7
Hydro (pumping excluded)	97.2	108.1	111.7	113.8	4.2	3.0	1.6
Lakes	52.2	57.4	58.8	59.2	1.4	1.0	0.7
Run of river	45.0	50.7	52.8	54.5	2.8	2.0	0.9
Wind power	12.8	110.8	208.6	275.1	32.4	81.0	92.2
Wind on-shore	12.8	95.2	153.1	177.0	25.1	44.2	38.3
Wind off-shore	0.0	15.7	55.5	98.1	7.4	36.9	53.8
Solar	0.2	1.7	27.7	57.3	0.0	22.8	46.9
Other renewables (tidal etc.)	0.0	0.2	0.4	0.4	0.0	0.0	0.0
Thermal power	410.5	475.5	554.6	671.8	-14.6	-30.0	-17.8
Solids fired	188.9	152.2	112.1	137.6	-4.3	-44.7	-73.6
Oil fired	74.3	64.4	41.9	35.6	-1.6	-6.0	0.7
Gas fired	131.9	228.5	280.2	336.5	-17.0	-41.0	-23.6
Natural gas	119.2	216.6	270.8	328.4	-17.0	-40.9	-23.5
Derived gasses	12.7	11.8	9.4	8.1	0.0	-0.1	-0.1
Biomass-waste fired	14.5	26.7	114.6	155.6	5.9	57.5	74.0
Fuel cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal heat	1.0	3.8	5.8	6.4	2.4	4.2	4.7
Total	**661.7**	**832.8**	**1014.4**	**1185.3**	**22.0**	**71.4**	**88.6**
EU-15	588.1	745.8	894.2	1014.7	21.4	65.7	84.8
NMS	73.7	87.0	120.2	170.6	0.6	5.7	3.8
of which CHP	***113.0***	***144.2***	***207.8***	***249.9***	***-6.7***	***-1.2***	***1.9***
EU-15	*88.5*	*119.4*	*176.4*	*197.5*	*-5.3*	*0.8*	*3.5*
NMS	*24.4*	*24.7*	*31.4*	*52.4*	*-1.4*	*-2.0*	*-1.6*

Source: PRIMES.

The strong penetration of renewable energy forms in the power generation sector has a particularly important impact on solids fired power plants, the installed capacity of which falls to just 137.6 GW in 2030 with a share of 11.6% in total installed capacity (7.7 percentage points lower than in the Baseline). Nuclear capacity is also affected in the long run (-34% from Baseline levels in 2030) accounting in 2030 for 5.6% of total installed capacity from 9.2% in the Baseline scenario. The fall in natural gas fired plant capacity reaches -6.7% below Baseline levels in 2030 (-13.1% in 2020), limiting their share to 28.4% of total installed capacity (4.4 percentage points below Baseline levels).

The increasing exploitation of renewable energy forms in the power generation sector also contributes to an improvement of the overall power generation efficiency with fuel input in power plants declining at rates well above those of electricity generation over the projection period (see Table 1.3-5). The strong penetration of intermittent renewable energy forms and the declining contribution of nuclear energy are the key driver for this result with overall power generation efficiency reaching 50.8% in 2030 (+2.2 percentage points compared to the Baseline scenario). However, the efficiency of thermal power plants is projected to reach only 46% in 2030 compared to 47.5% in the Baseline as biomass and waste fired power plants are less efficient than those that they replace following policies promoting renewable energy forms. Consumption of biomass and waste in power generation increases by 50% in 2010 and more than doubles from Baseline levels in 2020 and 2030. The most pronounced decline from Baseline levels is projected for solid fuels (reaching -38% in 2030) whereas transformation input of natural gas declines at higher rates in the medium term (-19.8% in 2020) than in 2030 (-8.6%). Nuclear also declines substantially in the long run reaching -33.5% from Baseline levels in 2030.

Table 1.3-5: Fuel input in the EU-25 power generation sector in the "High renewables" case

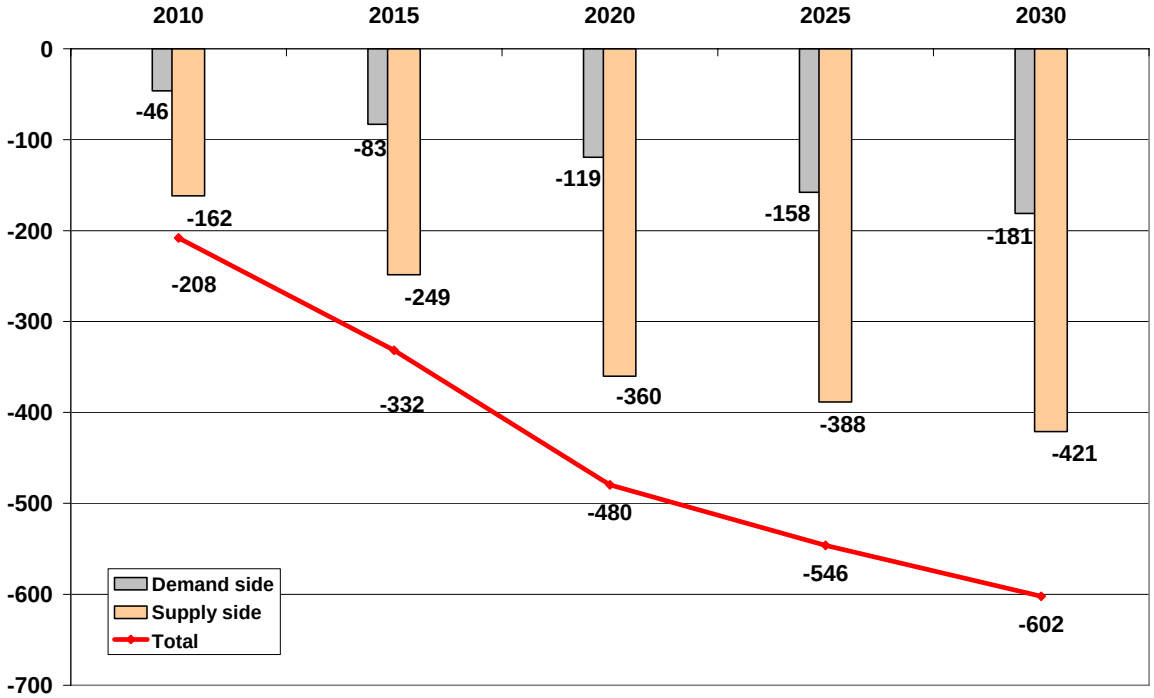
	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solids	214.5	188.1	136.8	149.0	-12.5	-31.1	-38.0
Oil products	41.9	32.4	23.4	20.7	2.4	0.5	4.8
Gas	105.5	138.4	146.5	141.9	-9.4	-19.8	-8.6
Biomass-waste	21.2	44.0	114.0	147.2	50.9	112.7	112.0
Nuclear energy	237.7	248.8	196.4	140.2	0.0	-14.1	-33.5
Geothermal heat	2.9	14.4	22.4	25.2	290.1	386.4	379.3
Total	**623.7**	**666.0**	**639.5**	**624.2**	**-2.2**	**-7.5**	**-10.9**
EU15	542.2	571.9	537.8	515.6	-2.7	-8.0	-11.6
NMS	81.5	94.2	101.7	108.6	0.7	-4.9	-7.7
Mt CO_2 emitted	**1250.0**	**1188.2**	**971.5**	**1002.7**	**-10.5**	**-25.5**	**-28.0**
EU-15	997.8	943.3	793.4	835.3	-10.6	-22.9	-25.7
NMS	252.2	245.0	178.1	167.4	-10.1	-35.2	-37.5

Source: PRIMES.

1.3.2.4. CO_2 emissions and concluding remarks

The projected changes in the fuel mix lead to CO_2 emissions reduction from the power generation sector of -10.5% from Baseline levels in 2010 and -28.0% in 2030 with improvements in terms of carbon intensity reaching 11.1% from Baseline levels in 2010 and 27.9% in 2030. In the presence of policies promoting renewable energy forms CO_2 emissions from the power generation sector remain well below 2000 levels over the projection period with reductions from Baseline levels being about 4 times higher than in the demand side in 2010 and still more than twice as high in 2030. Thus, in 2010 the supply side accounts for 78% of total CO_2 emissions reduction achieved from Baseline levels, a share dropping to 70% by 2030 (see Figure 1.3-4).

Figure 1.3-4: Changes in CO_2 emissions in EU-25 (diff. from Baseline in Mt CO_2) in the "High renewables" case



Source: PRIMES.

Total CO_2 emissions are over 200 mill.t lower than Baseline in 2010 and over 600 mill.t lower in 2030. Compared to the Kyoto base-year 1990, CO_2 emissions decrease to minus

3% in 2010 (instead of increasing 3% in the Baseline) and to minus 11% in 2030 (instead of growing by 5% in the absence of strong renewables policies).

Concluding, the "High renewables" case is characterised by a substantial shift towards the use of renewable energy forms that, despite the limited energy intensity gains (-1.8% from Baseline levels in 2030) allow for a much more favourable development of the EU-25 energy system in the horizon to 2030 both in terms of import dependency (57.8% in 2030 compared to 64.9% in the Baseline) as well as in terms of CO_2 emissions that remain below 1990 levels over the projection period (-2.7% in 2010, -11.2% in 2030).

1.3.3. "12% renewables share in 2010" scenario results for EU-25[23]

The "12% renewables share in 2010" case exploits the evolution of the EU-25 energy system in the horizon to 2030 with supporting policies for renewable energy forms remaining constant over the projection period at the levels needed for the achievement of a 12% share for renewable energy forms in 2010 (i.e. the "renewables value" of 25 €05 per MWh is kept constant in 2010-2030).

Table 1.3-6: Evolution of primary energy needs in the EU-25 energy system in the "12% renewables share in 2010" case

	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid Fuels	306.5	258.2	203.1	215.7	-10.0	-21.7	-26.4
Liquid Fuels	634.7	652.6	648.3	613.4	-2.4	-3.2	-4.2
Natural Gas	376.3	442.8	489.4	495.8	-4.2	-7.6	-4.3
Nuclear	237.7	248.8	205.8	156.7	0.0	-10.0	-25.7
Renewable En. Sources	96.5	208.9	322.8	378.5	45.3	65.1	64.0
Total	**1653.8**	**1813.5**	**1871.6**	**1862.3**	**0.1**	**-0.7**	**-1.7**
EU-15	1456.9	1585.8	1611.7	1579.1	-0.1	-0.7	-1.8
NMS	196.9	227.7	259.8	283.1	1.0	-0.6	-1.3
Mt CO_2 emitted	**3674.1**	**3677.0**	**3547.7**	**3518.2**	**-5.3**	**-9.7**	**-11.0**
EU-15	3127.0	3124.1	3019.8	2975.5	-5.1	-8.5	-10.1
NMS	547.1	552.9	527.8	542.7	-6.5	-15.9	-15.7

Source: PRIMES.

As was the case in the "High renewables" scenario, overall primary energy needs in the EU-25 energy system exhibit only a limited decline from Baseline levels (see Table 1.3-6).[24] Nevertheless, demand for renewable energy forms exhibits a strong growth on top of baseline levels over the projection period (+45.3% in 2010, +64.0% in 2030) while a decline of energy requirements for all other energy forms is projected. In the short term, the most pronounced changes occur in the use of solid fuels and natural gas (-10.0% and -4.2 % from Baseline levels in 2010 respectively). In the long term the use of solids is most affected (-26.4% in 2030) followed by nuclear energy (-25.7%). With renewables promotion there is less replacement of nuclear by such plants at the end of their lifetime. The bulk of the increase in renewable energy use is for biomass/waste (67.8% of incremental demand for renewables in 2010, 66.9% in 2030), whereas the contribution of other renewable energy sources, such as hydro, wind, solar and geothermal energy, is

[23] Aggregate results by group of countries (EU-25, EU-15, NMS, EU-27, EU28 and Europe-30) can be found in Appendix 3.

[24] It should be noted that results for 2010 are slightly different to those of the "High renewables" case despite the fact that the same "renewables value" is introduced for that year. This is explained by the inter-temporal character of the power generation sector model due to which investment decisions are not only affected by prevailing assumptions in a specific year but through expectations of investors also by the overall policy approach in the specific scenario (i.e. existence of signals for strengthening renewables promotion, such as targets, or their absence). Thus, with different "renewables values" beyond 2010 for the "12% renewables share in 2010" to the "High renewables" case the results for 2010 are also affected.

less pronounced. The high exploitation of the large potential of biomass/waste in the EU-25 energy system, especially in power and steam generation, as well as in biofuels production, is the key driver for this result.

The share of renewable energy forms reaches 11.5% in 2010, 17.2% in 2020 and 20.3% in 2030 (compared with 7.4%, 10.4 and 12.2% respectively in the Baseline scenario). These changes also influence the projected evolution of CO_2 emissions from the EU-25 energy system. In 2010, CO_2 emissions in the "12% renewables share in 2010" case are projected to be -5.3% below Baseline levels (-11.0% in 2030). Import dependency also improves somewhat, being limited to 52.1% in 2010 (-3.0 percentage points from Baseline levels) and 60.1% in 2030 (compared to 64.9% in the Baseline scenario).

The demand side also undergoes some significant changes from Baseline levels. While final energy demand exhibits a slight growth on top of Baseline levels (+0.2% in 2010, +0.1% in 2030) policies stimulating the use of renewable energy lead to changes in the fuel mix with higher use of biomass and waste as well as solar energy occurring to the detriment of all other energy forms. Furthermore, the share of biofuels increases significantly in this "12% renewables share in 2010" case. Biofuels reach shares of 6.4% in 2010 and 13.1% in 2030. The corresponding shares in the Baseline scenario are 3.9% in 2010 and 8.3% in 2030.

The projected changes in the fuel mix on the demand side towards the use of less carbon intensive energy forms lead to a reduction of CO_2 emissions by -1.9% from Baseline levels in 2010 and -3.7% in 2030. In the short term the biggest improvement in carbon intensity occurs in industry (-3.0% from Baseline levels in 2010). Transport related CO_2 emissions are projected to be -2.1% below Baseline levels in 2010, due to the higher exploitation of the biofuels potential. In the long term the tertiary sector experiences the largest decline from Baseline levels in CO_2 emissions (-6.4% in 2030) as a result of the substantial increase in the use of solar energy.

Significant changes also occur in the electricity and steam generation sector. Renewable energy forms increase their market share to the detriment of gas and solid fuels in the "12% renewables share in 2010" case, while overall electricity requirements are slightly lower than those in the Baseline scenario. Nuclear energy is also strongly affected in the long run. The most pronounced growth above Baseline levels in relative terms is projected for solar energy and geothermal heat with electricity generation from these energy forms in 2030 reaching 7.3 and 3 times higher from Baseline levels. However, their share in total electricity generation remains small reaching 1.5% for solar energy and 0.7% for geothermal heat in 2030 (+1.3 and +0.5 percentage points above Baseline levels respectively). The use of biomass and waste in electricity generation exhibits the highest growth in absolute terms (+61.7% in 2010, +90.3% in 2030), whereas expansion in the use of wind energy is limited to +45.7% in 2010 and +41.5% in 2030 reflecting the strong penetration already achieved in the Baseline. In the short term the increased use of renewable energy forms for electricity generation purposes occurs to the detriment both of natural gas (-12.7% in 2010) and solid fuels (-12.8%). In the long term the decline in solid fuels use reaches -31.9% in 2030 compared to -8.3% for natural gas. A strong decline is also projected for nuclear energy (-25.7% from Baseline levels in 2030). The above changes lead to a significant increase of the share of renewable energy in electricity generation reaching 23.5% in 2010 and 42.0% in 2030 (+5.4 and +14.4 percentage points from Baseline levels respectively). Furthermore, the projected changes in the fuel mix lead to CO_2 emissions reduction from the power generation sector of -10.4% from Baseline levels in 2010 and -22.9% in 2030.

Overall CO_2 reduction compared with Baseline derives mostly from changes on the supply side over the projection period (77.9% of total CO_2 reduction in 2010, 79.4% in 2030). CO_2 emissions in absolute terms exhibit a continuous decline from 1990 levels in the period to 2030 (-2.6% in 2010, -6.1% in 2020 and -6.8% in 2030).

Concluding, the "12% renewables share in 2010" case is characterised by similar trends to those discussed earlier for the "High renewables" case, however, less pronounced ones as supporting policies for renewable energy forms remain stable at 2010 levels in the horizon to 2030. With primary energy requirements exhibiting only a slight decline from Baseline levels, bringing nevertheless a slight improvement in energy intensity, the changes in the fuel mix towards renewable energy forms allow for significant improvements both regarding the evolution of CO_2 emissions and the import dependency of the EU-25 energy system. For example, CO_2 emissions in 2030 are down 7% from their 1990 level in the "12% renewables share in 2010" case, whereas they decrease 11% below 1990 in the "High renewables" case. Import dependency in 2030 would be limited to 60% in the "12% renewables share in 2010" case, whereas it reaches only 58% in the "High renewables" case. On the other hand, costs are higher in long run for the "High renewables" case, mirrored by a renewables value of 35 €05/MWh in 2030 compared to 25 €05/MWh in the "12% renewables share in 2010" case.

1.4. The "Combined high renewables and efficiency" case

1.4.1. Modelling approach

This scenario aims at simulating the energy and environment effects (in terms of CO_2 emissions) of successfully implementing strong policies for both energy efficiency and renewables as far as such measures can be modelled. The policies included relate to those discussed earlier on the "Energy efficiency" and the "High renewables" case. In the approach retained, the "Energy efficiency and high renewables case" combines the assumptions of the above mentioned cases, focusing on exploring the possible synergies and trade-offs of policies promoting energy efficiency and renewable energy forms simultaneously, regardless of any specific targets (for example rather than revising the "renewables value" so as to achieve a 12% renewables share in 2010 and 20% share in 2020, it is kept as in the "High renewables" case).

1.4.2. "Combined high renewables and efficiency" scenario results for EU-25[25]

1.4.2.1. Overview of main results

The combination of policies promoting energy efficiency and renewable energy forms leads to a significantly different evolution of the EU-25 energy system in comparison to the Baseline scenario (see Table 1.4-1). In 2010, primary energy needs in the "Combined high renewables and efficiency" case are projected to be 2.8% below Baseline levels. This decrease is even more pronounced in the long run (-19.9% in 2030). As was the case in the "Energy efficiency" case, beyond 2010 total energy consumption declines not only relative to Baseline but also in absolute terms (-0.7% pa in 2010-2030) reaching -2.5% from 1990 levels by 2030. In 2030, total energy requirements would be -2.5% lower than they had been in 1990. This compares to a decline of -0.9% in 1990-2030 achieved in the "Energy efficiency" case reflecting the higher transformation efficiency of e.g. wind in power generation.

[25] Aggregate results by group of countries (EU-25, EU-15, NMS, EU-27, EU28 and Europe-30) can be found in Appendix 4.

Table 1.4-1: Primary Energy Demand in EU-25 in the "Combined high renewables and efficiency" case

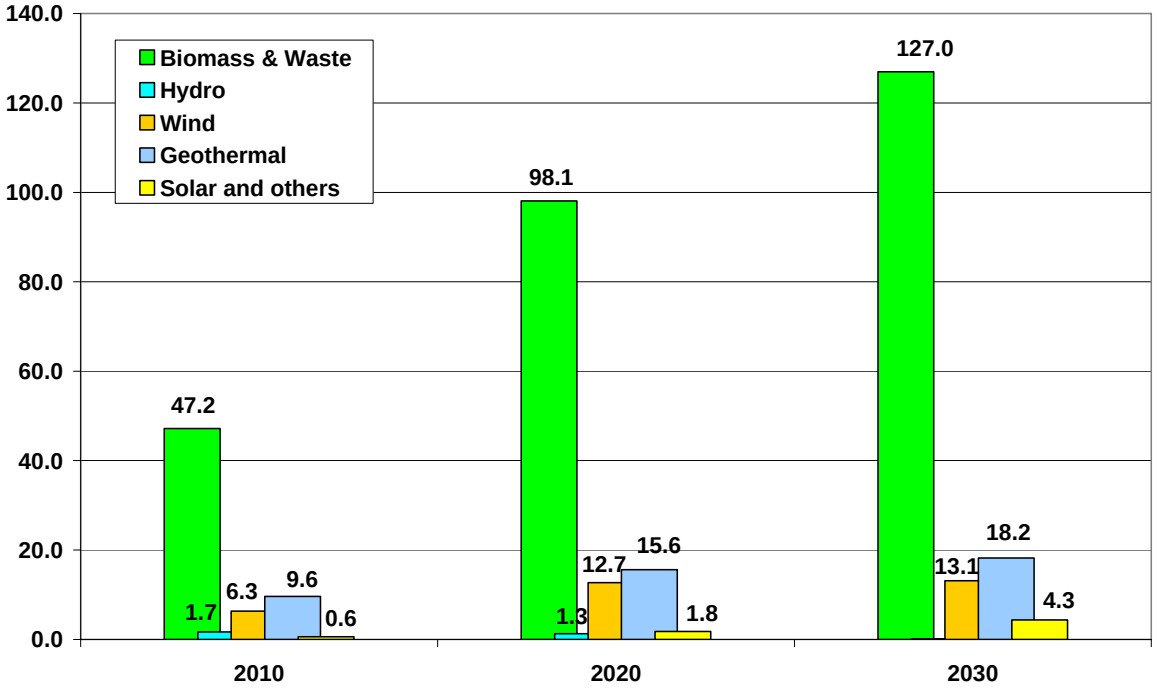
	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid Fuels	306.5	246.0	156.9	124.5	-14.2	-39.5	-57.5
Liquid Fuels	634.7	637.7	574.9	529.8	-4.6	-14.2	-17.3
Natural Gas	376.3	417.8	413.7	394.3	-9.6	-21.9	-23.9
Nuclear	237.7	248.8	161.5	73.5	0.0	-29.4	-65.1
Renewable En. Sources	96.5	209.2	324.9	393.7	45.5	66.2	70.5
Total	**1653.8**	**1761.6**	**1633.4**	**1517.5**	**-2.8**	**-13.4**	**-19.9**
EU-15	1456.9	1543.0	1411.1	1293.1	-2.8	-13.1	-19.6
NMS	196.9	218.6	222.4	224.4	-3.1	-15.0	-21.7
Mt CO_2 emitted	**3674.1**	**3524.1**	**2968.8**	**2669.5**	**-9.2**	**-24.4**	**-32.5**
EU-15	3127.0	2990.7	2543.3	2300.1	-9.1	-23.0	-30.5
NMS	547.1	533.4	425.5	369.4	-9.8	-32.2	-42.6

Source: PRIMES.

Lower energy requirements combined with additional policies and measures for renewables allow for a growth of the renewables share in primary energy needs at rates above those projected in the "High renewables" case, despite the less pronounced growth of renewables consumption in absolute terms (reaching 394 Mtoe in 2030 compared to 446 Mtoe in the "High renewables" case). Thus, in 2010 renewables are projected to account for 11.9% of primary energy needs in the EU-25 energy system, a share rising to 19.9% in 2020 and reaching 25.9% in 2030 (from 11.6%, 19.3% and 24%, respectively, in the "High renewables" case). Demand for all other energy forms is projected to decline from Baseline levels with the impacts in the short run being more pronounced for solids and natural gas (-14.2% and -9.6% respectively from Baseline levels in 2010). In the long run, nuclear energy (-65.1% from Baseline levels in 2030) and solids (-57.5%) decline most following strong combined policies on energy efficiency and renewables. The more than pronounced decline in nuclear, following a substantial reduction in electricity demand, limits the share of carbon free energy forms in primary energy needs to 30.8% in 2030 (from 26% in 2010 and 29.8% in 2020). In the "High renewables" case the share of carbon free energy forms increased from 25.3% in 2010 up to 29.8% in 2020 and 31.5% in 2030.

Carbon intensity of the EU-25 energy system improves by 6.6% from Baseline levels in 2010, 12.8% in 2020 and 15.7% in 2030 as a result of the changes in the fuel mix occurring in the "Combined high renewables and efficiency" cases. This, in combination to the much lower energy requirements in the EU-25 energy system leads to a strong decline of CO_2 emissions which are projected to reach -9.2% from Baseline levels in 2010 and -32.5% in 2030. Compared to 1990 levels, CO_2 emissions are reduced by -6.7% in 2010, by -21.4% in 2020 and by -29.3% in 2030. This illustrates clearly that pursuing simultaneously strong policies towards energy efficiency and renewables allows for a much more favourable development of CO_2 emissions, especially in the long run.

Figure 1.4-1: Changes in primary energy demand by renewable energy form in EU-25 (diff. from Baseline in Mtoe) in the "Combined high renewables and efficiency" case



Source: PRIMES.

Biomass and waste have a predominant role in the increase of the renewables share accounting for 72% and 78% of incremental renewables demand in 2010 and 2030, respectively (see Figure 1.4-1). Geothermal heat also increases substantially (+317% from Baseline levels in 2030), followed by solar energy (+99% in 2030) and wind energy (+34.6% in 2030), while hydro exhibits a limited growth on top of Baseline levels in the short to medium term, reaching a levels almost identical to those of the Baseline scenario in the long run.

Table 1.4-2: Import dependency in EU-25 in the "Combined high renewables and efficiency" case

	%				percentage points difference from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid fuels	30.8	43.8	49.9	55.8	-2.3	0.4	-3.2
Liquid fuels	76.4	83.0	91.9	92.8	-0.6	-0.8	-1.0
Natural gas	49.6	59.9	76.5	80.2	-2.8	-5.0	-4.3
Total	**47.2**	**51.4**	**57.7**	**59.2**	**-3.7**	**-5.8**	**-5.7**
EU-15	49.5	53.3	59.7	61.3	-3.3	-5.7	-5.5
NMS	30.1	37.7	44.7	46.1	-6.4	-7.3	-7.7

Source: PRIMES.

Finally, in the "Combined high renewables and efficiency" case, the EU-25 energy system import dependency is also projected to improve from Baseline levels being limited to 51.4% in 2010 (-3.7 percentage points from Baseline levels) and 59.2% in 2030 from 64.9% in the Baseline scenario (see Table 1.4-2).

1.4.2.2. Final energy demand

In the presence of policies towards energy efficiency, energy requirements in the demand side decline substantially from Baseline levels; up to -15.6% in 2030 (see Table 1.4-3). With the drivers being the same as those discussed in the "Energy efficiency" case the highest energy intensity gains are projected for the tertiary sector (-32.3% from Baseline levels in 2030) followed by the residential sector, the transport sector and industry.

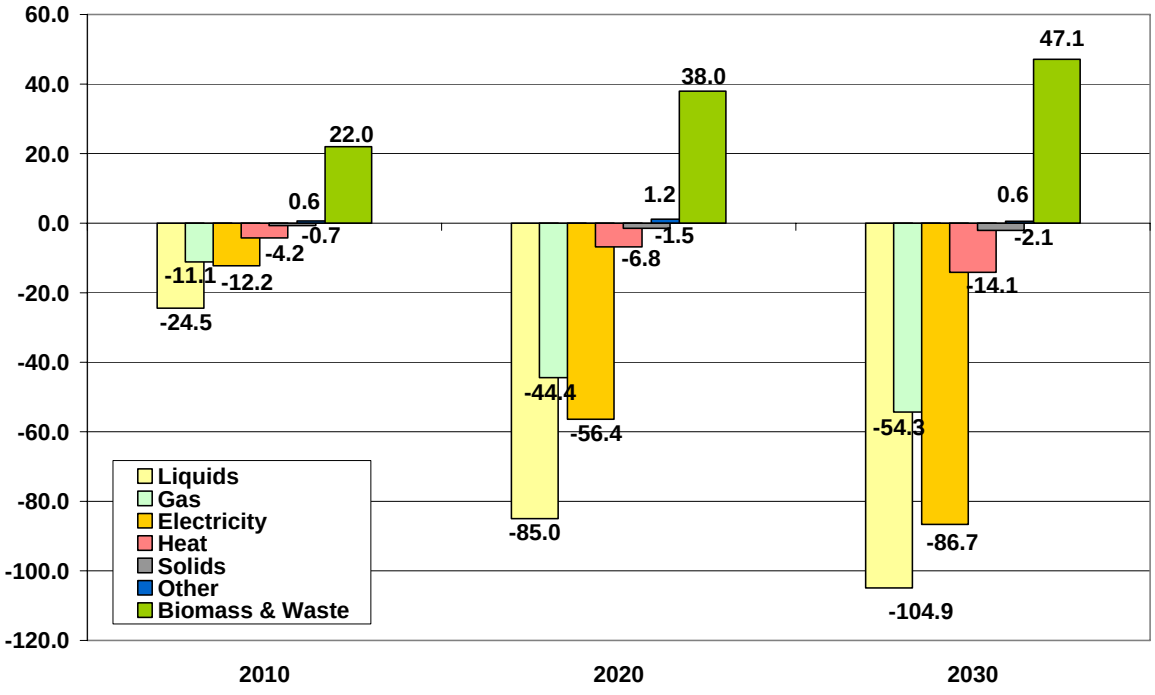
Table 1.4-3: Final Energy Demand and CO_2 emission by Sector in EU-25 in the "Combined high renewables and efficiency" case

	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Industry	330.1	356.7	373.0	384.7	0.1	-2.5	-1.8
Residential	273.3	303.2	278.8	260.3	-2.8	-17.7	-25.9
Tertiary	159.0	175.0	164.0	152.6	-7.1	-22.6	-32.3
Transports	333.0	373.0	367.8	358.5	-2.1	-9.3	-10.9
Total	**1095.4**	**1207.9**	**1183.5**	**1156.1**	**-2.4**	**-11.6**	**-15.6**
EU-15	970.7	1061.0	1026.4	990.8	-2.4	-11.1	-14.9
NMS	124.7	146.9	157.1	165.2	-2.9	-14.3	-20.0
	Mt CO_2 emissions				*% change from baseline*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Industry	567.7	554.2	542.6	534.4	-3.9	-8.8	-6.2
Residential	452.1	465.1	411.7	370.0	-3.6	-16.8	-24.0
Tertiary	244.6	246.7	232.8	221.0	-5.8	-15.6	-21.6
Transports	969.9	1028.3	930.8	856.8	-4.3	-16.6	-21.6
Total	**2234.3**	**2294.3**	**2117.9**	**1982.2**	**-4.3**	**-14.6**	**-18.5**
EU-15	1985.3	2021.7	1842.1	1704.2	-4.4	-14.8	-18.4
NMS	249.0	272.6	275.8	278.1	-3.2	-13.7	-18.8

Source: PRIMES.

However, while in the "Energy efficiency" case a worsening of carbon intensity from Baseline levels was projected for the demand side, in the "Combined high renewables and efficiency" case supporting policies for renewable energy forms allow for an improvement of carbon intensity compared to the Baseline scenario leading to a reduction of CO_2 emissions at rates higher than the decrease of final energy demand (up to -18.5% in 2030). The higher penetration of biomass and waste in the demand side, including the increased share of biofuels used in the transport sector, more than counterbalances the declining energy requirements for electricity and distributed steam, which are carbon free energies at the point of use (see Figure 1.4-2).

Figure 1.4-2: Changes in final energy demand by fuel in EU-25 (diff. from Baseline in Mtoe) in the "Combined high renewables and efficiency" case



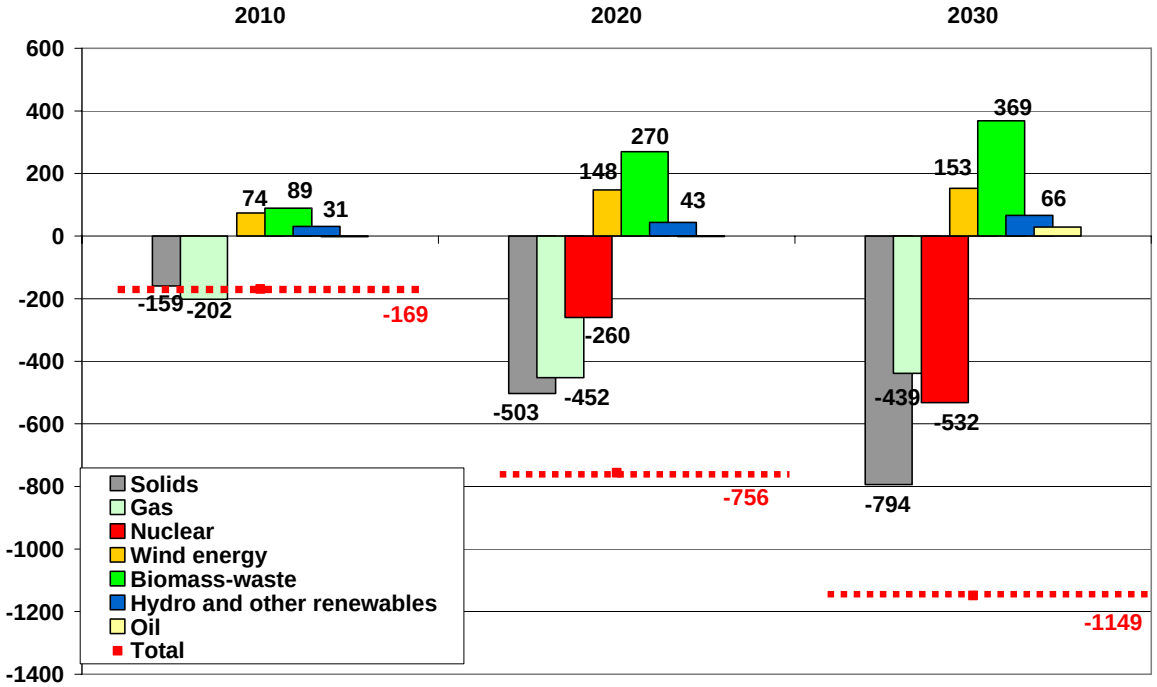
Source: PRIMES.

In 2030, biomass and waste account for close to 10% of energy requirements in the demand side (+5 percentage points from Baseline levels), an increase in market share that occurs mainly to the detriment of electricity (-3 percentage points from Baseline levels in 2030) and liquids (-2 percentage points). In the presence of energy efficiency measures, solar energy is projected to make significantly slower inroads than in the "High renewables" case given lower electricity demand (+16.6% from Baseline levels in 2030 from +45.5% in 2010, with the corresponding figures in the "High renewables" case being +88.5% in 2010 and +632% in 2030). The share of biofuels increases significantly reaching 6.4% of gasoline and diesel used in the transport sector, and 20.9% in 2030 (from 6.4% in 2010 and 19.1 in 2030 for the "High renewables" case). This is also reflected on the evolution of CO_2 emissions in the transport sector, which decline at rates well above the corresponding decline in energy requirements (with a percentage decrease of CO_2 from Baseline almost twice as high in 2030). A carbon intensity improvement is also projected for industrial sectors (driven by the above mentioned higher exploitation of biomass and waste options) with CO_2 emissions in 2030 declining by -6.2% from Baseline levels compared to a decline of energy demand by -1.8%. On the contrary, in the tertiary and the residential sector carbon intensity worsens from Baseline levels as the decline in electricity requirements is not counterbalanced by the further deployment of solar energy in these sectors.

1.4.2.3. Electricity and steam generation

In the "Combined high renewables and efficiency" case electricity production is projected to decline by -4.8% from Baseline levels in 2010 and -26.3% in 2030, a decline driven by the exploitation of energy efficiency options in the demand side. In combination to policies promoting renewable energy forms the structure of the power generation sector of the EU-25 energy system undergoes significant changes in comparison to the Baseline scenario (see Figure 1.4-3).

Figure 1.4-3: Changes in electricity generation by energy form in EU-25 (diff. from Baseline in TWh) in the "Combined high renewables and efficiency" case



Source: PRIMES.

Renewable electricity accounts for 24.8% of total electricity generation in 2010 with its share rising to a remarkable 55.7% in 2030 (+6.8 and +28.1 percentage points from

Baseline levels respectively, +1.4 and +10.1 percentage points from "High renewables" case levels respectively). Solar and wind would account for 20.1% of electricity generation in 2030 with 35.6% covered by biomass, waste, geothermal and hydro. Biomass and waste account for 46% of incremental renewables electricity compared to the Baseline in 2010, a share increasing to 63% in 2030. The corresponding shares for wind energy are 38% in 2010 and 26% in 2030, whereas some significant inroads are also projected for geothermal heat in the short to medium term and solar energy in the long run.

Electricity generation from fossil fuels is strongly affected. The most pronounced impact in the short run is projected for natural gas (share declining by -4.7 percentage points from Baseline levels in 2010), the corresponding decline for solids reaching -3.5 percentage points. In the long run the share of solid fuels in total electricity generation is limited to 12.7% in 2030 (-14.8 percentage points from Baseline levels) with that of gas reaching 17.9% (-5.3 percentage points from Baseline levels). As regards nuclear energy, lower electricity requirements in 2010 lead to an increase of its share in total electricity generation from 27.7% in the Baseline scenario up to 29.1% in the "Combined high renewables and efficiency" case. In the long run this trend is reversed, with electricity generation from nuclear power plants in 2030 reaching only 8.9% of total electricity generation compared to 18.7% in the Baseline scenario.

Cogeneration of electricity and steam is also favoured in the "Combined high renewables and efficiency" case with electricity generation from cogeneration units reaching 19.4% in 2010 (+1.4 percentage points from Baseline levels) and 35.8% in 2030 (+11.5 percentage points).

Table 1.4-4: Installed capacity by plant type in EU-25 in the "Combined high renewables and efficiency" case

	GW installed				*change from baseline (in GW)*		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Nuclear energy	141.1	136.4	105.8	40.4	0.0	-11.1	-60.8
Renewable energy (excl. biomass-waste)	110.1	215.3	312.7	403.9	31.1	71.2	97.9
Hydro (pumping excluded)	97.2	106.9	110.5	112.6	3.0	1.9	0.4
Lakes	52.2	57.4	58.8	59.2	1.4	1.0	0.7
Run of river	45.0	49.5	51.7	53.4	1.6	0.9	-0.3
Wind power	12.8	106.5	190.1	252.1	28.1	62.5	69.2
Wind on-shore	12.8	93.3	140.2	164.2	23.2	31.2	25.6
Wind off-shore	0.0	13.2	50.0	87.9	4.9	31.3	43.6
Solar	0.2	1.7	11.7	38.7	0.0	6.8	28.4
Other renewables (tidal etc.)	0.0	0.2	0.4	0.4	0.0	0.0	0.0
Thermal power	410.5	471.0	476.4	515.1	-19.1	-108.1	-174.5
Solids fired	188.9	152.5	91.4	90.9	-4.1	-65.4	-120.3
Oil fired	74.3	61.8	48.0	39.6	-4.3	0.1	4.7
Gas fired	131.9	219.1	233.5	233.6	-26.3	-87.7	-126.6
Natural gas	119.2	207.3	223.9	226.7	-26.3	-87.8	-125.2
Derived gasses	12.7	11.8	9.6	6.8	0.0	0.1	-1.3
Biomass-waste fired	14.5	34.1	98.3	145.0	13.4	41.2	63.4
Fuel cells	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal heat	1.0	3.6	5.3	6.0	2.2	3.7	4.4
Total	**661.7**	**822.7**	**895.0**	**959.4**	**12.0**	**-48.0**	**-137.3**
EU-15	588.1	735.4	795.9	834.2	11.0	-32.6	-95.8
NMS	73.7	87.4	99.1	125.2	1.0	-15.4	-41.5
of which CHP	***113.0***	***149.3***	***195.3***	***241.1***	***-1.6***	***-13.7***	***-6.9***
EU-15	*88.5*	*122.7*	*165.5*	*196.5*	*-2.0*	*-10.0*	*2.5*
NMS	*24.4*	*26.6*	*29.7*	*44.6*	*0.4*	*-3.7*	*-9.4*

Source: PRIMES.

Total installed capacity is projected to reach 960 GW in 2030 (137 GW or 12.5% lower than in the Baseline scenario). The significantly less pronounced decline compared to

that of electricity generation (-26.3% from Baseline levels) reflects the higher deployment of renewables capacity (involving lower utilisation rates). As illustrated in Table 1.4-4, renewables capacity increases on top of Baseline levels to reach close to 550 GW in 2030 (including biomass-waste fired power plants) or 57.2% of total installed capacity. The most pronounced growth on top of Baseline levels is projected for wind turbines with their capacity exceeding 250 GW in 2030 (+69 GW from Baseline levels).

Capacities of solid fired and gas fired power plants exhibit a similar decline in absolute terms from Baseline levels in the long run (-120 GW and -127 GW respectively) remaining rather stable at 2020 levels in the horizon to 2030. Nuclear capacity exhibits a strong decline from Baseline levels in the long run being limited to 40 GW in 2030 (4.2% of total installed capacity from 9.2% in the Baseline scenario).

The stronger penetration of renewable energy forms in the power generation sector in combination to the adoption of more efficient power generation technologies leads to an improvement of the overall power generation efficiency with fuel input in power plants declining at rates well above those of electricity generation over the projection period (see Table 1.4-5). Overall power generation efficiency is projected to reach 53.5% in 2030 (from 48.6% in the Baseline scenario), with the efficiency of thermal power plants reaching 46% in 2030 compared to 47.5% in the Baseline as biomass and waste fired power plants remain less efficient than those that they replace in the presence of policies promoting renewable energy forms. Consumption of biomass and waste in power generation increases by 60% in 2010 and 92.5% in 2030. The most pronounced decline from Baseline levels is projected for solid fuels (reaching -68% in 2030) whereas transformation input of gas declines at slower rates (-38% in 2030). Nuclear fuel also declines substantially in the long run reaching -65% from Baseline levels in 2030.

Table 1.4-5: Fuel input in the EU-25 power generation sector in the "Combined high renewables and efficiency" case

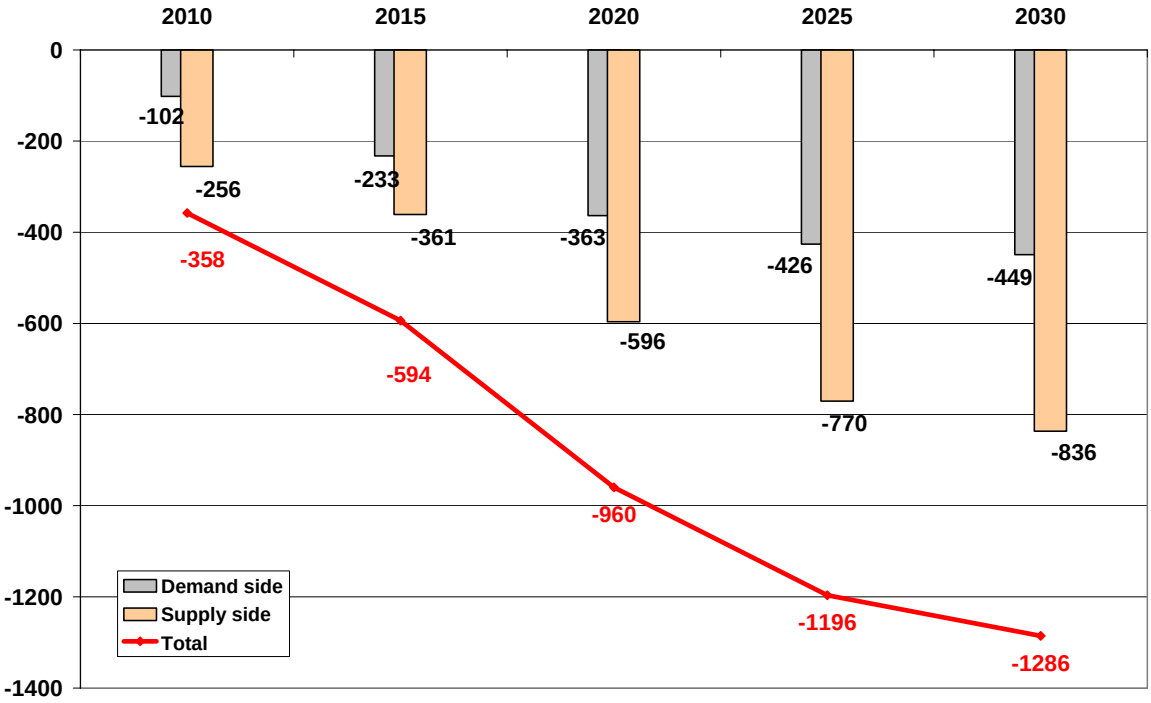
	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solids	214.5	177.0	99.3	77.2	-17.6	-50.0	-67.9
Oil products	41.9	31.8	21.4	22.5	0.6	-8.0	13.7
Gas	105.5	121.2	122.6	97.0	-20.7	-32.9	-37.6
Biomass-waste	21.2	46.7	101.0	133.7	60.3	88.4	92.5
Nuclear energy	237.7	248.8	161.5	73.5	0.0	-29.4	-65.1
Geothermal heat	2.9	13.3	20.3	23.5	261.2	339.5	347.4
Total	**623.7**	**638.8**	**526.1**	**427.4**	**-6.2**	**-23.9**	**-39.0**
EU15	542.2	550.0	441.8	350.6	-6.4	-24.4	-39.9
NMS	81.5	88.8	84.2	76.8	-5.1	-21.3	-34.8
Mt CO_2 emitted	**1250.0**	**1100.4**	**759.8**	**614.7**	**-17.1**	**-41.7**	**-55.9**
EU-15	997.8	866.3	625.6	534.6	-17.9	-39.2	-52.5
NMS	252.2	234.1	134.2	80.2	-14.1	-51.2	-70.1

Source: PRIMES.

1.4.2.4. CO_2 emissions and concluding remarks

Lower electricity and steam requirements combined with changes in the fuel mix of the EU-25 power generation sector lead to CO_2 emissions reductions from the power generation sector of -17.1% from Baseline levels in 2010 up to -55.9% in 2030. Improvements in terms of carbon intensity in electricity and steam generation reach 14.9% from Baseline levels in 2010 and 45.3% in 2030. In 2010 the supply side accounts for 72% of total CO_2 emissions reduction achieved from Baseline levels, a share dropping to 65% by 2030 (see Figure 1.4-4).

Figure 1.4-4: Changes in CO_2 emissions in EU-25 (diff. from Baseline in Mt CO_2) in the "Combined high renewables and efficiency" case



Source: PRIMES.

Total CO_2 emissions decrease substantially in the "Energy efficiency and high renewables case". In 2010 they are 7% lower than they had been in 1990, while the reduction below the 1990 level amounts to even 29% in 2030.

Concluding, the "Combined high renewables and efficiency" case reveals a much more favourable EU-25 energy system outlook with energy requirements declining by 2030 to levels slightly below those observed in 1990. CO_2 emissions, too, remain well below 1990 levels over the projection period (-6.7% in 2010, -21.4% in 2020 and -29.3% in 2030) contributing substantially to Kyoto objectives for 2010 and possibly more ambitious ones for later periods. Furthermore, in the "Combined high renewables and efficiency" case import dependency also improves from Baseline levels reaching 59.2% in 2030 (5.7 percentage points below Baseline levels).

1.4.3. "Combined 12% renewables share in 2010 and efficiency" scenario results for EU-25[26]

The "Combined 12% renewables share in 2010 and efficiency" case combines the assumptions of the "Energy efficiency" case with those of the "12% renewables share in 2010" case in the same manner as that described for the "Combined high renewables and efficiency" case.

In the presence of policies towards energy efficiency, overall primary energy needs in the EU-25 energy system decline substantially from Baseline levels (see Table 1.4-6). Demand for renewable energy forms exhibits a strong growth on top of baseline levels over the projection period (+43.8% in 2010, +49.4% in 2030), while a decline of energy requirements for all other energy forms is projected. In the short term, the most

[26] Aggregate results by group of countries (EU-25, EU-15, NMS, EU-27, EU28 and Europe-30) can be found in Appendix 5.

pronounced changes occur in the use of solid fuels and natural gas (-13.8% and -9.1 % from Baseline levels in 2010 respectively). In 2030 the use of nuclear energy declines by -59.1% from Baseline levels followed by solid fuels (-54.0% in 2030). Close to 73% of additional renewable energy requirements are satisfied by biomass/waste in 2010, a share further growing to 75% in 2030.

Table 1.4-6: Evolution of primary energy needs in the EU-25 energy system in the "Combined 12% renewables share in 2010 and efficiency" case

	Mtoe				% change from baseline		
	2000	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
Solid Fuels	306.5	247.3	164.1	134.9	-13.8	-36.8	-54.0
Liquid Fuels	634.7	637.7	587.8	550.0	-4.6	-12.3	-14.1
Natural Gas	376.3	420.4	421.8	405.8	-9.1	-20.4	-21.6
Nuclear	237.7	248.8	175.9	86.1	0.0	-23.0	-59.1
Renewable En. Sources	96.5	206.8	291.3	344.8	43.8	49.0	49.4
Total	**1653.8**	**1763.0**	**1642.5**	**1523.5**	**-2.7**	**-12.9**	**-19.6**
EU-15	1456.9	1544.2	1419.9	1299.6	-2.7	-12.6	-19.2
NMS	196.9	218.8	222.6	223.9	-3.0	-14.9	-21.9
Mt CO_2 emitted	**3674.1**	**3535.0**	**3055.0**	**2797.8**	**-8.9**	**-22.2**	**-29.3**
EU-15	3127.0	3000.3	2615.4	2398.6	-8.8	-20.8	-27.6
NMS	547.1	534.7	439.5	399.2	-9.5	-30.0	-38.0

Source: PRIMES.

In 2010, the share of renewable energy forms in total primary energy needs increases from 7.9% in the Baseline scenario to 11.7% in the "Combined 12% renewables share in 2010 and efficiency" case. By 2030, the renewables share reaches 22.6% (+10.5 percentage points above Baseline levels). Lower energy requirements in combination to the higher exploitation of renewable energy sources limits CO_2 emissions in the "Combined 12% renewables share in 2010 and efficiency" case at -9% from Baseline levels in 2010 and -29% in 2030. In addition import dependency also improves, reaching 61.1% in 2030 (from 64.9% in the Baseline scenario.

In the demand side, energy requirements decline by -2.4% from Baseline levels in 2010, reaching -15.6% in 2030. Policies stimulating the use of renewable energy lead to changes in the fuel mix with higher use of biomass and waste and to a less extent solar energy occurring to the detriment of all other energy forms. Furthermore, the share of biofuels in gasoline and diesel demand increases significantly from Baseline levels to reach 6.4% in 2010 and 14.3% in 2030 (+2.5 and +6.1 percentage points respectively from Baseline levels). As a combined effect of the above changes CO_2 emissions in the demand side are projected to decline from Baseline levels by -4.1% in 2010 and by -15.9% in 2030. Industry and the transport sector exhibit strong improvements of carbon intensity on top of Baseline levels, whereas a worsening of carbon intensity is projected for the tertiary and the residential sector due to the much lower demand for electricity (a carbon free energy form for the demand side).

Significant changes also occur in the electricity and steam generation sector. Renewable energy forms increase their market share to the detriment of gas and solid fuels, while overall electricity generation declines significantly from Baseline levels (-4.7% in 2010, -25.8% in 2030). Nuclear energy is also strongly affected in the long run. The most pronounced growth above Baseline levels in relative terms is projected for solar energy and geothermal heat with electricity generation from these energy forms in 2030 exceeding Baseline levels by +140% and +263%, respectively. Electricity generation from biomass and waste exhibits the highest growth in absolute terms (+98.2% in 2010, +86.2% in 2030), whereas electricity generation from wind energy is projected to increase by +37.5% in 2010 and +25.2% in 2030. Natural gas and solid fuels are mostly affected in the short term, with electricity generation from these energy forms declining by -22.6% and -18.7% respectively in 2010. In 2030 electricity generation from nuclear energy is -59% lower than in the Baseline scenario, whereas the corresponding decline

for solids fired electricity reaches -61.6% and that of gas fired electricity -37.8%. Thus, the renewables share in electricity generation increases to 24.6% in 2010 (from 18.1% in the Baseline) and 51.0% in 2030 (from 27.6% in the Baseline). In 2030, 17.7% of electricity would come from wind and solar, while biomass, waste, geothermal and hydro would contribute 33.4%

CO_2 emissions in the power generation sector decline by -16.6% from Baseline levels in 2010 and -51.4% in 2030 clearly illustrating the strong changes that take place in this sector in the presence of strong policies promoting energy efficiency and renewable energy forms. Thus, CO_2 emissions reduction from Baseline levels in the supply side accounts for 71.6% of total CO_2 emissions reduction in 2010 and 66.6% in 2030. In the "Combined 12% renewables share in 2010 and efficiency" CO_2 emissions in absolute terms exhibit a continuous decline from 1990 levels in the period to 2030 (-6.4% in 2010, -19.1% in 2020 and -25.9% in 2030).

Concluding, as was the case for the "Combined high renewables and efficiency" case, the combination of strong policies towards energy efficiency and the promotion of renewable energy forms allows for a reduction of overall energy requirements in the horizon to 2030 slightly below 1990 levels, and a favourable development for CO_2 emissions (remaining below 1990 levels from 2010 onwards., In addition, there is a significant reduction of the EU-25 energy import dependency from Baseline levels (61% instead of 65% in 2030).

Glossary

Carbon intensity: The amount of CO2 by weight emitted per unit of energy consumed or produced (t of CO2/tonne of oil equivalent (toe) or MWh)

Clean coal units: A number of innovative, new technologies designed to use coal in a more efficient and cost-effective manner while enhancing environmental protection. Among the most promising technologies are fluidised-bed combustion (PFBC), integrated gasification combined cycle (IGCC), coal liquefaction and coal gasification.

CO_2 Emissions to GDP: The amount of CO_2 by weight emitted per unit of GDP (carbon intensity of GDP - t of CO_2/MEuro'00).

Cogeneration thermal plant: A system using a common energy source to produce both electricity and steam for other uses, resulting in increased fuel efficiency (see also: CHP).

Combined Cycle Gas Turbine plant (CCGT): A technology which combines gas turbines and steam turbines, connected to one or more electrical generators at the same plant. The gas turbine (usually fuelled by natural gas or oil) produces mechanical power, which drives the generator, and heat in the form of hot exhaust gases. These gases are fed to a boiler, where steam is raised at pressure to drive a conventional steam turbine, which is also connected to an electrical generator. This has the effect of producing additional electricity from the same fuel compared to an open cycle turbine.

Combined Heat and Power: This means cogeneration of useful heat and power (electricity) in a single process. In contrast to conventional power plants that convert only a limited part of the primary energy into electricity with the remainder of this energy being discharged as waste heat. CHP makes use of large parts of this energy for e.g. industrial processes, district heating, and space heating. CHP therefore improves energy efficiency (see also: cogeneration thermal plant).

Efficiency for thermal electricity production: A measure of the efficiency of converting a fuel to electricity and useful heat; heat and electricity output divided by the calorific value of input fuel times 100 (for expressing this ratio in percent).

Efficiency indicator in freight transport (activity related): Energy efficiency in freight transport is computed on the basis of energy use per tonne-km. Given the existence of inconsistencies between transport and energy statistics, absolute numbers (especially at the level of individual Member States) might be misleading in some cases. For that reason, the numbers given are only illustrative of the trends in certain cases.

Efficiency indicator in passenger transport (activity related): Energy efficiency in passenger transport is computed on the basis of energy use per passenger-km travelled. Issues related to consistency of transport and energy statistics also apply to passenger transport (see also: Efficiency indicator in freight transport).

Energy branch consumption: Energy consumed in refineries, electricity and steam generation and in other transformation processes; it does not include the energy input for transformation as such.

Energy intensity: energy consumption/GDP or another indicator for economic activity

Energy intensive industries: Iron and steel, non-ferrous, chemicals, non-metallic minerals, and paper and pulp industries.

Final energy demand: Energy finally consumed in the transport, industrial, household and tertiary sectors with tertiary comprising services and agriculture. It excludes deliveries to the energy transformation sector (e.g. power plants) and to the energy branch. It includes electricity consumption in the above final demand sectors.

Freight transport activity: Expressed in tonne kilometres (1 Gtkm = 10^9 tkm); one tkm = one tonne transported a distance of one km. It should be noted that inland navigation includes both waterborne inland transport activity and domestic sea shipping. However, international short sea shipping is not included in the above category as, according to EUROSTAT energy balances, energy needs for international shipping are allocated to bunkers.

Fuel cells: A fuel cell is an electrochemical energy conversion device converting hydrogen and oxygen into electricity and heat with the help of catalysts. The fuel cell provides a direct current voltage that can be used to power various electrical devices including motors and lights.

Fuel input to power generation: Fuel use in electricity, CHP plants and heat plants.

Gas: Includes natural gas, blast furnace gas, coke-oven gas and gasworks gas.

Generation capacity: The maximum rated output of a generator, prime mover, or other electric power production equipment under specific conditions designated by the manufacturer.

Geothermal plant: A plant in which the prime mover is a steam turbine. The turbine is driven either by steam produced from hot water or by natural steam that derives its energy from heat in rocks or fluids beneath the surface of the earth. The energy is extracted by drilling and/or pumping.

Gross Inland Consumption: Quantity of energy consumed within the borders of a country. It is calculated as primary production + recovered products + imports +/- stock changes – exports – bunkers (i.e. quantities supplied to sea-going ships).

Gross Inland Consumption/GDP: Energy intensity indicator calculated as the ratio of total energy consumption to GDP – (toe/MEuro'00).

Hydro power plant: A plant producing energy with the use of moving water. For the purposes of these energy balance projections, hydro excludes pumped storage plants that generate electricity during peak load periods by using water previously pumped into an elevated storage reservoir during off-peak periods when excess generating capacity is available.

Non fossil fuels: Nuclear and renewable energy sources.

Non-energy uses: Non-energy consumption of energy carriers in petrochemicals and other sectors, such as chemical feedstocks, lubricants and asphalt for road construction.

Nuclear power plant: A plant in which a nuclear fission chain reaction can be initiated, controlled, and sustained at a specific rate. They include new nuclear designs (such as the EPR as well as the AP1000 and AP600) with passive safety features (which reduce core fusion probability from 10^{-5}/year of existing nuclear plants to less than 5.10^{-7}/year).

Oil: Includes refinery gas, liquefied petroleum gas, kerosene, gasoline, diesel oil, fuel oil, crude oil, naphtha and feedstocks.

Open cycle units: A turbine connected to an electrical generator. Less efficient than a combined cycle gas turbine (CCGT) because it does not recover and use the heat of the exhaust gases. Open cycle units include polyvalent units, monovalent coal-lignite units, monovalent oil-gas units and monovalent biomass-waste units.

Passenger transport activity: Expressed in passenger kilometres (1 Gpkm = 10^9 pkm); one pkm relates to one person travelling a distance of one km. Passenger transport activity includes energy consuming passenger transport on roads (public and private), by rail, in airplanes and on ships as far as this takes place on rivers, canals, lakes and as domestic sea shipping; international short sea shipping is not included as, according to

EUROSTAT energy balances, energy needs for international shipping are allocated to bunkers.

Primary production: Total indigenous production.

Renewable energy sources: Energy resources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Renewable energy resources include: biomass, hydro, wind, geothermal, solar, wave and tidal energy.

Solar power plant: A plant producing energy with the use of radiant energy from the sun; includes solar thermal and photovoltaic (direct conversion of solar energy into electricity) plants.

Solids: Include both primary products (hard coal and lignite) and derived fuels (patent fuels, coke, tar, pitch and benzol).

Supercritical polyvalent units: A power plant for which the evaporator part of the boiler operates at pressures above 22.1 MegaPascals (MPa). The cycle-medium in this case is a single phase fluid with homogenous properties and thus there is no need to separate steam from water in a drum, allowing for higher efficiency in power generation.

Thermal power plants: Type of electric generating station in which the source of energy for the prime mover is heat.

Wind power plant: Typically a group of wind turbines interconnected to a common utility system through a system of transformers, distribution lines, and (usually) one substation. Operation, control, and maintenance functions are often centralised through a network of computerised monitoring systems, supplemented by visual inspection.

APPENDIX 1: "Energy efficiency" case results

Summary results by groups of countries (comparison to Baseline)

EU25: Efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**877543**	**898598**	**826724**	**632443**	**552129**	**-9693**	**-74078**	**-132973**	**-1.2**	**-10.5**	**-19.4**
Solids	351650	204139	152787	106879	88247	-1740	-24203	-31950	-1.1	-18.5	-26.6
Oil	120396	163631	116792	51713	43185	-386	-1246	-264	-0.3	-2.4	-0.6
Natural gas	139723	196665	170188	98046	78730	-1990	-303	-1076	-1.2	-0.3	-1.3
Nuclear	196920	237664	248776	200621	137079	0	-28018	-73729	0.0	-12.3	-35.0
Renewable energy sources	68855	96499	138180	175184	204888	-5576	-20309	-25954	-3.9	-10.4	-11.2
Hydro	23391	28982	29457	31220	33165	-421	-983	-716	-1.4	-3.1	-2.1
Biomass & Waste	42151	61865	89092	115156	133730	-3316	-14035	-15150	-3.6	-10.9	-10.2
Wind	67	1913	14042	21454	29483	-1744	-4788	-8458	-11.0	-18.2	-22.3
Solar and others	145	417	1420	2323	3445	-70	-423	-949	-4.7	-15.4	-21.6
Geothermal	3101	3322	4168	5031	5066	-25	-79	-680	-0.6	-1.6	-11.8
Net Imports	**711300**	**801061**	**991733**	**1082122**	**1046818**	**-32542**	**-149569**	**-218749**	**-3.2**	**-12.1**	**-17.3**
Solids	75449	94307	126411	107422	104551	-5876	-20972	-68368	-4.4	-16.3	-39.5
Oil	510017	518147	586374	607844	582006	-13324	-62021	-70444	-2.2	-9.3	-10.8
- Crude oil and Feedstocks	479112	496826	547910	578465	558641	-13447	-58210	-67609	-2.4	-9.1	-10.8
- Oil products	30905	21321	38464	29378	23364	123	-3812	-2835	0.3	-11.5	-10.8
Natural gas	123653	186463	276720	364765	358144	-13333	-66545	-79852	-4.6	-15.4	-18.2
Electricity	2181	2144	2228	2090	2117	-9	-31	-85	-0.4	-1.5	-3.9
Gross Inland Consumption	**1556194**	**1653841**	**1770297**	**1661689**	**1543515**	**-42235**	**-223647**	**-351722**	**-2.3**	**-11.9**	**-18.6**
Solids	431944	306538	279198	214302	192799	-7617	-45175	-100318	-2.7	-17.4	-34.2
Oil	595746	634711	655008	606681	569759	-13710	-63267	-70707	-2.1	-9.4	-11.0
Natural gas	260548	376284	446908	462811	436874	-15323	-66848	-80928	-3.3	-12.6	-15.6
Nuclear	196920	237664	248776	200621	137079	0	-28018	-73729	0.0	-12.3	-35.0
Electricity	2181	2144	2228	2090	2117	-9	-31	-85	-0.4	-1.5	-3.9
Renewable energy forms	68855	96499	138180	175184	204888	-5576	-20309	-25954	-3.9	-10.4	-11.2
as % in Gross Inland Consumption											
Solids	27.8	18.5	15.8	12.9	12.5	-0.1	-0.9	-3.0	-0.3	-6.3	-19.2
Oil	38.3	38.4	37.0	36.5	36.9	0.1	1.0	3.1	0.3	2.7	9.2
Natural gas	16.7	22.8	25.2	27.9	28.3	-0.3	-0.2	1.0	-1.0	-0.9	3.6
Nuclear	12.7	14.4	14.1	12.1	8.9	0.3	-0.1	-2.2	2.4	-0.4	-20.2
Renewable energy forms	4.4	5.8	7.8	10.5	13.3	-0.1	0.2	1.1	-1.6	1.7	9.0
Electricity Generation in GWh$_e$	**2455674**	**2900835**	**3364410**	**3366592**	**3323947**	**-118776**	**-639183**	**-1042652**	**-3.4**	**-16.0**	**-23.9**
Nuclear	780056	921193	964265	777609	531312	0	-108598	-285779	0.0	-12.3	-35.0
Hydro & wind	272788	359249	507374	616752	737048	-25169	-67099	-106676	-4.7	-9.8	-12.6
Thermal (incl. biomass)	1402830	1620392	1892770	1972232	2055587	-93606	-463486	-650197	-4.7	-19.0	-24.0
Fuel Inputs for Thermal Power Generation [1]	**355362**	**385987**	**414501**	**387048**	**363472**	**-17740**	**-75723**	**-126566**	**-4.1**	**-16.4**	**-25.8**
Solids	246377	214488	208037	155934	142205	-6913	-42567	-98106	-3.2	-21.4	-40.8
Oil (including refinery gas)	48954	41870	31830	21930	22729	197	-1381	2934	0.6	-5.9	14.8
Gas	47057	105480	143928	157839	126149	-8899	-24892	-29099	-5.8	-13.6	-18.7
Biomass & Waste	10201	21211	27022	46737	67697	-2125	-6882	-1727	-7.3	-12.8	-2.5
Geothermal heat	2774	2939	3685	4608	4693	0	0	-568	0.0	0.0	-10.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**797634**	**796450**	**797787**	**757720**	**720087**	**-15110**	**-66375**	**-76978**	**-1.9**	**-8.1**	**-9.7**
Refineries	642275	710448	714780	672762	638518	-14142	-61263	-69585	-1.9	-8.3	-9.8
Biofuels and hydrogen production	2	637	16812	31382	36393	19	378	18	0.1	1.2	0.1
District heating	31035	17261	14804	9241	7996	-446	-4576	-6737	-2.9	-33.1	-45.7
Others	124322	68104	51391	44335	37180	-542	-914	-674	-1.0	-2.0	-1.8
Energy Branch Consumption	**73032**	**80377**	**79833**	**72580**	**66501**	**-1664**	**-8586**	**-11633**	**-2.0**	**-10.6**	**-14.9**
Non-Energy Uses	**94476**	**105950**	**107943**	**111197**	**112173**	**96**	**-3**	**9**	**0.1**	**0.0**	**0.0**
Final Energy Demand	**1021913**	**1095359**	**1205270**	**1184217**	**1155370**	**-32736**	**-154287**	**-215083**	**-2.6**	**-11.5**	**-15.7**
by sector											
Industry[1]	341087	330062	354118	370498	382274	-2302	-11904	-9292	-0.6	-3.1	-2.4
- energy intensive industries	216809	211616	219619	221969	219584	-1141	-6423	-5348	-0.5	-2.8	-2.4
- other industrial sectors	124278	118446	134500	148529	162689	-1161	-5481	-3944	-0.9	-3.6	-2.4
Residential	261006	273302	302314	279923	260045	-9652	-58818	-91240	-3.1	-17.4	-26.0
Tertiary	146622	158975	175858	166051	154639	-12629	-45805	-70677	-6.7	-21.6	-31.4
Transport	273198	333020	372980	367745	358412	-8153	-37760	-43875	-2.1	-9.3	-10.9
by fuel [1]											
Solids	123937	56633	44926	38135	32701	-276	-1285	-1323	-0.6	-3.3	-3.9
Oil	428121	468312	505024	472779	444413	-12318	-57117	-67423	-2.4	-10.8	-13.2
Gas	200242	251885	272220	272848	274603	-6955	-36878	-46795	-2.5	-11.9	-14.6
Electricity	176468	211352	250298	254484	254414	-9012	-48433	-79629	-3.5	-16.0	-23.8
Heat (from CHP and District Heating)	63092	68712	77245	83662	87525	-2932	-4029	-7800	-3.7	-4.6	-8.2
Other	30053	38465	55558	62309	61713	-1244	-6545	-12113	-2.2	-9.5	-16.4
CO2 Emissions (Mt of CO2)	**3776.1**	**3674.1**	**3775.3**	**3404.1**	**3156.3**	**-106.6**	**-524.5**	**-798.7**	**-2.7**	**-13.4**	**-20.2**
Power generation/District heating	1362.6	1294.9	1312.4	1089.4	962.0	-49.4	-243.8	-462.1	-3.6	-18.3	-32.4
Energy Branch	141.5	144.9	120.9	95.7	80.1	-3.0	-18.2	-19.6	-2.4	-16.0	-19.6
Industry	698.9	567.7	576.3	568.8	558.0	-0.7	-26.4	-11.9	-0.1	-4.4	-2.1
Residential	506.1	452.1	468.2	414.4	372.5	-14.5	-80.5	-114.2	-3.0	-16.3	-23.5
Tertiary	274.2	244.6	246.6	232.9	221.1	-15.3	-42.9	-60.8	-5.8	-15.6	-21.6
Transport	792.7	969.9	1050.9	1002.8	962.8	-23.7	-112.7	-130.1	-2.2	-10.1	-11.9
CO2 Emissions Index (1990=100)	**100.0**	**97.3**	**100.0**	**90.1**	**83.6**	-2.8	-13.9	-21.2	-2.7	-13.4	-20.2

Source: PRIMES

EU25: Efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	440.788	452.915	464.054	469.270	469.365	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7294.7	8947.0	10946.8	13656.3	16051.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	213.3	184.8	161.7	121.7	96.2	-3.9	-16.4	-21.9	-2.3	-11.9	-18.6
Gross Inl. Cons./Capita (toe/inhabitant)	3.53	3.65	3.81	3.54	3.29	-0.09	-0.48	-0.75	-2.3	-11.9	-18.6
Electricity Generated/Capita (kWh/inhabitant)	5571	6405	7250	7174	7082	-256	-1362	-2221	-3.4	-16.0	-23.9
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.22	2.13	2.05	2.04	-0.01	-0.04	-0.04	-0.4	-1.7	-2.0
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.57	8.11	8.14	7.25	6.72	-0.23	-1.12	-1.70	-2.7	-13.4	-20.2
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	517.7	410.7	344.9	249.3	196.6	-9.7	-38.4	-49.8	-2.7	-13.4	-20.2
Import Dependency %	44.7	47.2	54.5	63.1	65.5	-0.5	-0.4	0.6	-0.9	-0.7	0.9
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	83.8	76.8	64.6	57.1	-0.5	-2.1	-1.4	-0.6	-3.1	-2.4
Residential (Energy on Private Income)	100.0	85.8	77.9	58.3	46.3	-2.5	-12.3	-16.2	-3.1	-17.4	-26.0
Tertiary (Energy on Value added)	100.0	84.9	74.2	55.4	43.5	-5.3	-15.3	-19.9	-6.7	-21.6	-31.4
Transport (Energy on GDP)	100.0	99.4	91.0	71.9	59.6	-2.0	-7.4	-7.3	-2.1	-9.3	-10.9
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.41	0.30	0.26	0.22	0.19	0.00	-0.01	-0.04	-0.6	-5.6	-15.9
Final energy demand (t of CO_2/toe)	2.22	2.04	1.94	1.87	1.83	0.01	0.02	0.06	0.4	1.1	3.1
Industry	2.05	1.72	1.63	1.54	1.46	0.01	-0.02	0.00	0.5	-1.4	0.3
Residential	1.94	1.65	1.55	1.48	1.43	0.00	0.02	0.05	0.1	1.3	3.4
Tertiary	1.87	1.54	1.40	1.40	1.43	0.01	0.10	0.18	0.9	7.7	14.3
Transport	2.90	2.91	2.82	2.73	2.69	0.00	-0.02	-0.03	-0.1	-0.9	-1.1
Electricity and steam generation											
Generation Capacity in MW_e		**661750**	**786486**	**805508**	**858206**	**-24021**	**-137073**	**-238086**	**-3.0**	**-14.5**	**-21.7**
Nuclear		141082	136430	108002	65240	0	-8934	-35976	0.0	-7.6	-35.5
Hydro (pumping excluded)		97168	102720	106345	110586	-1214	-2272	-1615	-1.2	-2.1	-1.4
Wind		12785	71746	108239	141356	-6646	-19385	-41575	-8.5	-15.2	-22.7
Solar		176	1658	4850	10364	0	0	0	0.0	0.0	0.0
Thermal		410539	473932	478072	530661	-16161	-106482	-158919	-3.3	-18.2	-23.0
of which cogeneration units		112958	144768	201768	261321	-6103	-7193	13321	-4.0	-3.4	5.4
Solids fired		188879	154473	122265	147480	-2063	-34540	-63756	-1.3	-22.0	-30.2
Gas fired		131875	234289	259090	262992	-11149	-62118	-97142	-4.5	-19.3	-27.0
Oil fired		74302	63627	48476	38993	-2422	546	4027	-3.7	1.1	11.5
Biomass-waste fired		14462	20187	46725	79720	-527	-10369	-1881	-2.5	-18.2	-2.3
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	1356	1517	1476	0	0	-167	0.0	0.0	-10.2
Indicators											
Efficiency for thermal electricity production (%)		36.1	39.3	43.8	48.6	-0.3	-1.4	1.2	-0.6	-3.2	2.4
Load factor for gross electric capacities (%)		50.0	48.8	47.7	44.2	-0.2	-0.8	-1.3	-0.5	-1.7	-2.8
CHP indicator (% of electricity from CHP)		14.5	17.9	28.2	38.4	0.0	6.3	14.2	0.3	29.1	58.3
Non fossil fuels in electricity generation (%)		46.5	46.5	47.8	48.7	0.7	2.3	2.4	1.6	5.0	5.2
- nuclear		31.8	28.7	23.1	16.0	1.0	1.0	-2.7	3.5	4.4	-14.6
- renewable energy forms		14.7	17.8	24.7	32.7	-0.3	1.3	5.1	-1.5	5.6	18.6
Transport sector											
Passenger transport activity (Gpkm)	**4640.8**	**5466.3**	**6448.7**	**7391.4**	**8101.9**	-0.7	-10.6	-28.3	0.0	-0.1	-0.3
Public road transport	504.1	480.1	495.9	483.6	471.9	0.9	3.1	5.1	0.2	0.6	1.1
Private cars and motorcycles	3529.3	4253.1	5014.8	5767.0	6327.6	-1.8	-13.7	-31.0	0.0	-0.2	-0.5
Rail	411.9	402.7	447.1	481.8	510.8	0.6	3.2	5.2	0.1	0.7	1.0
Aviation	166.3	296.9	451.2	613.6	742.3	-0.4	-3.0	-7.4	-0.1	-0.5	-1.0
Inland navigation	29.2	33.6	39.7	45.4	49.3	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	10528	12069	13897	15751	17261	-1.4	-22.6	-60.3	0.0	-0.1	-0.3
Freight transport activity (Gtkm)	**1753.9**	**2131.5**	**2580.6**	**3035.6**	**3403.9**	-1.6	-13.2	-28.0	-0.1	-0.4	-0.8
Trucks	1034.1	1486.3	1888.8	2294.7	2623.2	-2.4	-17.0	-34.2	-0.1	-0.7	-1.3
Rail	461.7	374.2	402.7	424.1	442.5	0.7	2.7	3.6	0.2	0.6	0.8
Inland navigation	258.1	271.0	289.2	316.8	338.2	0.2	1.2	2.6	0.1	0.4	0.8
Freight activity per unit of GDP (tkm/000 Euro'00)	240	238	236	222	212	-0.1	-1.0	-1.7	-0.1	-0.4	-0.8
Energy demand in transport (ktoe)	**273198**	**333020**	**372980**	**367745**	**358412**	-8153	-37760	-43875	-2.1	-9.3	-10.9
Public road transport	7841	7018	6983	5903	4923	-38	-371	-398	-0.5	-5.9	-7.5
Private cars and motorcycles	138202	158349	169421	163722	152417	-755	-5179	-7434	-0.4	-3.1	-4.7
Trucks	82444	108068	135095	142300	142936	-553	-14531	-21450	-0.4	-9.3	-13.0
Rail	9066	8897	8126	6031	5593	-181	-487	-426	-2.2	-7.5	-7.1
Aviation	28932	45320	47559	43742	46441	-6615	-17035	-13918	-12.2	-28.0	-23.1
Inland navigation	6714	5368	5796	6049	6103	-12	-156	-250	-0.2	-2.5	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	39.3	39.9	35.8	29.6	25.8	-1.2	-3.1	-2.6	-3.2	-9.3	-9.2
Freight transport (toe/Mtkm)	51.7	53.9	55.1	49.1	43.9	-0.2	-4.7	-6.0	-0.4	-8.7	-12.1

Source: PRIMES

EU15: Efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**707946**	**761643**	**701067**	**523512**	**446467**	**-8570**	**-56987**	**-105266**	**-1.2**	**-9.8**	**-19.1**
Solids	210737	100172	67090	44463	32716	-1169	-15532	-25901	-1.7	-25.9	-44.2
Oil	117782	160552	114437	49596	41357	-380	-1232	-241	-0.3	-2.4	-0.6
Natural gas	132975	190581	164432	92808	73967	-1988	-227	-1049	-1.2	-0.2	-1.4
Nuclear	181439	222846	231522	183033	119731	0	-24128	-57856	0.0	-11.6	-32.6
Renewable energy sources	65014	87491	123586	153612	178697	-5033	-15867	-20219	-3.9	-9.4	-10.2
Hydro	22275	27627	27997	29568	31311	-419	-975	-703	-1.5	-3.2	-2.2
Biomass & Waste	39426	54257	76533	96014	110616	-2786	-10210	-11791	-3.5	-9.6	-9.6
Wind	67	1912	13637	20927	28646	-1744	-4251	-6261	-11.3	-16.9	-17.9
Solar and others	145	381	1265	2089	3076	-60	-356	-790	-4.5	-14.6	-20.4
Geothermal	3101	3315	4154	5014	5048	-25	-76	-674	-0.6	-1.5	-11.8
Net Imports	**643284**	**741591**	**897249**	**966535**	**928349**	**-27176**	**-128365**	**-182494**	**-2.9**	**-11.7**	**-16.4**
Solids	89663	110142	130706	104066	100830	-4375	-19411	-59123	-3.2	-15.7	-37.0
Oil	458793	472543	530874	548115	519140	-11886	-55448	-60278	-2.2	-9.2	-10.4
- Crude oil and Feedstocks	435365	455606	501580	528260	505736	-12252	-52871	-59165	-2.4	-9.1	-10.5
- Oil products	23428	16937	29294	19855	13404	367	-2577	-1113	1.3	-11.5	-7.7
Natural gas	92495	155262	231851	310598	303491	-10910	-53488	-63020	-4.5	-14.7	-17.2
Electricity	2333	3644	3818	3756	4889	-5	-18	-72	-0.1	-0.5	-1.5
Gross Inland Consumption	**1319965**	**1456936**	**1551299**	**1438446**	**1320740**	**-35746**	**-185352**	**-287760**	**-2.3**	**-11.4**	**-17.9**
Solids	303612	215739	197796	148529	133546	-5544	-34944	-85025	-2.7	-19.0	-38.9
Oil	544159	587926	598294	546109	506420	-12266	-56680	-60519	-2.0	-9.4	-10.7
Natural gas	223408	339289	396283	403406	377458	-12898	-53715	-64069	-3.2	-11.8	-14.5
Nuclear	181439	222846	231522	183033	119731	0	-24128	-57856	0.0	-11.6	-32.6
Electricity	2333	3644	3818	3756	4889	-5	-18	-72	-0.1	-0.5	-1.5
Renewable energy forms	65014	87491	123586	153612	178697	-5033	-15867	-20219	-3.9	-9.4	-10.2
as % in Gross Inland Consumption											
Solids	23.0	14.8	12.8	10.3	10.1	-0.1	-1.0	-3.5	-0.5	-8.6	-25.6
Oil	41.2	40.4	38.6	38.0	38.3	0.1	0.8	3.1	0.2	2.3	8.8
Natural gas	16.9	23.3	25.5	28.0	28.6	-0.2	-0.1	1.1	-0.9	-0.4	4.1
Nuclear	13.7	15.3	14.9	12.7	9.1	0.3	0.0	-2.0	2.3	-0.3	-17.9
Renewable energy forms	4.9	6.0	8.0	10.7	13.5	-0.1	0.2	1.2	-1.7	2.3	9.4
Electricity Generation in GWh$_e$	**2138940**	**2576502**	**2979330**	**2943479**	**2870466**	**-103420**	**-541263**	**-864979**	**-3.4**	**-15.5**	**-23.2**
Nuclear	720059	863760	897389	709442	464073	0	-93519	-224246	0.0	-11.6	-32.6
Hydro & wind	259810	343478	485670	591256	705086	-25145	-60767	-80980	-4.9	-9.3	-10.3
Thermal (incl. biomass)	1159070	1369264	1596270	1642782	1701307	-78275	-386976	-559753	-4.7	-19.1	-24.8
Fuel Inputs for Thermal Power Generation [1]	**282186**	**319336**	**341219**	**315566**	**297990**	**-14761**	**-61658**	**-107572**	**-4.1**	**-16.3**	**-26.5**
Solids	184170	158097	151196	108669	100156	-5159	-34137	-84030	-3.3	-23.9	-45.6
Oil (including refinery gas)	43718	38588	29098	19901	20993	398	-1057	3520	1.4	-5.0	20.1
Gas	41697	99188	133072	143235	116233	-7863	-20618	-23602	-5.6	-12.6	-16.9
Biomass & Waste	9827	20524	24170	39154	55915	-2136	-5847	-2892	-8.1	-13.0	-4.9
Geothermal heat	2774	2939	3685	4608	4693	0	0	-568	0.0	0.0	-10.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**704402**	**725664**	**726841**	**685271**	**645943**	**-13108**	**-57581**	**-63878**	**-1.8**	**-7.8**	**-9.0**
Refineries	595036	665476	665160	619356	582573	-12926	-55830	-61039	-1.9	-8.3	-9.5
Biofuels and hydrogen production	2	604	15543	28491	32489	17	298	-31	0.1	1.1	-0.1
District heating	13085	8717	6938	3962	3234	203	-1499	-2413	3.0	-27.5	-42.7
Others	96279	50868	39199	33462	27647	-402	-549	-395	-1.0	-1.6	-1.4
Energy Branch Consumption	**63555**	**67696**	**67507**	**60496**	**54575**	**-1338**	**-7025**	**-9633**	**-1.9**	**-10.4**	**-15.0**
Non-Energy Uses	**84387**	**95815**	**97149**	**97788**	**96796**	**87**	**-9**	**14**	**0.1**	**0.0**	**0.0**
Final Energy Demand	**866453**	**970663**	**1058562**	**1026722**	**989851**	**-28173**	**-128383**	**-174075**	**-2.6**	**-11.1**	**-15.0**
by sector											
Industry[1]	272481	284781	304731	313527	318733	-2038	-9531	-7400	-0.7	-3.0	-2.3
- energy intensive industries	182306	182967	190506	190079	185994	-1009	-5211	-4260	-0.5	-2.7	-2.2
- other industrial sectors	90175	101814	114225	123447	132739	-1029	-4320	-3140	-0.9	-3.4	-2.3
Residential	220020	238404	260942	237692	218045	-8179	-49306	-75069	-3.0	-17.2	-25.6
Tertiary	121346	137376	151369	141736	130501	-10252	-35481	-53988	-6.3	-20.0	-29.3
Transport	252606	310102	341520	333767	322572	-7704	-34065	-37618	-2.2	-9.3	-10.4
by fuel [1]											
Solids	79761	35330	28425	24826	20746	-199	-488	-866	-0.7	-1.9	-4.0
Oil	393325	434547	461787	425861	395132	-11349	-51395	-58722	-2.4	-10.8	-12.9
Gas	173014	226415	238943	235351	233009	-5723	-30142	-38091	-2.3	-11.4	-14.1
Electricity	155929	191711	225243	225468	223319	-7921	-41138	-65777	-3.4	-15.4	-22.8
Heat (from CHP and District Heating)	36558	50708	57796	63760	66912	-2095	-996	-2079	-3.5	-1.5	-3.0
Other	27865	31953	46368	51456	50732	-885	-4223	-8539	-1.9	-7.6	-14.4
CO2 Emissions (Mt of CO2)	**3068.4**	**3127.0**	**3202.4**	**2866.8**	**2641.5**	**-88.5**	**-434.3**	**-669.5**	**-2.7**	**-13.2**	**-20.2**
Power generation/District heating	1021.1	1014.7	1025.9	845.0	750.0	-37.8	-191.5	-382.7	-3.6	-18.5	-33.8
Energy Branch	127.2	127.0	110.1	86.4	71.7	-2.6	-16.3	-17.8	-2.3	-15.9	-19.9
Industry	545.2	471.6	475.3	459.1	439.1	-0.4	-21.5	-12.1	-0.1	-4.5	-2.7
Residential	419.7	401.5	414.4	365.3	327.0	-12.8	-69.6	-98.2	-3.0	-16.0	-23.1
Tertiary	220.7	207.4	213.3	199.7	185.8	-12.3	-33.6	-46.8	-5.5	-14.4	-20.1
Transport	734.5	904.8	963.3	911.2	868.0	-22.4	-101.8	-111.9	-2.3	-10.0	-11.4
CO2 Emissions Index (1990=100)	**100.0**	**101.9**	**104.4**	**93.4**	**86.1**	-2.9	-14.2	-21.8	-2.7	-13.2	-20.2

Source: PRIMES

EU15: Efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	365.749	378.062	390.652	397.458	398.737	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	6981.9	8572.2	10391.5	12835.7	14948.8	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	189.1	170.0	149.3	112.1	88.4	-3.4	-14.4	-19.2	-2.3	-11.4	-17.9
Gross Inl. Cons./Capita (toe/inhabitant)	3.61	3.85	3.97	3.62	3.31	-0.09	-0.47	-0.72	-2.3	-11.4	-17.9
Electricity Generated/Capita (kWh/inhabitant)	5848	6815	7627	7406	7199	-265	-1362	-2169	-3.4	-15.5	-23.2
Carbon intensity (t of CO_2/toe of GIC)	2.32	2.15	2.06	1.99	2.00	-0.01	-0.04	-0.06	-0.4	-2.0	-2.8
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.39	8.27	8.20	7.21	6.62	-0.23	-1.09	-1.68	-2.7	-13.2	-20.2
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	439.5	364.8	308.2	223.3	176.7	-8.5	-33.8	-44.8	-2.7	-13.2	-20.2
Import Dependency %	47.5	49.5	56.1	64.9	67.5	-0.4	-0.5	0.7	-0.8	-0.7	1.1
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	90.9	84.8	71.2	62.7	-0.6	-2.2	-1.5	-0.7	-3.0	-2.3
Residential (Energy on Private Income)	100.0	88.8	80.6	60.1	47.5	-2.5	-12.5	-16.4	-3.0	-17.2	-25.6
Tertiary (Energy on Value added)	100.0	88.7	77.7	57.9	45.4	-5.3	-14.5	-18.8	-6.3	-20.0	-29.3
Transport (Energy on GDP)	100.0	100.0	90.8	71.9	59.6	-2.0	-7.3	-7.0	-2.2	-9.3	-10.4
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.39	0.27	0.24	0.20	0.18	0.00	-0.01	-0.04	-0.6	-6.4	-18.3
Final energy demand (t of CO_2/toe)	2.22	2.05	1.95	1.88	1.84	0.01	0.01	0.04	0.3	0.7	2.4
Industry	2.00	1.66	1.56	1.46	1.38	0.01	-0.02	-0.01	0.6	-1.6	-0.4
Residential	1.91	1.68	1.59	1.54	1.50	0.00	0.02	0.05	0.0	1.4	3.4
Tertiary	1.82	1.51	1.41	1.41	1.42	0.01	0.09	0.16	0.9	7.0	12.9
Transport	2.91	2.92	2.82	2.73	2.69	0.00	-0.02	-0.03	-0.1	-0.9	-1.1
Electricity and steam generation											
Generation Capacity in MW_e		**588083**	**702705**	**711890**	**732739**	**-21464**	**-116201**	**-196814**	**-3.0**	**-14.0**	**-21.2**
Nuclear		131758	127644	99216	56563	0	-6982	-28105	0.0	-6.6	-33.2
Hydro (pumping excluded)		90794	95906	99030	102849	-1207	-2238	-1546	-1.2	-2.2	-1.5
Wind		12769	69487	105020	136107	-6645	-16311	-30703	-8.7	-13.4	-18.4
Solar		176	1645	4712	9827	0	0	0	0.0	0.0	0.0
Thermal		352586	408023	403911	427393	-13612	-90670	-136460	-3.2	-18.3	-24.2
of which cogeneration units		88543	119053	169282	206471	-5646	-6267	12458	-4.5	-3.6	6.4
Solids fired		144882	115160	89531	102940	-1360	-27618	-51245	-1.2	-23.6	-33.2
Gas fired		125804	218267	233293	228137	-9686	-56329	-87243	-4.2	-19.4	-27.7
Oil fired		67470	56542	43637	35283	-2439	1908	5867	-4.1	4.6	19.9
Biomass-waste fired		13407	16698	35933	59557	-127	-8631	-3672	-0.8	-19.4	-5.8
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	1356	1517	1476	0	0	-167	0.0	0.0	-10.2
Indicators											
Efficiency for thermal electricity production (%)		36.9	40.2	44.8	49.1	-0.2	-1.5	1.2	-0.6	-3.3	2.4
Load factor for gross electric capacities (%)		50.0	48.4	47.2	44.7	-0.2	-0.8	-1.2	-0.4	-1.7	-2.5
CHP indicator (% of electricity from CHP)		13.4	16.7	26.6	35.2	0.0	6.2	13.5	-0.2	30.2	62.4
Non fossil fuels in electricity generation (%)		49.4	49.1	50.2	50.8	0.7	2.3	3.1	1.3	4.9	6.4
- nuclear		33.5	30.1	24.1	16.2	1.0	1.1	-2.3	3.5	4.6	-12.3
- renewable energy forms		15.9	19.0	26.1	34.6	-0.4	1.3	5.3	-1.8	5.2	18.2
Transport sector											
Passenger transport activity (Gpkm)	**4130.1**	**4997.7**	**5831.5**	**6637.2**	**7206.8**	-0.5	-8.6	-22.0	0.0	-0.1	-0.3
Public road transport	369.0	401.8	423.2	416.5	408.6	0.8	2.5	4.1	0.2	0.6	1.0
Private cars and motorcycles	3265.7	3928.0	4544.5	5163.4	5587.8	-1.3	-11.0	-23.9	0.0	-0.2	-0.4
Rail	309.8	351.3	396.7	432.4	462.0	0.4	2.8	4.9	0.1	0.6	1.1
Aviation	157.3	283.6	428.0	580.3	699.9	-0.4	-2.8	-6.9	-0.1	-0.5	-1.0
Inland navigation	28.4	33.0	39.1	44.7	48.5	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	11292	13219	14928	16699	18074	-1.2	-21.7	-55.1	0.0	-0.1	-0.3
Freight transport activity (Gtkm)	**1419.2**	**1825.6**	**2141.8**	**2481.4**	**2755.9**	-1.3	-10.0	-20.3	-0.1	-0.4	-0.7
Trucks	914.2	1309.3	1588.9	1887.7	2131.7	-1.3	-11.9	-24.8	-0.1	-0.6	-1.2
Rail	254.9	249.5	268.0	281.4	290.6	-0.2	0.8	1.9	-0.1	0.3	0.7
Inland navigation	250.1	266.8	284.9	312.2	333.6	0.2	1.1	2.6	0.1	0.4	0.8
Freight activity per unit of GDP (tkm/000 Euro'00)	203	213	206	193	184	-0.1	-0.8	-1.4	-0.1	-0.4	-0.7
Energy demand in transport (ktoe)	**252606**	**310102**	**341520**	**333767**	**322572**	-7704	-34065	-37618	-2.2	-9.3	-10.4
Public road transport	6250	5860	5924	5047	4258	-32	-310	-296	-0.5	-5.8	-6.5
Private cars and motorcycles	129911	146708	154529	147720	135955	-653	-4449	-4780	-0.4	-2.9	-3.4
Trucks	75351	100615	122708	127847	126998	-476	-12643	-18715	-0.4	-9.0	-12.8
Rail	6970	7579	6957	5159	4849	-156	-385	-285	-2.2	-6.9	-5.5
Aviation	27742	44025	45662	42004	44470	-6374	-16122	-13296	-12.2	-27.7	-23.0
Inland navigation	6383	5314	5739	5989	6042	-12	-155	-247	-0.2	-2.5	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	41.2	40.7	36.4	30.1	26.3	-1.2	-3.1	-2.5	-3.3	-9.5	-8.7
Freight transport (toe/Mtkm)	58.0	58.5	60.2	53.9	48.2	-0.2	-5.0	-6.5	-0.3	-8.4	-11.9

Source: PRIMES

NMS: Efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**169598**	**136955**	**125656**	**108930**	**105662**	**-1123**	**-17091**	**-27707**	**-0.9**	**-13.6**	**-20.8**
Solids	140913	103966	85697	62416	55531	-572	-8670	-6049	-0.7	-12.2	-9.8
Oil	2614	3079	2355	2117	1829	-6	-13	-23	-0.3	-0.6	-1.2
Natural gas	6749	6084	5757	5238	4762	-2	-77	-27	0.0	-1.4	-0.6
Nuclear	15481	14818	17254	17587	17348	0	-3890	-15874	0.0	-18.1	-47.8
Renewable energy sources	3841	9008	14594	21572	26192	-543	-4441	-5735	-3.6	-17.1	-18.0
Hydro	1116	1355	1460	1652	1854	-2	-8	-12	-0.1	-0.5	-0.7
Biomass & Waste	2725	7609	12559	19143	23113	-530	-3826	-3360	-4.1	-16.7	-12.7
Wind	0	1	405	526	837	0	-536	-2197	0.0	-50.5	-72.4
Solar and others	0	35	155	234	369	-10	-67	-159	-6.1	-22.4	-30.1
Geothermal	0	8	15	17	18	-1	-4	-7	-4.8	-17.7	-26.7
Net Imports	**68016**	**59470**	**94484**	**115587**	**118469**	**-5366**	**-21204**	**-36255**	**-5.4**	**-15.5**	**-23.4**
Solids	-14214	-15836	-4295	3356	3722	-1501	-1561	-9245	53.8	-31.7	-71.3
Oil	51224	45604	55501	59729	62866	-1438	-6573	-10166	-2.5	-9.9	-13.9
- Crude oil and Feedstocks	43747	41220	46331	50205	52905	-1195	-5338	-8444	-2.5	-9.6	-13.8
- Oil products	7477	4384	9170	9524	9961	-244	-1235	-1722	-2.6	-11.5	-14.7
Natural gas	31158	31202	44868	54167	54654	-2423	-13057	-16832	-5.1	-19.4	-23.5
Electricity	-152	-1500	-1591	-1665	-2772	-4	-13	-13	0.2	0.8	0.5
Gross Inland Consumption	**236229**	**196904**	**218998**	**223244**	**222775**	**-6489**	**-38295**	**-63963**	**-2.9**	**-14.6**	**-22.3**
Solids	128332	90799	81403	65772	59253	-2073	-10231	-15294	-2.5	-13.5	-20.5
Oil	51587	46785	56714	60572	63338	-1444	-6587	-10189	-2.5	-9.8	-13.9
Natural gas	37140	36994	50625	59405	59416	-2425	-13133	-16859	-4.6	-18.1	-22.1
Nuclear	15481	14818	17254	17587	17348	0	-3890	-15874	0.0	-18.1	-47.8
Electricity	-152	-1500	-1591	-1665	-2772	-4	-13	-13	0.2	0.8	0.5
Renewable energy forms	3841	9008	14594	21572	26192	-543	-4441	-5735	-3.6	-17.1	-18.0
as % in Gross Inland Consumption											
Solids	54.3	46.1	37.2	29.5	26.6	0.2	0.4	0.6	0.4	1.4	2.3
Oil	21.8	23.8	25.9	27.1	28.4	0.1	1.5	2.8	0.4	5.7	10.9
Natural gas	15.7	18.8	23.1	26.6	26.7	-0.4	-1.1	0.1	-1.7	-4.1	0.3
Nuclear	6.6	7.5	7.9	7.9	7.8	0.2	-0.3	-3.8	3.0	-4.1	-32.8
Renewable energy forms	1.6	4.6	6.7	9.7	11.8	0.0	-0.3	0.6	-0.7	-2.8	5.6
Electricity Generation in GWh_e	**316734**	**324333**	**385080**	**423113**	**453481**	**-15356**	**-97920**	**-177673**	**-3.8**	**-18.8**	**-28.2**
Nuclear	59996	57434	66876	68167	67239	0	-15079	-61533	0.0	-18.1	-47.8
Hydro & wind	12978	15771	21704	25495	31961	-24	-6332	-25695	-0.1	-19.9	-44.6
Thermal (incl. biomass)	243760	251128	296500	329450	354280	-15332	-76510	-90444	-4.9	-18.8	-20.3
Fuel Inputs for Thermal Power Generation [1]	**73176**	**66652**	**73282**	**71482**	**65482**	**-2979**	**-14065**	**-18994**	**-3.9**	**-16.4**	**-22.5**
Solids	62206	56391	56841	47266	42049	-1754	-8430	-14076	-3.0	-15.1	-25.1
Oil (including refinery gas)	5236	3281	2732	2029	1736	-201	-324	-586	-6.9	-13.8	-25.2
Gas	5360	6292	10856	14604	9916	-1036	-4274	-5497	-8.7	-22.6	-35.7
Biomass & Waste	374	687	2852	7583	11781	12	-1036	1165	0.4	-12.0	11.0
Geothermal heat	0	0	0	0	0	0	0	0			
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**93232**	**70786**	**70946**	**72448**	**74144**	**-2001**	**-8795**	**-13100**	**-2.7**	**-10.8**	**-15.0**
Refineries	47239	44972	49620	53405	55945	-1215	-5433	-8546	-2.4	-9.2	-13.3
Biofuels and hydrogen production	0	33	1269	2891	3904	2	80	50	0.2	2.8	1.3
District heating	17949	8544	7866	5279	4762	-648	-3077	-4324	-7.6	-36.8	-47.6
Others	28043	17236	12191	10873	9533	-140	-365	-278	-1.1	-3.2	-2.8
Energy Branch Consumption	**9477**	**12681**	**12327**	**12084**	**11927**	**-327**	**-1561**	**-2000**	**-2.6**	**-11.4**	**-14.4**
Non-Energy Uses	**10089**	**10135**	**10794**	**13409**	**15377**	**9**	**5**	**-5**	**0.1**	**0.0**	**0.0**
Final Energy Demand	**155460**	**124696**	**146709**	**157495**	**165519**	**-4563**	**-25904**	**-41009**	**-3.0**	**-14.1**	**-19.9**
by sector											
Industry[1]	68606	45281	49387	56972	63541	-265	-2373	-1892	-0.5	-4.0	-2.9
- energy intensive industries	34503	28649	29113	31890	33591	-133	-1211	-1088	-0.5	-3.7	-3.1
- other industrial sectors	34103	16632	20274	25082	29950	-132	-1162	-804	-0.6	-4.4	-2.6
Residential	40986	34898	41372	42231	42001	-1472	-9513	-16171	-3.4	-18.4	-27.8
Tertiary	25276	21599	24489	24315	24138	-2376	-10323	-16690	-8.8	-29.8	-40.9
Transport	20592	22917	31460	33978	35840	-450	-3695	-6256	-1.4	-9.8	-14.9
by fuel [1]											
Solids	44176	21303	16500	13308	11956	-77	-797	-457	-0.5	-5.6	-3.7
Oil	34795	33764	43236	46918	49281	-969	-5721	-8701	-2.2	-10.9	-15.0
Gas	27229	25471	33277	37497	41594	-1232	-6736	-8704	-3.6	-15.2	-17.3
Electricity	20539	19641	25055	29016	31095	-1091	-7295	-13852	-4.2	-20.1	-30.8
Heat (from CHP and District Heating)	26534	18005	19449	19902	20613	-836	-3033	-5721	-4.1	-13.2	-21.7
Other	2188	6512	9190	10853	10980	-358	-2322	-3574	-3.8	-17.6	-24.6
CO2 Emissions (Mt of CO2)	**707.7**	**547.1**	**572.9**	**537.3**	**514.8**	**-18.1**	**-90.2**	**-129.2**	**-3.1**	**-14.4**	**-20.1**
Power generation/District heating	341.5	280.2	286.6	244.4	212.0	-11.6	-52.3	-79.4	-3.9	-17.6	-27.2
Energy Branch	14.3	17.9	10.9	9.3	8.4	-0.4	-1.9	-1.8	-3.3	-17.0	-17.3
Industry	153.7	96.1	100.9	109.6	118.8	-0.3	-4.9	0.2	-0.3	-4.3	0.2
Residential	86.4	50.6	53.7	49.2	45.5	-1.7	-10.9	-16.1	-3.0	-18.1	-26.1
Tertiary	53.5	37.2	33.2	33.2	35.3	-2.9	-9.4	-14.0	-8.1	-22.0	-28.4
Transport	58.2	65.1	87.6	91.5	94.8	-1.3	-10.9	-18.3	-1.4	-10.7	-16.2
CO2 Emissions Index (1990=100)	**100.0**	**77.3**	**81.0**	**75.9**	**72.7**	-2.6	-12.8	-18.3	-3.1	-14.4	-20.1

Source: PRIMES

NMS: Efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	75.039	74.853	73.401	71.813	70.628	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	312.8	374.8	555.3	820.6	1102.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	755.2	525.3	394.4	272.0	202.0	-11.7	-46.7	-58.0	-2.9	-14.6	-22.3
Gross Inl. Cons./Capita (toe/inhabitant)	3.15	2.63	2.98	3.11	3.15	-0.09	-0.53	-0.91	-2.9	-14.6	-22.3
Electricity Generated/Capita (kWh/inhabitant)	4221	4333	5246	5892	6421	-209	-1364	-2516	-3.8	-18.8	-28.2
Carbon intensity (t of CO_2/toe of GIC)	3.00	2.78	2.62	2.41	2.31	-0.01	0.01	0.06	-0.2	0.3	2.9
CO_2 Emissions/Capita (t of CO_2/inhabitant)	9.43	7.31	7.81	7.48	7.29	-0.25	-1.26	-1.83	-3.1	-14.4	-20.1
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	2262.2	1459.6	1031.7	654.8	466.9	-32.6	-110.0	-117.2	-3.1	-14.4	-20.1
Import Dependency %	28.7	30.1	42.9	51.5	52.9	-1.1	-0.6	-0.8	-2.6	-1.1	-1.6
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	52.9	35.0	27.1	23.3	-0.2	-1.1	-0.7	-0.5	-4.0	-2.9
Residential (Energy on Private Income)	100.0	70.0	55.1	37.7	27.7	-2.0	-8.5	-10.7	-3.4	-18.4	-27.8
Tertiary (Energy on Value added)	100.0	65.9	50.3	33.2	23.7	-4.9	-14.1	-16.4	-8.8	-29.8	-40.9
Transport (Energy on GDP)	100.0	92.9	86.1	62.9	49.4	-1.2	-6.8	-8.6	-1.4	-9.8	-14.9
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.50	0.46	0.41	0.32	0.26	0.00	-0.01	-0.01	-0.5	-2.0	-4.7
Final energy demand (t of CO_2/toe)	2.26	2.00	1.88	1.80	1.78	0.02	0.06	0.12	0.9	3.3	7.3
Industry	2.24	2.12	2.04	1.92	1.87	0.01	-0.01	0.06	0.3	-0.3	3.2
Residential	2.11	1.45	1.30	1.16	1.08	0.01	0.00	0.02	0.4	0.4	2.3
Tertiary	2.12	1.72	1.36	1.36	1.46	0.01	0.14	0.26	0.8	11.1	21.2
Transport	2.83	2.84	2.78	2.69	2.65	0.00	-0.03	-0.04	0.0	-1.0	-1.5
Electricity and steam generation											
Generation Capacity in MW_e		**73667**	**83781**	**93618**	**125467**	**-2557**	**-20872**	**-41271**	**-3.0**	**-18.2**	**-24.8**
Nuclear		9324	8786	8786	8677	0	-1952	-7871	0.0	-18.2	-47.6
Hydro (pumping excluded)		6374	6813	7315	7736	-7	-35	-69	-0.1	-0.5	-0.9
Wind		16	2259	3218	5249	0	-3074	-10872	0.0	-48.9	-67.4
Solar		0	13	138	537	0	0	0	0.0	0.0	0.0
Thermal		57953	65910	74161	103267	-2549	-15812	-22459	-3.7	-17.6	-17.9
of which cogeneration units		24415	25715	32486	54849	-457	-926	864	-1.7	-2.8	1.6
Solids fired		43996	39313	32734	44540	-703	-6923	-12511	-1.8	-17.5	-21.9
Gas fired		6071	16022	25796	34855	-1464	-5789	-9899	-8.4	-18.3	-22.1
Oil fired		6832	7085	4839	3710	16	-1363	-1840	0.2	-22.0	-33.2
Biomass-waste fired		1055	3489	10792	20163	-399	-1738	1791	-10.3	-13.9	9.8
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		0	0	0	0	0	0	0			
Indicators											
Efficiency for thermal electricity production (%)		32.4	34.8	39.6	46.5	-0.4	-1.2	1.3	-1.1	-2.9	2.8
Load factor for gross electric capacities (%)		50.3	52.5	51.6	41.3	-0.5	-0.4	-2.0	-0.9	-0.7	-4.5
CHP indicator (% of electricity from CHP)		23.5	27.4	38.9	59.2	0.7	7.9	19.3	2.8	25.6	48.3
Non fossil fuels in electricity generation (%)		23.3	25.8	31.5	35.5	1.0	1.2	-2.4	4.2	3.9	-6.3
- nuclear		17.7	17.4	16.1	14.8	0.7	0.1	-5.6	4.0	0.8	-27.3
- renewable energy forms		5.6	8.4	15.4	20.6	0.4	1.1	3.2	4.6	7.4	18.3
Transport sector											
Passenger transport activity (Gpkm)	**510.7**	**468.6**	**617.2**	**754.2**	**895.1**	-0.2	-2.0	-6.3	0.0	-0.3	-0.7
Public road transport	135.1	78.3	72.7	67.1	63.3	0.1	0.6	1.0	0.2	0.9	1.6
Private cars and motorcycles	263.6	325.1	470.3	603.6	739.8	-0.5	-2.8	-7.1	-0.1	-0.5	-0.9
Rail	102.1	51.4	50.4	49.4	48.8	0.2	0.4	0.3	0.4	0.9	0.6
Aviation	9.0	13.3	23.2	33.3	42.4	0.0	-0.2	-0.5	-0.1	-0.6	-1.2
Inland navigation	0.8	0.6	0.7	0.7	0.8	0.0	0.0	0.0	-0.1	-0.2	-0.5
Travel per person (km per capita)	6805	6261	8408	10502	12673	-2.3	-27.3	-89.5	0.0	-0.3	-0.7
Freight transport activity (Gtkm)	**334.6**	**305.9**	**438.8**	**554.2**	**648.0**	-0.3	-3.1	-7.7	-0.1	-0.6	-1.2
Trucks	119.9	177.1	299.9	407.0	491.5	-1.1	-5.1	-9.4	-0.4	-1.2	-1.9
Rail	206.8	124.7	134.7	142.7	151.9	0.8	1.9	1.7	0.6	1.3	1.1
Inland navigation	7.9	4.2	4.3	4.5	4.6	0.0	0.0	0.0	0.1	0.5	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	1070	816	790	675	588	-0.5	-3.8	-6.9	-0.1	-0.6	-1.2
Energy demand in transport (ktoe)	**20592**	**22917**	**31460**	**33978**	**35840**	-450	-3695	-6256	-1.4	-9.8	-14.9
Public road transport	1591	1159	1058	856	665	-6	-61	-102	-0.5	-6.7	-13.3
Private cars and motorcycles	8290	11641	14892	16001	16462	-102	-730	-2655	-0.7	-4.4	-13.9
Trucks	7093	7453	12386	14452	15938	-77	-1887	-2735	-0.6	-11.6	-14.6
Rail	2096	1317	1169	871	744	-25	-102	-141	-2.1	-10.5	-15.9
Aviation	1190	1294	1897	1737	1971	-240	-913	-621	-11.2	-34.5	-24.0
Inland navigation	331	54	56	60	61	0	-1	-3	-0.2	-2.2	-4.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	23.9	31.4	29.7	25.1	21.6	-0.6	-2.2	-3.6	-1.9	-8.2	-14.3
Freight transport (toe/Mtkm)	25.0	26.7	29.9	27.2	25.4	-0.2	-3.3	-4.1	-0.6	-10.9	-13.8

Source: PRIMES

EU27: Efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**928078**	**937145**	**868408**	**674941**	**594797**	**-9780**	**-76128**	**-137848**	**-1.1**	**-10.1**	**-18.8**
Solids	364706	214324	164134	118205	99510	-1741	-24785	-32014	-1.0	-17.3	-24.3
Oil	128402	170011	123038	57926	49390	-386	-1246	-264	-0.3	-2.1	-0.5
Natural gas	162645	207644	182915	109223	88674	-1990	-303	-1076	-1.1	-0.3	-1.2
Nuclear	200702	243761	253537	206826	143565	0	-28866	-77742	0.0	-12.2	-35.1
Renewable energy sources	71623	101405	144784	182762	213658	-5662	-20928	-26752	-3.8	-10.3	-11.1
Hydro	25013	30483	31296	33393	35695	-421	-983	-716	-1.3	-2.9	-2.0
Biomass & Waste	43297	65264	93754	120276	139500	-3400	-14546	-15866	-3.5	-10.8	-10.2
Wind	67	1913	14092	21536	29658	-1744	-4865	-8472	-11.0	-18.4	-22.2
Solar and others	145	417	1444	2433	3630	-71	-440	-991	-4.7	-15.3	-21.5
Geothermal	3101	3329	4199	5123	5175	-27	-95	-707	-0.6	-1.8	-12.0
Net Imports	**749474**	**817569**	**1015461**	**1114348**	**1087836**	**-33084**	**-157467**	**-227493**	**-3.2**	**-12.4**	**-17.3**
Solids	81418	98469	132099	113688	113411	-5879	-23851	-71261	-4.3	-17.3	-38.6
Oil	529724	525771	598658	622046	598843	-13571	-64397	-73534	-2.2	-9.4	-10.9
- Crude oil and Feedstocks	503451	507009	563692	596550	579869	-13732	-61039	-71303	-2.4	-9.3	-10.9
- Oil products	26273	18762	34965	25496	18974	161	-3358	-2231	0.5	-11.6	-10.5
Natural gas	135011	191643	283097	377061	373926	-13625	-69186	-82611	-4.6	-15.5	-18.1
Electricity	3321	1687	1607	1553	1655	-9	-32	-87	-0.6	-2.0	-5.0
Gross Inland Consumption	**1645474**	**1709133**	**1835588**	**1736251**	**1627002**	**-42864**	**-233595**	**-365341**	**-2.3**	**-11.9**	**-18.3**
Solids	450795	320708	296233	231892	212921	-7620	-48636	-103275	-2.5	-17.3	-32.7
Oil	624250	648970	673415	626934	592602	-13958	-65643	-73798	-2.0	-9.5	-11.1
Natural gas	294782	392603	466012	486284	462600	-15615	-69489	-83687	-3.2	-12.5	-15.3
Nuclear	200702	243761	253537	206826	143565	0	-28866	-77742	0.0	-12.2	-35.1
Electricity	3321	1687	1607	1553	1655	-9	-32	-87	-0.6	-2.0	-5.0
Renewable energy forms	71623	101405	144784	182762	213658	-5662	-20928	-26752	-3.8	-10.3	-11.1
as % in Gross Inland Consumption											
Solids	27.4	18.8	16.1	13.4	13.1	0.0	-0.9	-2.8	-0.2	-6.2	-17.5
Oil	37.9	38.0	36.7	36.1	36.4	0.1	0.9	3.0	0.3	2.7	8.9
Natural gas	17.9	23.0	25.4	28.0	28.4	-0.3	-0.2	1.0	-1.0	-0.7	3.7
Nuclear	12.2	14.3	13.8	11.9	8.8	0.3	-0.1	-2.3	2.3	-0.4	-20.6
Renewable energy forms	4.4	5.9	7.9	10.5	13.1	-0.1	0.2	1.1	-1.5	1.8	8.8
Electricity Generation in GWh_e	**2561205**	**2993398**	**3480345**	**3503755**	**3487286**	**-121822**	**-659954**	**-1077131**	**-3.4**	**-15.9**	**-23.6**
Nuclear	794718	944823	982718	801659	556454	0	-111887	-301334	0.0	-12.2	-35.1
Hydro & wind	291642	376697	529332	643005	768589	-25169	-67998	-106840	-4.5	-9.6	-12.2
Thermal (incl. biomass)	1474844	1671878	1968295	2059091	2162243	-96652	-480069	-668957	-4.7	-18.9	-23.6
Fuel Inputs for Thermal Power Generation [1]	**384763**	**402753**	**434621**	**407165**	**383989**	**-17808**	**-80848**	**-131210**	**-3.9**	**-16.6**	**-25.5**
Solids	261342	225135	221235	169885	158600	-6858	-45662	-100637	-3.0	-21.2	-38.8
Oil (including refinery gas)	56108	43691	34071	22840	22987	291	-1399	2851	0.9	-5.8	14.2
Gas	54301	109769	148158	162385	129174	-9138	-26839	-31129	-5.8	-14.2	-19.4
Biomass & Waste	10237	21219	27473	47447	68536	-2103	-6948	-1727	-7.1	-12.8	-2.5
Geothermal heat	2774	2939	3685	4608	4693	0	0	-568	0.0	0.0	-10.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**840016**	**818581**	**823527**	**785536**	**751317**	**-15463**	**-69423**	**-80820**	**-1.8**	**-8.1**	**-9.7**
Refineries	673728	727122	736808	697059	665950	-14426	-64093	-73279	-1.9	-8.4	-9.9
Biofuels and hydrogen production	2	637	16923	31710	37399	20	386	29	0.1	1.2	0.1
District heating	38458	19291	14923	9241	7996	-512	-4675	-6849	-3.3	-33.6	-46.1
Others	127829	71530	54872	47525	39972	-545	-1042	-722	-1.0	-2.1	-1.8
Energy Branch Consumption	**78427**	**85834**	**86836**	**79883**	**74318**	**-1750**	**-9472**	**-12748**	**-2.0**	**-10.6**	**-14.6**
Non-Energy Uses	**98844**	**109187**	**110485**	**114161**	**115598**	**99**	**-3**	**9**	**0.1**	**0.0**	**0.0**
Final Energy Demand	**1071205**	**1126314**	**1247594**	**1236698**	**1219084**	**-33566**	**-160491**	**-224181**	**-2.6**	**-11.5**	**-15.5**
by sector											
Industry[1]	372041	342654	371620	393543	412048	-2450	-12978	-9888	-0.7	-3.2	-2.3
- energy intensive industries	239834	220752	231973	237582	239561	-1229	-7189	-5771	-0.5	-2.9	-2.4
- other industrial sectors	132206	121902	139648	155961	172488	-1221	-5789	-4117	-0.9	-3.6	-2.3
Residential	267394	283857	313954	292870	273551	-9926	-60579	-94108	-3.1	-17.1	-25.6
Tertiary	151680	161545	178990	169285	157841	-12910	-47461	-73861	-6.7	-21.9	-31.9
Transport	280091	338258	383029	381000	375643	-8279	-39473	-46324	-2.1	-9.4	-11.0
by fuel [1]											
Solids	128087	58191	47009	40078	34853	-310	-1532	-1637	-0.7	-3.7	-4.5
Oil	441141	476894	518972	489919	464764	-12497	-59364	-70363	-2.4	-10.8	-13.1
Gas	219636	259889	283656	288686	295115	-7066	-37714	-47763	-2.4	-11.6	-13.9
Electricity	183815	216343	257349	263623	265748	-9237	-49859	-82145	-3.5	-15.9	-23.6
Heat (from CHP and District Heating)	67635	73194	80811	87524	91838	-3112	-5005	-9394	-3.7	-5.4	-9.3
Other	30892	41802	59797	66868	66765	-1344	-7016	-12878	-2.2	-9.5	-16.2
CO2 Emissions (Mt of CO2)	**4009.9**	**3800.2**	**3934.8**	**3580.3**	**3354.6**	**-108.0**	**-551.4**	**-825.9**	**-2.7**	**-13.3**	**-19.8**
Power generation/District heating	1483.5	1359.8	1384.4	1160.6	1037.0	-49.7	-261.0	-477.4	-3.5	-18.4	-31.5
Energy Branch	151.1	154.0	130.5	103.7	84.8	-3.2	-18.1	-19.1	-2.4	-14.9	-18.4
Industry	761.0	594.1	610.7	610.9	610.1	-0.9	-28.0	-11.4	-0.2	-4.4	-1.8
Residential	516.6	459.7	479.2	427.5	386.4	-14.7	-82.2	-117.1	-3.0	-16.1	-23.3
Tertiary	285.7	247.7	250.2	236.9	225.3	-15.5	-44.2	-63.5	-5.8	-15.7	-22.0
Transport	812.0	984.9	1079.9	1040.7	1010.8	-24.0	-117.7	-137.4	-2.2	-10.2	-12.0
CO2 Emissions Index (1990=100)	**100.0**	**94.8**	**98.1**	**89.3**	**83.7**	-2.7	-13.7	-20.6	-2.7	-13.3	-19.8

Source: PRIMES

EU27: Efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	472.712	483.520	492.838	496.408	494.784	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7358.9	9001.0	11044.1	13825.4	16315.6	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	223.6	189.9	166.2	125.6	99.7	-3.9	-16.9	-22.4	-2.3	-11.9	-18.3
Gross Inl. Cons./Capita (toe/inhabitant)	3.48	3.53	3.72	3.50	3.29	-0.09	-0.47	-0.74	-2.3	-11.9	-18.3
Electricity Generated/Capita (kWh/inhabitant)	5418	6191	7062	7058	7048	-247	-1329	-2177	-3.4	-15.9	-23.6
Carbon intensity (t of CO_2/toe of GIC)	2.44	2.22	2.14	2.06	2.06	-0.01	-0.04	-0.04	-0.4	-1.7	-1.7
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.48	7.86	7.98	7.21	6.78	-0.22	-1.11	-1.67	-2.7	-13.3	-19.8
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	544.9	422.2	356.3	259.0	205.6	-9.8	-39.9	-50.6	-2.7	-13.3	-19.8
Import Dependency %	44.6	46.7	53.9	62.3	64.7	-0.5	-0.6	0.4	-1.0	-0.9	0.7
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	80.2	73.9	62.7	55.9	-0.5	-2.1	-1.3	-0.7	-3.2	-2.3
Residential (Energy on Private Income)	100.0	87.2	78.8	59.3	47.1	-2.5	-12.3	-16.2	-3.1	-17.1	-25.6
Tertiary (Energy on Value added)	100.0	83.5	73.0	54.4	42.7	-5.3	-15.3	-20.0	-6.7	-21.9	-31.9
Transport (Energy on GDP)	100.0	98.7	91.1	72.4	60.5	-2.0	-7.5	-7.5	-2.1	-9.4	-11.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.27	0.22	0.19	0.00	-0.01	-0.03	-0.4	-5.8	-15.1
Final energy demand (t of CO_2/toe)	2.22	2.03	1.94	1.87	1.83	0.01	0.02	0.06	0.4	1.1	3.2
Industry	2.05	1.73	1.64	1.55	1.48	0.01	-0.02	0.01	0.5	-1.2	0.5
Residential	1.93	1.62	1.53	1.46	1.41	0.00	0.02	0.04	0.1	1.2	3.2
Tertiary	1.88	1.53	1.40	1.40	1.43	0.01	0.10	0.18	1.0	7.9	14.5
Transport	2.90	2.91	2.82	2.73	2.69	0.00	-0.02	-0.03	-0.1	-0.9	-1.1
Electricity and steam generation											
Generation Capacity in MW_e		**697174**	**824024**	**842130**	**907823**	**-25299**	**-141344**	**-248494**	**-3.0**	**-14.4**	**-21.5**
Nuclear		145542	139130	111402	68425	0	-9366	-38011	0.0	-7.8	-35.7
Hydro (pumping excluded)		105185	111162	115609	120554	-1214	-2272	-1615	-1.1	-1.9	-1.3
Wind		12786	72160	108930	142811	-6646	-20026	-41692	-8.4	-15.5	-22.6
Solar		176	1661	4865	10435	0	0	0	0.0	0.0	0.0
Thermal		433485	499910	501324	565597	-17439	-109679	-167175	-3.4	-18.0	-22.8
of which cogeneration units		120284	156391	216189	283452	-7251	-9528	9277	-4.4	-4.2	3.4
Solids fired		203503	168100	137211	165526	-2342	-34824	-65833	-1.4	-20.2	-28.5
Gas fired		135927	242223	265419	275383	-12147	-64279	-103915	-4.8	-19.5	-27.4
Oil fired		78309	67464	49677	39320	-2422	526	3990	-3.5	1.1	11.3
Biomass-waste fired		14723	20768	47500	83892	-528	-11103	-1249	-2.5	-18.9	-1.5
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	1356	1517	1476	0	0	-167	0.0	0.0	-10.2
Indicators											
Efficiency for thermal electricity production (%)		35.7	38.9	43.5	48.4	-0.3	-1.3	1.2	-0.8	-2.8	2.5
Load factor for gross electric capacities (%)		49.0	48.2	47.5	43.9	-0.2	-0.8	-1.2	-0.4	-1.7	-2.7
CHP indicator (% of electricity from CHP)		14.9	18.6	29.0	39.6	0.0	6.2	13.8	0.0	27.5	53.4
Non fossil fuels in electricity generation (%)		46.4	46.1	47.5	48.1	0.7	2.3	2.2	1.6	5.0	4.8
- nuclear		31.6	28.2	22.9	16.0	1.0	0.9	-2.8	3.5	4.3	-15.1
- renewable energy forms		14.9	17.9	24.6	32.2	-0.2	1.3	5.0	-1.3	5.7	18.5
Transport sector											
Passenger transport activity (Gpkm)	**4769.3**	**5568.5**	**6595.2**	**7611.3**	**8395.1**	-0.7	-11.1	-29.8	0.0	-0.1	-0.4
Public road transport	554.1	502.3	518.0	508.0	500.6	1.0	3.6	6.5	0.2	0.7	1.3
Private cars and motorcycles	3567.1	4316.4	5124.4	5938.8	6553.5	-1.9	-15.1	-34.3	0.0	-0.3	-0.5
Rail	450.2	417.8	458.4	497.3	532.1	0.6	3.6	6.2	0.1	0.7	1.2
Aviation	168.5	298.4	454.7	621.8	759.6	-0.4	-3.1	-8.0	-0.1	-0.5	-1.0
Inland navigation	29.4	33.6	39.7	45.4	49.4	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	10089	11517	13382	15333	16967	-1.5	-22.3	-60.3	0.0	-0.1	-0.4
Freight transport activity (Gtkm)	**1861.5**	**2177.1**	**2683.0**	**3186.9**	**3613.1**	-1.8	-14.9	-32.6	-0.1	-0.5	-0.9
Trucks	1075.1	1507.0	1956.4	2406.3	2784.6	-2.6	-19.0	-39.7	-0.1	-0.8	-1.4
Rail	524.7	396.1	426.8	449.2	470.3	0.6	2.8	4.0	0.2	0.6	0.9
Inland navigation	261.8	274.0	299.8	331.5	358.2	0.2	1.3	3.0	0.1	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	253	242	243	231	221	-0.2	-1.1	-2.0	-0.1	-0.5	-0.9
Energy demand in transport (ktoe)	**280091**	**338258**	**383029**	**381000**	**375643**	-8279	-39473	-46324	-2.1	-9.4	-11.0
Public road transport	8685	7514	7434	6317	5287	-39	-388	-457	-0.5	-5.8	-8.0
Private cars and motorcycles	139578	160719	173161	168719	158440	-773	-5369	-7864	-0.4	-3.1	-4.7
Trucks	85770	109568	139873	148832	151745	-575	-15628	-22935	-0.4	-9.5	-13.1
Rail	9564	9423	8406	6266	5852	-207	-525	-451	-2.4	-7.7	-7.2
Aviation	29449	45553	47954	44302	47592	-6673	-17390	-14301	-12.2	-28.2	-23.1
Inland navigation	7044	5481	6201	6563	6727	-13	-173	-317	-0.2	-2.6	-4.5
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.8	35.7	29.5	25.8	-1.2	-3.0	-2.6	-3.1	-9.3	-9.2
Freight transport (toe/Mtkm)	50.8	53.6	55.0	49.0	44.0	-0.2	-4.8	-6.0	-0.4	-8.9	-12.1

Source: PRIMES

EU28: Efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**961237**	**963855**	**893941**	**707421**	**635207**	**-10358**	**-78322**	**-143513**	**-1.1**	**-10.0**	**-18.4**
Solids	377116	227617	174342	131338	113219	-2069	-25304	-33193	-1.2	-16.2	-22.7
Oil	132112	172757	126282	61308	53129	-386	-1246	-264	-0.3	-2.0	-0.5
Natural gas	162820	208170	183935	110578	90094	-2044	-303	-1076	-1.1	-0.3	-1.2
Nuclear	200702	243761	253537	206826	146350	0	-28866	-78426	0.0	-12.2	-34.9
Renewable energy sources	88487	111549	155846	197371	232415	-5859	-22603	-30554	-3.6	-10.3	-11.6
Hydro	27003	33138	34444	36922	39845	-421	-983	-716	-1.2	-2.6	-1.8
Biomass & Waste	57710	71804	99692	126937	146986	-3475	-15323	-17225	-3.4	-10.8	-10.5
Wind	67	1916	14195	22276	30902	-1795	-4865	-8529	-11.2	-17.9	-21.6
Solar and others	173	679	2184	4879	8183	-125	-1170	-3057	-5.4	-19.3	-27.2
Geothermal	3534	4012	5331	6357	6498	-43	-262	-1028	-0.8	-4.0	-13.7
Net Imports	**776740**	**868442**	**1083712**	**1207909**	**1212357**	**-35422**	**-171307**	**-256445**	**-3.2**	**-12.4**	**-17.5**
Solids	85626	107717	144725	126566	128848	-5933	-26807	-76943	-3.9	-17.5	-37.4
Oil	550163	555056	630626	668838	659377	-14588	-69424	-84922	-2.3	-9.4	-11.4
- Crude oil and Feedstocks	523502	528467	593398	640117	636272	-14683	-65743	-81959	-2.4	-9.3	-11.4
- Oil products	26661	26589	37229	28721	23106	95	-3681	-2963	0.3	-11.4	-11.4
Natural gas	137693	203694	307071	411185	422789	-14891	-75043	-94491	-4.6	-15.4	-18.3
Electricity	3259	1975	1290	1321	1343	-9	-33	-88	-0.7	-2.4	-6.2
Gross Inland Consumption	**1704962**	**1786487**	**1928873**	**1861652**	**1791155**	**-45780**	**-249629**	**-399957**	**-2.3**	**-11.8**	**-18.3**
Solids	467717	343986	319067	257904	242068	-8002	-52110	-110136	-2.4	-16.8	-31.3
Oil	647159	679975	708128	676467	656097	-14974	-70670	-85186	-2.1	-9.5	-11.5
Natural gas	297637	405241	491006	521763	512883	-16935	-75347	-95567	-3.3	-12.6	-15.7
Nuclear	200702	243761	253537	206826	146350	0	-28866	-78426	0.0	-12.2	-34.9
Electricity	3259	1975	1290	1321	1343	-9	-33	-88	-0.7	-2.4	-6.2
Renewable energy forms	88487	111549	155846	197371	232415	-5859	-22603	-30554	-3.6	-10.3	-11.6
as % in Gross Inland Consumption											
Solids	27.4	19.3	16.5	13.9	13.5	0.0	-0.8	-2.6	-0.1	-5.7	-15.9
Oil	38.0	38.1	36.7	36.3	36.6	0.1	0.9	2.8	0.3	2.7	8.3
Natural gas	17.5	22.7	25.5	28.0	28.6	-0.3	-0.3	0.9	-1.0	-0.9	3.1
Nuclear	11.8	13.6	13.1	11.1	8.2	0.3	-0.1	-2.1	2.4	-0.5	-20.4
Renewable energy forms	5.2	6.2	8.1	10.6	13.0	-0.1	0.2	1.0	-1.3	1.8	8.1
Electricity Generation in GWh_e	**2618738**	**3118298**	**3645971**	**3724144**	**3810949**	**-129132**	**-698378**	**-1152948**	**-3.4**	**-15.8**	**-23.2**
Nuclear	794718	944823	982718	801659	567250	0	-111887	-303983	0.0	-12.2	-34.9
Hydro & wind	314786	407604	567130	692683	831489	-25772	-67998	-107493	-4.3	-8.9	-11.4
Thermal (incl. biomass)	1509233	1765871	2096124	2229802	2412210	-103360	-518493	-741473	-4.7	-18.9	-23.5
Fuel Inputs for Thermal Power Generation [1]	**393649**	**424378**	**461044**	**440800**	**425043**	**-19115**	**-86732**	**-143858**	**-4.0**	**-16.4**	**-25.3**
Solids	266482	235098	231038	185851	180255	-7185	-48775	-106751	-3.0	-20.8	-37.2
Oil (including refinery gas)	57294	46624	36034	23943	23874	311	-1392	2829	0.9	-5.5	13.4
Gas	56793	118348	162124	177581	145756	-10138	-29617	-37641	-5.9	-14.3	-20.5
Biomass & Waste	10237	21304	27970	48623	70178	-2103	-6948	-1727	-7.0	-12.5	-2.4
Geothermal heat	2842	3004	3878	4801	4979	0	0	-568	0.0	0.0	-10.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**867592**	**846345**	**859821**	**835896**	**815143**	**-16429**	**-74004**	**-91497**	**-1.9**	**-8.1**	**-10.1**
Refineries	696742	750941	769758	744008	726092	-15378	-68797	-83935	-2.0	-8.5	-10.4
Biofuels and hydrogen production	2	637	17013	32055	38391	21	457	95	0.1	1.4	0.2
District heating	38458	19291	14958	9340	8156	-515	-4703	-6907	-3.3	-33.5	-45.9
Others	132391	75474	58092	50494	42504	-557	-961	-751	-1.0	-1.9	-1.7
Energy Branch Consumption	**80396**	**88538**	**89706**	**83446**	**78552**	**-1860**	**-9867**	**-13538**	**-2.0**	**-10.6**	**-14.7**
Non-Energy Uses	**101612**	**112692**	**113882**	**118144**	**120136**	**105**	**-7**	**8**	**0.1**	**0.0**	**0.0**
Final Energy Demand	**1109885**	**1180941**	**1319527**	**1338300**	**1357800**	**-35533**	**-172982**	**-250721**	**-2.6**	**-11.4**	**-15.6**
by sector											
Industry[1]	384219	363322	398600	432893	471989	-2647	-14420	-11841	-0.7	-3.2	-2.4
- energy intensive industries	245670	228215	240219	247747	252716	-1293	-7458	-6014	-0.5	-2.9	-2.3
- other industrial sectors	138549	135107	158381	185146	219273	-1354	-6961	-5827	-0.8	-3.6	-2.6
Residential	281949	300854	332996	317396	304070	-10322	-64414	-103631	-3.0	-16.9	-25.4
Tertiary	154275	166339	186887	179600	169741	-13720	-50973	-79770	-6.8	-22.1	-32.0
Transport	289441	350426	401044	408412	412000	-8844	-43176	-55480	-2.2	-9.6	-11.9
by fuel [1]											
Solids	136126	68674	58407	48656	41158	-359	-1910	-2326	-0.6	-3.8	-5.3
Oil	458929	499706	548238	534463	523152	-13380	-64384	-81701	-2.4	-10.8	-13.5
Gas	220792	264489	295342	309541	328891	-7372	-40768	-53129	-2.4	-11.6	-13.9
Electricity	187680	224587	269092	280205	290231	-9776	-52842	-88009	-3.5	-15.9	-23.3
Heat (from CHP and District Heating)	67875	74443	81551	89623	96293	-3156	-4406	-8956	-3.7	-4.7	-8.5
Other	38483	49041	66899	75812	78075	-1490	-8672	-16601	-2.2	-10.3	-17.5
CO2 Emissions (Mt of CO2)	**4136.3**	**3998.9**	**4176.2**	**3901.0**	**3761.8**	**-115.7**	**-593.7**	**-914.1**	**-2.7**	**-13.2**	**-19.5**
Power generation/District heating	1515.0	1431.1	1464.1	1265.8	1167.6	-53.3	-279.9	-517.2	-3.5	-18.1	-30.7
Energy Branch	155.8	159.9	131.8	104.3	85.3	-3.7	-18.0	-19.1	-2.8	-14.7	-18.3
Industry	796.2	650.1	682.9	702.6	734.1	-1.4	-32.9	-17.9	-0.2	-4.5	-2.4
Residential	538.0	481.6	504.1	460.8	427.5	-15.2	-87.3	-129.7	-2.9	-15.9	-23.3
Tertiary	291.5	255.8	261.1	248.5	234.5	-16.4	-46.7	-65.9	-5.9	-15.8	-22.0
Transport	839.9	1020.5	1132.2	1119.1	1112.9	-25.7	-128.8	-164.3	-2.2	-10.3	-12.9
CO2 Emissions Index (1990=100)	**100.0**	**96.7**	**101.0**	**94.3**	**90.9**	-2.8	-14.4	-22.1	-2.7	-13.2	-19.5

Source: PRIMES

EU28: Efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	528.913	550.981	569.992	582.152	587.546	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7511.4	9217.8	11370.5	14408.7	17374.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	227.0	193.8	169.6	129.2	103.1	-4.0	-17.3	-23.0	-2.3	-11.8	-18.3
Gross Inl. Cons./Capita (toe/inhabitant)	3.22	3.24	3.38	3.20	3.05	-0.08	-0.43	-0.68	-2.3	-11.8	-18.3
Electricity Generated/Capita (kWh/inhabitant)	4951	5660	6397	6397	6486	-227	-1200	-1962	-3.4	-15.8	-23.2
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.24	2.17	2.10	2.10	-0.01	-0.03	-0.03	-0.4	-1.6	-1.6
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.82	7.26	7.33	6.70	6.40	-0.20	-1.02	-1.56	-2.7	-13.2	-19.5
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	550.7	433.8	367.3	270.7	216.5	-10.2	-41.2	-52.6	-2.7	-13.2	-19.5
Import Dependency %	44.6	47.5	54.8	63.1	65.6	-0.5	-0.6	0.3	-0.9	-1.0	0.4
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.8	75.4	64.4	57.9	-0.5	-2.1	-1.5	-0.7	-3.2	-2.4
Residential (Energy on Private Income)	100.0	87.3	78.7	59.7	47.5	-2.4	-12.1	-16.2	-3.0	-16.9	-25.4
Tertiary (Energy on Value added)	100.0	84.3	74.3	55.7	43.4	-5.5	-15.8	-20.4	-6.8	-22.1	-32.0
Transport (Energy on GDP)	100.0	98.7	91.5	73.6	61.5	-2.0	-7.8	-8.3	-2.2	-9.6	-11.9
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.27	0.23	0.20	0.00	-0.01	-0.03	-0.4	-5.5	-14.2
Final energy demand (t of CO_2/toe)	2.22	2.04	1.96	1.89	1.85	0.01	0.02	0.05	0.4	1.1	3.0
Industry	2.07	1.79	1.71	1.62	1.56	0.01	-0.02	0.00	0.5	-1.3	0.1
Residential	1.91	1.60	1.51	1.45	1.41	0.00	0.02	0.04	0.1	1.1	2.9
Tertiary	1.89	1.54	1.40	1.38	1.38	0.01	0.10	0.18	1.0	8.1	14.7
Transport	2.90	2.91	2.82	2.74	2.70	0.00	-0.02	-0.03	-0.1	-0.8	-1.1
Electricity and steam generation											
Generation Capacity in MW_e		**725459**	**863609**	**891542**	**985892**	**-25213**	**-146543**	**-259234**	**-2.8**	**-14.1**	**-20.8**
Nuclear		145542	139130	111402	69800	0	-9366	-38350	0.0	-7.8	-35.5
Hydro (pumping excluded)		116592	122720	127892	134203	-1214	-2272	-1615	-1.0	-1.7	-1.2
Wind		12806	72571	112255	150096	-6848	-20026	-42158	-8.6	-15.1	-21.9
Solar		176	1661	4896	10583	0	0	0	0.0	0.0	0.0
Thermal		450343	527528	535097	621209	-17151	-114878	-177110	-3.1	-17.7	-22.2
of which cogeneration units		122684	161587	227629	306593	-6976	-8111	14731	-4.1	-3.4	5.0
Solids fired		210547	178192	147115	186067	-2342	-37576	-71435	-1.3	-20.3	-27.7
Gas fired		143140	255817	286055	303629	-11792	-66743	-110788	-4.4	-18.9	-26.7
Oil fired		80801	70967	51704	41221	-2488	460	3924	-3.4	0.9	10.5
Biomass-waste fired		14814	21128	48639	88723	-529	-11019	1356	-2.4	-18.5	1.6
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	1424	1585	1568	0	0	-167	0.0	0.0	-9.6
Indicators											
Efficiency for thermal electricity production (%)		35.8	39.1	43.5	48.8	-0.3	-1.3	1.1	-0.7	-2.9	2.4
Load factor for gross electric capacities (%)		49.1	48.2	47.7	44.1	-0.3	-0.9	-1.4	-0.6	-1.9	-3.0
CHP indicator (% of electricity from CHP)		14.8	18.3	28.9	39.4	0.1	6.4	14.1	0.4	28.7	56.0
Non fossil fuels in electricity generation (%)		45.6	45.1	46.1	46.2	0.7	2.3	2.2	1.6	5.3	5.1
- nuclear		30.3	27.0	21.5	14.9	0.9	0.9	-2.7	3.5	4.2	-15.2
- renewable energy forms		15.3	18.2	24.6	31.3	-0.2	1.5	4.9	-1.1	6.3	18.6
Transport sector											
Passenger transport activity (Gpkm)	**4881.2**	**5752.9**	**6896.4**	**8250.1**	**9447.2**	-0.8	-14.8	-47.2	0.0	-0.2	-0.5
Public road transport	618.4	589.7	619.8	631.1	615.4	1.2	5.5	9.2	0.2	0.9	1.5
Private cars and motorcycles	3601.6	4397.4	5298.4	6391.3	7369.7	-2.3	-21.7	-57.9	0.0	-0.3	-0.8
Rail	456.6	423.6	467.1	519.5	577.3	0.7	5.2	12.0	0.2	1.0	2.1
Aviation	170.7	304.7	466.2	653.0	822.1	-0.4	-3.6	-10.1	-0.1	-0.6	-1.2
Inland navigation	33.9	37.4	45.0	55.2	62.7	0.0	-0.2	-0.4	0.0	-0.3	-0.7
Travel per person (km per capita)	9229	10441	12099	14172	16079	-1.4	-25.4	-80.4	0.0	-0.2	-0.5
Freight transport activity (Gtkm)	**1958.3**	**2352.3**	**2945.1**	**3591.8**	**4185.2**	-2.3	-20.2	-46.3	-0.1	-0.6	-1.1
Trucks	1159.5	1668.6	2201.2	2784.3	3318.1	-3.1	-24.9	-55.5	-0.1	-0.9	-1.6
Rail	532.6	405.9	438.7	468.1	498.6	0.6	3.3	6.0	0.1	0.7	1.2
Inland navigation	266.3	277.8	305.2	339.4	368.5	0.2	1.4	3.3	0.1	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	261	255	259	249	241	-0.2	-1.4	-2.7	-0.1	-0.6	-1.1
Energy demand in transport (ktoe)	**289441**	**350426**	**401044**	**408412**	**412000**	-8844	-43176	-55480	-2.2	-9.6	-11.9
Public road transport	9634	8758	8867	7855	6464	-43	-473	-655	-0.5	-5.7	-9.2
Private cars and motorcycles	140266	162549	176687	176653	170579	-797	-5682	-10398	-0.4	-3.1	-5.7
Trucks	92511	116941	150966	163420	168987	-652	-17584	-27733	-0.4	-9.7	-14.1
Rail	9807	9691	8658	6524	6311	-224	-560	-430	-2.5	-7.9	-6.4
Aviation	29928	46814	49397	46973	52403	-7115	-18684	-15898	-12.6	-28.5	-23.3
Inland navigation	7295	5673	6469	6987	7257	-14	-194	-366	-0.2	-2.7	-4.8
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.5	39.3	35.1	28.8	24.9	-1.2	-3.0	-2.7	-3.2	-9.4	-9.9
Freight transport (toe/Mtkm)	51.8	52.8	53.9	47.6	42.2	-0.2	-4.7	-6.2	-0.4	-9.0	-12.9

Source: PRIMES

Europe-30: Efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**1091087**	**1200143**	**1139691**	**954652**	**841623**	**-18638**	**-105240**	**-167796**	**-1.6**	**-9.9**	**-16.6**
Solids	377317	228042	174875	131637	113345	-2069	-25332	-33370	-1.2	-16.1	-22.7
Oil	216359	337714	256494	185627	134965	-1712	-1246	-264	-0.7	-0.7	-0.2
Natural gas	186970	253987	272327	205215	189832	-8647	-25820	-19265	-3.1	-11.2	-9.2
Nuclear	206883	250675	260539	213640	148643	0	-29194	-83120	0.0	-12.0	-35.9
Renewable energy sources	103557	129725	175457	218533	254838	-6211	-23649	-31777	-3.4	-9.8	-11.1
Hydro	40003	48250	49513	53109	56361	-431	-1179	-1110	-0.9	-2.2	-1.9
Biomass & Waste	59720	74749	104038	131705	152641	-3540	-15661	-17268	-3.3	-10.6	-10.2
Wind	67	1919	14276	22365	31022	-2070	-5364	-9299	-12.7	-19.3	-23.1
Solar and others	173	703	2211	4914	8239	-126	-1173	-3060	-5.4	-19.3	-27.1
Geothermal	3595	4103	5420	6440	6575	-45	-273	-1041	-0.8	-4.1	-13.7
Net Imports	**695727**	**684878**	**895371**	**1016826**	**1058074**	**-28363**	**-149802**	**-241324**	**-3.1**	**-12.8**	**-18.6**
Solids	86632	108508	145472	127031	129099	-6000	-26879	-77115	-4.0	-17.5	-37.4
Oil	490237	412700	521920	564507	596700	-14744	-72169	-87557	-2.7	-11.3	-12.8
- Crude oil and Feedstocks	458354	384418	482390	533840	572255	-14992	-68320	-84406	-3.0	-11.3	-12.9
- Oil products	31883	28282	39530	30667	24445	249	-3849	-3151	0.6	-11.2	-11.4
Natural gas	117149	163941	228092	325293	332315	-7610	-50720	-76563	-3.2	-13.5	-18.7
Electricity	1710	-272	-114	-5	-40	-10	-33	-88	9.1	-117.3	-182.7
Gross Inland Consumption	**1751588**	**1839144**	**1985223**	**1916506**	**1841774**	**-47002**	**-255042**	**-409120**	**-2.3**	**-11.7**	**-18.2**
Solids	468937	345317	320348	258668	242444	-8069	-52211	-110486	-2.5	-16.8	-31.3
Oil	669257	702393	728574	695162	673743	-16456	-73415	-87821	-2.2	-9.6	-11.5
Natural gas	301245	411306	500420	530508	522146	-16257	-76540	-95828	-3.1	-12.6	-15.5
Nuclear	206883	250675	260539	213640	148643	0	-29194	-83120	0.0	-12.0	-35.9
Electricity	1710	-272	-114	-5	-40	-10	-33	-88	9.1	-117.3	-182.7
Renewable energy forms	103557	129725	175457	218533	254838	-6211	-23649	-31777	-3.4	-9.8	-11.1
as % in Gross Inland Consumption											
Solids	26.8	18.8	16.1	13.5	13.2	0.0	-0.8	-2.5	-0.1	-5.7	-16.0
Oil	38.2	38.2	36.7	36.3	36.6	0.0	0.9	2.7	0.1	2.5	8.1
Natural gas	17.2	22.4	25.2	27.7	28.4	-0.2	-0.3	0.9	-0.9	-1.0	3.3
Nuclear	11.8	13.6	13.1	11.1	8.1	0.3	0.0	-2.2	2.4	-0.3	-21.6
Renewable energy forms	5.9	7.1	8.8	11.4	13.8	-0.1	0.3	1.1	-1.1	2.2	8.7
Electricity Generation in GWh_e	**2794856**	**3323905**	**3857909**	**3946556**	**4033225**	**-133680**	**-715783**	**-1184412**	**-3.3**	**-15.4**	**-22.7**
Nuclear	818651	971593	1009830	828046	576128	0	-113156	-322158	0.0	-12.0	-35.9
Hydro & wind	465941	583374	743317	882000	1025076	-29077	-76073	-121029	-3.8	-7.9	-10.6
Thermal (incl. biomass)	1510263	1768938	2104762	2236511	2432020	-104603	-526554	-741225	-4.7	-19.1	-23.4
Fuel Inputs for Thermal Power Generation [1]	**394358**	**425676**	**463424**	**442880**	**428993**	**-19162**	**-87999**	**-144243**	**-4.0**	**-16.6**	**-25.2**
Solids	266510	235114	231257	185959	180255	-7160	-48688	-106751	-3.0	-20.7	-37.2
Oil (including refinery gas)	57394	46636	36191	24007	23925	309	-1397	2814	0.9	-5.5	13.3
Gas	56913	118562	162798	177581	146427	-10333	-30552	-37624	-6.0	-14.7	-20.4
Biomass & Waste	10698	22359	29300	50531	73407	-1978	-7362	-2114	-6.3	-12.7	-2.8
Geothermal heat	2842	3004	3878	4801	4979	0	0	-568	0.0	0.0	-10.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**884427**	**866713**	**878876**	**854502**	**833768**	**-18075**	**-76605**	**-94062**	**-2.0**	**-8.2**	**-10.1**
Refineries	713481	771184	788189	761467	743392	-17004	-71343	-86376	-2.1	-8.6	-10.4
Biofuels and hydrogen production	2	637	17350	32865	39408	22	465	95	0.1	1.4	0.2
District heating	38512	19379	15220	9661	8458	-535	-4758	-7022	-3.4	-33.0	-45.4
Others	132432	75512	58118	50509	42510	-558	-970	-760	-1.0	-1.9	-1.8
Energy Branch Consumption	**83789**	**92950**	**94513**	**87434**	**81916**	**-1702**	**-10366**	**-13907**	**-1.8**	**-10.6**	**-14.5**
Non-Energy Uses	**103762**	**115166**	**116093**	**120284**	**122320**	**106**	**-7**	**8**	**0.1**	**0.0**	**0.0**
Final Energy Demand	**1145388**	**1220510**	**1362212**	**1381044**	**1399772**	**-36808**	**-177124**	**-256000**	**-2.6**	**-11.4**	**-15.5**
by sector											
Industry[1]	394004	375356	411065	446366	485932	-2741	-14667	-12097	-0.7	-3.2	-2.4
- energy intensive industries	252212	236839	249092	257211	262245	-1344	-7583	-6182	-0.5	-2.9	-2.3
- other industrial sectors	141792	138517	161972	189155	223687	-1397	-7084	-5915	-0.9	-3.6	-2.6
Residential	290806	310280	343110	327328	313573	-10466	-65319	-104984	-3.0	-16.6	-25.1
Tertiary	160718	172911	194510	186937	176734	-14276	-52558	-82012	-6.8	-21.9	-31.7
Transport	299860	361964	413528	420413	423533	-9325	-44580	-56907	-2.2	-9.6	-11.8
by fuel [1]											
Solids	137278	69933	59368	49270	41527	-442	-2060	-2613	-0.7	-4.0	-5.9
Oil	477192	518412	566703	551566	539138	-14226	-66742	-83991	-2.4	-10.8	-13.5
Gas	222317	266915	299386	314212	333877	-7307	-40966	-53381	-2.4	-11.5	-13.8
Electricity	200044	238509	284293	296540	306665	-10133	-54222	-90517	-3.4	-15.5	-22.8
Heat (from CHP and District Heating)	68198	75229	82641	90965	98219	-3042	-4531	-9187	-3.6	-4.7	-8.6
Other	40359	51512	69822	78492	80347	-1658	-8602	-16312	-2.3	-9.9	-16.9
CO2 Emissions (Mt of CO2)	**4207.7**	**4076.8**	**4257.8**	**3974.5**	**3831.5**	**-118.7**	**-605.0**	**-923.9**	**-2.7**	**-13.2**	**-19.4**
Power generation/District heating	1515.7	1431.7	1467.4	1266.9	1169.8	-53.7	-282.0	-517.7	-3.5	-18.2	-30.7
Energy Branch	163.4	170.4	141.6	112.2	92.0	-3.6	-19.2	-19.8	-2.5	-14.6	-17.7
Industry	807.4	663.2	694.4	715.1	746.9	-1.7	-34.0	-19.1	-0.2	-4.5	-2.5
Residential	551.3	493.5	516.2	471.2	436.5	-15.5	-88.5	-130.8	-2.9	-15.8	-23.1
Tertiary	300.2	264.5	271.0	257.3	242.6	-17.1	-48.5	-67.9	-5.9	-15.9	-21.9
Transport	869.6	1053.4	1167.2	1151.8	1143.8	-27.1	-132.9	-168.5	-2.3	-10.3	-12.8
CO2 Emissions Index (1990=100)	**100.0**	**96.9**	**101.2**	**94.5**	**91.1**	-2.8	-14.4	-22.0	-2.7	-13.2	-19.4

Source: PRIMES

Europe-30: Efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (B)					
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	539.950	562.681	582.130	594.587	600.252	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7877.3	9665.6	11898.8	15057.8	18137.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	222.4	190.3	166.8	127.3	101.5	-4.0	-16.9	-22.6	-2.3	-11.7	-18.2
Gross Inl. Cons./Capita (toe/inhabitant)	3.24	3.27	3.41	3.22	3.07	-0.08	-0.43	-0.68	-2.3	-11.7	-18.2
Electricity Generated/Capita (kWh/inhabitant)	5176	5907	6627	6637	6719	-230	-1204	-1973	-3.3	-15.4	-22.7
Carbon intensity (t of CO_2/toe of GIC)	2.40	2.22	2.14	2.07	2.08	-0.01	-0.04	-0.03	-0.4	-1.7	-1.5
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.79	7.25	7.31	6.68	6.38	-0.20	-1.02	-1.54	-2.7	-13.2	-19.4
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	534.2	421.8	357.8	264.0	211.2	-10.0	-40.2	-50.9	-2.7	-13.2	-19.4
Import Dependency %	38.9	36.4	44.0	51.6	55.7	-0.4	-0.8	-0.6	-0.8	-1.6	-1.0
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.7	75.3	64.3	57.8	-0.5	-2.1	-1.4	-0.7	-3.2	-2.4
Residential (Energy on Private Income)	100.0	87.4	78.7	59.8	47.7	-2.4	-11.9	-16.0	-3.0	-16.6	-25.1
Tertiary (Energy on Value added)	100.0	84.5	74.7	56.0	43.7	-5.5	-15.7	-20.3	-6.8	-21.9	-31.7
Transport (Energy on GDP)	100.0	98.4	91.3	73.3	61.3	-2.1	-7.8	-8.2	-2.2	-9.6	-11.8
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.40	0.29	0.26	0.22	0.19	0.00	-0.01	-0.03	-0.5	-5.9	-14.6
Final energy demand (t of CO_2/toe)	2.21	2.03	1.94	1.88	1.84	0.01	0.02	0.05	0.4	1.0	2.8
Industry	2.05	1.77	1.69	1.60	1.54	0.01	-0.02	0.00	0.4	-1.4	-0.1
Residential	1.90	1.59	1.50	1.44	1.39	0.00	0.01	0.04	0.1	1.0	2.7
Tertiary	1.87	1.53	1.39	1.38	1.37	0.01	0.10	0.17	1.0	7.8	14.4
Transport	2.90	2.91	2.82	2.74	2.70	0.00	-0.02	-0.03	-0.1	-0.8	-1.1
Electricity and steam generation											
Generation Capacity in MW_e		**769539**	**911288**	**941486**	**1036382**	**-26522**	**-149753**	**-265176**	**-2.8**	**-13.7**	**-20.4**
Nuclear		148992	142580	114852	70909	0	-9366	-40666	0.0	-7.5	-36.4
Hydro (pumping excluded)		155831	163989	170917	177739	-1227	-2397	-1601	-0.7	-1.4	-0.9
Wind		12886	73002	112753	150991	-7959	-22264	-45232	-9.8	-16.5	-23.1
Solar		195	1705	5007	10814	0	0	0	0.0	0.0	0.0
Thermal		451636	530011	537957	625929	-17336	-115725	-177677	-3.2	-17.7	-22.1
of which cogeneration units		123656	162883	229439	310446	-6907	-8100	15198	-4.1	-3.4	5.1
Solids fired		210703	178348	147192	186067	-2280	-37514	-71435	-1.3	-20.3	-27.7
Gas fired		143723	257366	287524	305148	-12071	-67382	-111185	-4.5	-19.0	-26.7
Oil fired		80968	71132	51799	41273	-2466	488	3916	-3.4	1.0	10.5
Biomass-waste fired		15202	21742	49856	91872	-519	-11317	1195	-2.3	-18.5	1.3
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	1424	1585	1568	0	0	-167	0.0	0.0	-9.6
Indicators											
Efficiency for thermal electricity production (%)		35.7	39.1	43.4	48.8	-0.3	-1.3	1.1	-0.8	-3.0	2.4
Load factor for gross electric capacities (%)		49.3	48.3	47.9	44.4	-0.3	-0.9	-1.3	-0.5	-1.9	-2.9
CHP indicator (% of electricity from CHP)		14.0	17.5	27.4	37.7	0.1	6.0	13.4	0.6	27.9	55.2
Non fossil fuels in electricity generation (%)		48.9	48.0	49.2	49.1	0.8	2.6	2.5	1.6	5.6	5.3
- nuclear		29.2	26.2	21.0	14.3	0.9	0.8	-2.9	3.5	3.9	-17.0
- renewable energy forms		19.6	21.8	28.2	34.8	-0.1	1.8	5.4	-0.5	6.9	18.4
Transport sector											
Passenger transport activity (Gpkm)	**5032.5**	**5925.5**	**7097.5**	**8473.0**	**9682.0**	-0.8	-15.0	-47.7	0.0	-0.2	-0.5
Public road transport	625.6	596.9	628.0	639.9	624.6	1.2	5.5	9.2	0.2	0.9	1.5
Private cars and motorcycles	3720.2	4530.1	5451.8	6560.7	7547.7	-2.4	-22.0	-58.5	0.0	-0.3	-0.8
Rail	473.5	443.8	490.0	544.2	602.8	0.8	5.3	12.1	0.2	1.0	2.1
Aviation	178.7	316.3	481.5	671.8	842.8	-0.4	-3.7	-10.2	-0.1	-0.5	-1.2
Inland navigation	34.5	38.4	46.2	56.5	64.1	0.0	-0.2	-0.4	0.0	-0.3	-0.7
Travel per person (km per capita)	9320	10531	12192	14250	16130	-1.4	-25.2	-79.5	0.0	-0.2	-0.5
Freight transport activity (Gtkm)	**2026.8**	**2447.9**	**3057.6**	**3722.8**	**4329.2**	-2.3	-20.8	-47.7	-0.1	-0.6	-1.1
Trucks	1179.2	1705.6	2252.5	2853.3	3402.9	-3.2	-25.6	-57.1	-0.1	-0.9	-1.7
Rail	544.1	419.3	454.5	484.6	515.2	0.7	3.3	6.0	0.1	0.7	1.2
Inland navigation	303.5	323.0	350.6	384.9	411.1	0.2	1.4	3.4	0.1	0.4	0.8
Freight activity per unit of GDP (tkm/000 Euro'00)	257	253	257	247	239	-0.2	-1.4	-2.6	-0.1	-0.6	-1.1
Energy demand in transport (ktoe)	**299860**	**361964**	**413528**	**420413**	**423533**	-9325	-44580	-56907	-2.2	-9.6	-11.8
Public road transport	9802	8917	9044	8017	6606	-44	-482	-665	-0.5	-5.7	-9.2
Private cars and motorcycles	145794	168062	182455	181921	175357	-824	-5848	-10553	-0.4	-3.1	-5.7
Trucks	94266	119351	154314	167251	173011	-672	-18071	-28444	-0.4	-9.8	-14.1
Rail	10142	10079	9047	6823	6582	-233	-585	-448	-2.5	-7.9	-6.4
Aviation	31627	49160	51466	48701	54072	-7537	-19385	-16408	-12.8	-28.5	-23.3
Inland navigation	8229	6394	7202	7700	7905	-16	-209	-389	-0.2	-2.6	-4.7
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.6	35.3	28.9	25.0	-1.2	-3.0	-2.7	-3.3	-9.5	-9.9
Freight transport (toe/Mtkm)	51.4	52.0	53.3	47.1	41.8	-0.2	-4.7	-6.2	-0.4	-9.0	-12.9

Source: PRIMES

(1) EUROSTAT Energy Balances do not take into account non-marketed steam, i.e. steam generated - either in boilers or in CHP plants - and used on site by industrial consumers. Using statistical information provided by EUROSTAT on CHP, the non-marketed steam generated in CHP units as well as the corresponding fuel input have been estimated for this study. In the PRIMES model, steam has been attributed to the demand side and the fuel input to the supply side. This approach ensures a better comparability of historical figures with the projections. However, slight differences exist for certain figures related to steam generation - both in terms of final energy demand and transformation input - in this report compared to EUROSTAT energy balances.

Disclaimer: Energy and transport statistics reported in this publication and used for the modelling are taken mainly from EUROSTAT and from the publication "EU Energy and Transport in Figures" of the Directorate General for Energy and Transport. Energy and transport statistical concepts have developed differently in the past according to their individual purposes. Energy demand in transport reflects usually sales of fuels at the point of refuelling, which can differ from the region of consumption. This is particularly relevant for airplanes and trucks. Transport statistics deal with the transport activity within a country but may not always fully include transit shipments. These differences should be borne in mind when comparing energy and transport figures. This applies in particular to transport activity ratios, such as energy efficiency in freight transport, which is measured in tonnes of oil equivalent per million tonne-km.

Abbreviations

GIC: Gross Inland Consumption
CHP: combined heat and power

Geographical regions
EU15: EU15 Member States
EU25: EU15 Member States + New Member States
NMS: New Member States (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia)
EU27: EU25 Member States + Bulgaria + Romania
EU28: EU27 + Turkey
Europe 30: EU28 + Norway + Switzerland

Units
toe: tonne of oil equivalent, or 10^{7} kilocalories, or 41.86 GJ (Gigajoule)
Mtoe: million toe

GW: Gigawatt or 10^{9} watt
kWh: kilowatt-hour or 10^{3} watt-hour
MWh: megawatt-hour or 10^{6} watt-hour
TWh: Terawatt-hour or 10^{12} watt-hour

t: metric tonnes, or 1000 kilogrammes
Mt: Million metric tonnes

km: kilometre
pkm: passenger-kilometre (one passenger transported a distance of one kilometre)
tkm: tonne-kilometre (one tonne transported a distance of one kilometre)
Gpkm: Giga passenger-kilometre, or 10^{9} passenger-kilometre
Gtkm: Giga tonne-kilometre, or 10^{9} tonne-kilometre

APPENDIX 2: "High renewables" case results

Summary results by groups of countries (comparison to Baseline)

EU25: High renewables case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**877543**	**898598**	**892669**	**801998**	**808992**	**56253**	**95477**	**123890**	**6.7**	**13.5**	**18.1**
Solids	351650	204139	146241	95682	99613	-8287	-35400	-20585	-5.4	-27.0	-17.1
Oil	120396	163631	116759	52492	42909	-420	-466	-540	-0.4	-0.9	-1.2
Natural gas	139723	196665	171121	97939	80027	-1058	-410	221	-0.6	-0.4	0.3
Nuclear	196920	237664	248776	196397	140177	0	-32241	-70631	0.0	-14.1	-33.5
Renewable energy sources	68855	96499	209773	359488	446266	66017	163996	215424	45.9	83.9	93.3
Hydro	23391	28982	31986	34034	34924	2108	1831	1043	7.1	5.7	3.1
Biomass & Waste	42151	61865	137157	247203	296690	44749	118011	147811	48.4	91.3	99.3
Wind	67	1913	23032	42996	55196	7246	16755	17254	45.9	63.8	45.5
Solar and others	145	417	2689	12297	33711	1199	9550	29317	80.5	347.7	667.2
Geothermal	3101	3322	14908	22959	25745	10715	17849	20000	255.5	349.3	348.1
Net Imports	**711300**	**801061**	**969363**	**1117652**	**1108116**	**-54912**	**-114039**	**-157451**	**-5.4**	**-9.3**	**-12.4**
Solids	75449	94307	111443	100117	100344	-20845	-28277	-72575	-15.8	-22.0	-42.0
Oil	510017	518147	582989	631172	597641	-16709	-38694	-54808	-2.8	-5.8	-8.4
- Crude oil and Feedstocks	479112	496826	544772	601179	575701	-16585	-35496	-50549	-3.0	-5.6	-8.1
- Oil products	30905	21321	38217	29993	21940	-124	-3197	-4259	-0.3	-9.6	-16.3
Natural gas	123653	186463	272772	384351	407931	-17280	-46959	-30066	-6.0	-10.9	-6.9
Electricity	2181	2144	2159	2012	2200	-78	-110	-2	-3.5	-5.2	-0.1
Gross Inland Consumption	**1556194**	**1653841**	**1813873**	**1866775**	**1861676**	**1341**	**-18562**	**-33561**	**0.1**	**-1.0**	**-1.8**
Solids	431944	306538	257683	195799	199957	-29132	-63677	-93160	-10.2	-24.5	-31.8
Oil	595746	634711	651589	630789	585118	-17129	-39160	-55348	-2.6	-5.8	-8.6
Natural gas	260548	376284	443893	482290	487958	-18338	-47369	-29845	-4.0	-8.9	-5.8
Nuclear	196920	237664	248776	196397	140177	0	-32241	-70631	0.0	-14.1	-33.5
Electricity	2181	2144	2159	2012	2200	-78	-110	-2	-3.5	-5.2	-0.1
Renewable energy forms	68855	96499	209773	359488	446266	66017	163996	215424	45.9	83.9	93.3
as % in Gross Inland Consumption											
Solids	27.8	18.5	14.2	10.5	10.7	-1.6	-3.3	-4.7	-10.2	-23.8	-30.6
Oil	38.3	38.4	35.9	33.8	31.4	-1.0	-1.7	-2.4	-2.6	-4.9	-7.0
Natural gas	16.7	22.8	24.5	25.8	26.2	-1.0	-2.3	-1.1	-4.0	-8.0	-4.1
Nuclear	12.7	14.4	13.7	10.5	7.5	0.0	-1.6	-3.6	-0.1	-13.2	-32.3
Renewable energy forms	4.4	5.8	11.6	19.3	24.0	3.6	8.9	11.8	45.8	85.7	96.8
Electricity Generation in GWh_e	**2455674**	**2900835**	**3436319**	**3920113**	**4259090**	**-46867**	**-85662**	**-107509**	**-1.3**	**-2.1**	**-2.5**
Nuclear	780056	921193	964265	761237	543324	0	-124970	-273767	0.0	-14.1	-33.5
Hydro & wind	272788	359249	641307	935026	1128501	108763	251175	284778	20.4	36.7	33.8
Thermal (incl. biomass)	1402830	1620392	1830746	2223851	2587265	-155630	-211867	-118519	-7.8	-8.7	-4.4
Fuel Inputs for Thermal Power Generation [1]	**355362**	**385987**	**417257**	**443126**	**484046**	**-14983**	**-19645**	**-5992**	**-3.5**	**-4.2**	**-1.2**
Solids	246377	214488	188068	136759	148985	-26882	-61743	-91326	-12.5	-31.1	-38.0
Oil (including refinery gas)	48954	41870	32408	23436	20743	775	124	948	2.4	0.5	4.8
Gas	47057	105480	138432	146487	141897	-14394	-36244	-13351	-9.4	-19.8	-8.6
Biomass & Waste	10201	21211	43975	114031	147208	14828	60412	77784	50.9	112.7	112.0
Geothermal heat	2774	2939	14375	22413	25215	10690	17806	19954	290.1	386.4	379.3
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**797634**	**796450**	**805352**	**819358**	**789373**	**-7545**	**-4737**	**-7692**	**-0.9**	**-0.6**	**-1.0**
Refineries	642275	710448	710830	695679	653659	-18092	-38345	-54444	-2.5	-5.2	-7.7
Biofuels and hydrogen production	2	637	26888	62149	80909	10095	31145	44534	60.1	100.5	122.4
District heating	31035	17261	17178	16545	16768	1928	2727	2035	12.6	19.7	13.8
Others	124322	68104	50455	44985	38037	-1477	-263	184	-2.8	-0.6	0.5
Energy Branch Consumption	**73032**	**80377**	**79600**	**78039**	**74549**	**-1898**	**-3127**	**-3586**	**-2.3**	**-3.9**	**-4.6**
Non-Energy Uses	**94476**	**105950**	**107358**	**110828**	**111696**	**-490**	**-371**	**-468**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1021913**	**1095359**	**1240910**	**1340478**	**1377071**	**2903**	**1973**	**6618**	**0.2**	**0.1**	**0.5**
by sector											
Industry[1]	341087	330062	358933	384888	393524	2513	2486	1958	0.7	0.7	0.5
- energy intensive industries	216809	211616	222597	230098	226214	1837	1706	1282	0.8	0.7	0.6
- other industrial sectors	124278	118446	136336	154790	167309	676	780	676	0.5	0.5	0.4
Residential	261006	273302	312864	339880	352815	898	1139	1530	0.3	0.3	0.4
Tertiary	146622	158975	187963	210162	228386	-524	-1694	3069	-0.3	-0.8	1.4
Transport	273198	333020	381151	405548	402346	17	43	60	0.0	0.0	0.0
by fuel [1]											
Solids	123937	56633	44654	38754	33509	-547	-666	-515	-1.2	-1.7	-1.5
Oil	428121	468312	505171	496303	460797	-12171	-33592	-51039	-2.4	-6.3	-10.0
Gas	200242	251885	275834	302517	310182	-3341	-7209	-11215	-1.2	-2.3	-3.5
Electricity	176468	211352	256211	297620	327648	-3099	-5298	-6395	-1.2	-1.7	-1.9
Heat (from CHP and District Heating)	63092	68712	78263	85885	94487	-1914	-1806	-838	-2.4	-2.1	-0.9
Other	30053	38465	80777	119399	150447	23976	50544	76621	42.2	73.4	103.8
CO2 Emissions (Mt of CO2)	**3776.1**	**3674.1**	**3673.9**	**3449.0**	**3352.9**	**-208.0**	**-479.6**	**-602.1**	**-5.4**	**-12.2**	**-15.2**
Power generation/District heating	1362.6	1294.9	1213.5	989.3	1018.1	-148.3	-344.0	-405.9	-10.9	-25.8	-28.5
Energy Branch	141.5	144.9	110.5	97.7	84.6	-13.4	-16.2	-15.1	-10.8	-14.2	-15.1
Industry	698.9	567.7	558.8	566.7	544.3	-18.2	-28.5	-25.5	-3.2	-4.8	-4.5
Residential	506.1	452.1	479.2	490.8	481.9	-3.5	-4.1	-4.8	-0.7	-0.8	-1.0
Tertiary	274.2	244.6	260.0	261.2	237.0	-1.8	-14.7	-44.9	-0.7	-5.3	-15.9
Transport	792.7	969.9	1051.9	1043.3	986.9	-22.7	-72.1	-106.0	-2.1	-6.5	-9.7
CO2 Emissions Index (1990=100)	**100.0**	**97.3**	**97.3**	**91.3**	**88.8**	-5.5	-12.7	-15.9	-5.4	-12.2	-15.2

Source: PRIMES

EU25: High renewables case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	440.788	452.915	464.054	469.270	469.365	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7294.7	8947.0	10946.8	13656.3	16051.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	213.3	184.8	165.7	136.7	116.0	0.1	-1.4	-2.1	0.1	-1.0	-1.8
Gross Inl. Cons./Capita (toe/inhabitant)	3.53	3.65	3.91	3.98	3.97	0.00	-0.04	-0.07	0.1	-1.0	-1.8
Electricity Generated/Capita (kWh/inhabitant)	5571	6405	7405	8354	9074	-101	-183	-229	-1.3	-2.1	-2.5
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.22	2.03	1.85	1.80	-0.12	-0.24	-0.29	-5.4	-11.3	-13.7
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.57	8.11	7.92	7.35	7.14	-0.45	-1.02	-1.28	-5.4	-12.2	-15.2
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	517.7	410.7	335.6	252.6	208.9	-19.0	-35.1	-37.5	-5.4	-12.2	-15.2
Import Dependency %	44.7	47.2	52.1	58.2	57.8	-3.0	-5.3	-7.1	-5.4	-8.4	-10.9
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	83.8	77.8	67.1	58.8	0.5	0.4	0.3	0.7	0.7	0.5
Residential (Energy on Private Income)	100.0	85.8	80.6	70.8	62.8	0.2	0.2	0.3	0.3	0.3	0.4
Tertiary (Energy on Value added)	100.0	84.9	79.3	70.1	64.2	-0.2	-0.6	0.9	-0.3	-0.8	1.4
Transport (Energy on GDP)	100.0	99.4	93.0	79.3	66.9	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.41	0.30	0.24	0.17	0.17	-0.03	-0.06	-0.06	-11.1	-25.4	-27.9
Final energy demand (t of CO_2/toe)	2.22	2.04	1.89	1.76	1.63	-0.04	-0.09	-0.14	-2.2	-5.0	-7.9
Industry	2.05	1.72	1.56	1.47	1.38	-0.06	-0.08	-0.07	-3.8	-5.4	-5.0
Residential	1.94	1.65	1.53	1.44	1.37	-0.02	-0.02	-0.02	-1.0	-1.2	-1.4
Tertiary	1.87	1.54	1.38	1.24	1.04	-0.01	-0.06	-0.21	-0.4	-4.6	-17.0
Transport	2.90	2.91	2.76	2.57	2.45	-0.06	-0.18	-0.26	-2.1	-6.5	-9.7
Electricity and steam generation											
Generation Capacity in MW_e		**661750**	**832528**	**1013950**	**1184840**	**22021**	**71369**	**88548**	**2.7**	**7.6**	**8.1**
Nuclear		141082	136430	111389	66869	0	-5547	-34347	0.0	-4.7	-33.9
Hydro (pumping excluded)		97168	108102	111656	113754	4169	3039	1553	4.0	2.8	1.4
Wind		12785	110835	208644	275086	32443	81020	92154	41.4	63.5	50.4
Solar		176	1658	27681	57304	0	22831	46940	0.0	470.8	452.9
Thermal		410539	475503	554581	671827	-14591	-29973	-17752	-3.0	-5.1	-2.6
of which cogeneration units		112958	144165	207768	249908	-6705	-1193	1909	-4.4	-0.6	0.8
Solids fired		188879	152192	112131	137616	-4345	-44675	-73620	-2.8	-28.5	-34.9
Gas fired		131875	228459	280220	336543	-16980	-40987	-23591	-6.9	-12.8	-6.6
Oil fired		74302	64401	41914	35640	-1648	-6016	674	-2.5	-12.6	1.9
Biomass-waste fired		14462	26651	114557	155646	5938	57464	74045	28.7	100.6	90.7
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3800	5758	6382	2444	4241	4739	180.2	279.5	288.4
Indicators											
Efficiency for thermal electricity production (%)		36.1	37.7	43.2	46.0	-1.8	-2.1	-1.5	-4.5	-4.7	-3.2
Load factor for gross electric capacities (%)		50.0	47.1	44.1	41.0	-1.9	-4.4	-4.4	-4.0	-9.0	-9.8
CHP indicator (% of electricity from CHP)		14.5	18.5	22.4	25.2	0.7	0.5	0.9	3.9	2.4	3.6
Non fossil fuels in electricity generation (%)		46.5	51.6	58.8	58.4	5.8	13.3	12.1	12.7	29.1	26.0
- nuclear		31.8	28.1	19.4	12.8	0.4	-2.7	-6.0	1.4	-12.2	-31.8
- renewable energy forms		14.7	23.5	39.4	45.6	5.4	16.0	18.0	30.1	68.1	65.3
Transport sector											
Passenger transport activity (Gpkm)	**4640.8**	**5466.3**	**6448.9**	**7400.7**	**8128.8**	-0.5	-1.3	-1.4	0.0	0.0	0.0
Public road transport	504.1	480.1	495.1	480.6	466.8	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3529.3	4253.1	5016.9	5781.8	6359.9	0.4	1.0	1.3	0.0	0.0	0.0
Rail	411.9	402.7	445.5	476.0	502.7	-0.9	-2.5	-3.0	-0.2	-0.5	-0.6
Aviation	166.3	296.9	451.6	616.8	749.9	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	29.2	33.6	39.7	45.5	49.5	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	10528	12069	13897	15771	17319	-1.0	-2.8	-3.0	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1753.9**	**2131.5**	**2581.8**	**3047.9**	**3431.0**	-0.4	-0.8	-0.9	0.0	0.0	0.0
Trucks	1034.1	1486.3	1891.4	2312.4	2658.4	0.3	0.7	1.1	0.0	0.0	0.0
Rail	461.7	374.2	401.3	419.8	436.9	-0.7	-1.6	-2.0	-0.2	-0.4	-0.5
Inland navigation	258.1	271.0	289.0	315.6	335.7	0.0	0.0	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	240	238	236	223	214	0.0	-0.1	-0.1	0.0	0.0	0.0
Energy demand in transport (ktoe)	**273198**	**333020**	**381151**	**405548**	**402346**	17	43	60	0.0	0.0	0.0
Public road transport	7841	7018	7021	6275	5321	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	138202	158349	170190	168929	159883	13	28	32	0.0	0.0	0.0
Trucks	82444	108068	135663	156875	164445	16	45	59	0.0	0.0	0.0
Rail	9066	8897	8290	6475	5974	-17	-43	-45	-0.2	-0.7	-0.7
Aviation	28932	45320	54178	60787	60369	4	10	11	0.0	0.0	0.0
Inland navigation	6714	5368	5808	6206	6354	0	1	1	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	39.3	39.9	37.0	32.7	28.4	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	51.7	53.9	55.3	53.8	49.9	0.0	0.0	0.0	0.0	0.1	0.1

Source: PRIMES

EU15: High renewables case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**707946**	**761643**	**753852**	**658988**	**652663**	**44215**	**78489**	**100930**	**6.2**	**13.5**	**18.3**
Solids	210737	100172	61866	42089	51399	-6393	-17906	-7218	-9.4	-29.8	-12.3
Oil	117782	160552	114400	50377	41084	-418	-451	-513	-0.4	-0.9	-1.2
Natural gas	132975	190581	165364	92637	75242	-1056	-398	226	-0.6	-0.4	0.3
Nuclear	181439	222846	231522	178810	123702	0	-28352	-53884	0.0	-13.7	-30.3
Renewable energy sources	65014	87491	180701	295074	361236	52082	125595	162320	40.5	74.1	81.6
Hydro	22275	27627	30263	32174	32974	1846	1632	960	6.5	5.3	3.0
Biomass & Waste	39426	54257	113194	191893	225587	33875	85670	103180	42.7	80.7	84.3
Wind	67	1912	21925	40044	50548	6545	14865	15640	42.6	59.0	44.8
Solar and others	145	381	2374	11086	29750	1049	8641	25884	79.1	353.4	669.5
Geothermal	3101	3315	12945	19877	22377	8767	14788	16656	209.8	290.6	291.1
Net Imports	**643284**	**741591**	**879146**	**999710**	**980746**	**-45279**	**-95190**	**-130097**	**-4.9**	**-8.7**	**-11.7**
Solids	89663	110142	118223	97175	96418	-16857	-26303	-63535	-12.5	-21.3	-39.7
Oil	458793	472543	528232	569164	531433	-14527	-34399	-47985	-2.7	-5.7	-8.3
- Crude oil and Feedstocks	435365	455606	499196	549432	520229	-14636	-31699	-44672	-2.8	-5.5	-7.9
- Oil products	23428	16937	29037	19732	11204	109	-2700	-3312	0.4	-12.0	-22.8
Natural gas	92495	155262	228868	329599	347934	-13894	-34487	-18577	-5.7	-9.5	-5.1
Electricity	2333	3644	3823	3773	4960	-1	-1	-1	0.0	0.0	0.0
Gross Inland Consumption	**1319965**	**1456936**	**1585981**	**1607096**	**1579333**	**-1064**	**-16701**	**-29167**	**-0.1**	**-1.0**	**-1.8**
Solids	303612	215739	180089	139264	147818	-23250	-44209	-70753	-11.4	-24.1	-32.4
Oil	544159	587926	595615	567939	518441	-14945	-34851	-48498	-2.4	-5.8	-8.6
Natural gas	223408	339289	394232	422236	423176	-14950	-34885	-18351	-3.7	-7.6	-4.2
Nuclear	181439	222846	231522	178810	123702	0	-28352	-53884	0.0	-13.7	-30.3
Electricity	2333	3644	3823	3773	4960	-1	-1	-1	0.0	0.0	0.0
Renewable energy forms	65014	87491	180701	295074	361236	52082	125595	162320	40.5	74.1	81.6
as % in Gross Inland Consumption											
Solids	23.0	14.8	11.4	8.7	9.4	-1.5	-2.6	-4.2	-11.4	-23.3	-31.1
Oil	41.2	40.4	37.6	35.3	32.8	-0.9	-1.8	-2.4	-2.4	-4.8	-6.9
Natural gas	16.9	23.3	24.9	26.3	26.8	-0.9	-1.9	-0.7	-3.6	-6.7	-2.4
Nuclear	13.7	15.3	14.6	11.1	7.8	0.0	-1.6	-3.2	0.1	-12.8	-29.1
Renewable energy forms	4.9	6.0	11.4	18.4	22.9	3.3	7.9	10.5	40.6	75.9	85.0
Electricity Generation in GWh_e	**2138940**	**2576502**	**3042394**	**3414280**	**3645733**	**-40356**	**-70462**	**-89713**	**-1.3**	**-2.0**	**-2.4**
Nuclear	720059	863760	897389	693070	479465	0	-109891	-208854	0.0	-13.7	-30.3
Hydro & wind	259810	343478	608383	878907	1051112	97568	226884	265046	19.1	34.8	33.7
Thermal (incl. biomass)	1159070	1369264	1536621	1842303	2115155	-137924	-187454	-145905	-8.2	-9.2	-6.5
Fuel Inputs for Thermal Power Generation [1]	**282186**	**319336**	**340348**	**358969**	**391903**	**-15632**	**-18255**	**-13659**	**-4.4**	**-4.8**	**-3.4**
Solids	184170	158097	135008	99348	113706	-21347	-43457	-70480	-13.7	-30.4	-38.3
Oil (including refinery gas)	43718	38588	29383	21118	18427	683	160	954	2.4	0.8	5.5
Gas	41697	99188	128958	137617	134148	-11977	-26236	-5687	-8.5	-16.0	-4.1
Biomass & Waste	9827	20524	34563	81519	103732	8257	36519	44925	31.4	81.2	76.4
Geothermal heat	2774	2939	12436	19366	21890	8751	14759	16630	237.5	320.3	316.1
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**704402**	**725664**	**733092**	**738838**	**703174**	**-6857**	**-4014**	**-6647**	**-0.9**	**-0.5**	**-0.9**
Refineries	595036	665476	661966	640681	595113	-16121	-34506	-48499	-2.4	-5.1	-7.5
Biofuels and hydrogen production	2	604	24662	56184	72425	9137	27991	39904	58.9	99.3	122.7
District heating	13085	8717	8324	8216	7444	1588	2755	1797	23.6	50.5	31.8
Others	96279	50868	38141	33757	28192	-1461	-254	150	-3.7	-0.7	0.5
Energy Branch Consumption	**63555**	**67696**	**67228**	**64787**	**60898**	**-1617**	**-2734**	**-3310**	**-2.3**	**-4.0**	**-5.2**
Non-Energy Uses	**84387**	**95815**	**96624**	**97462**	**96372**	**-439**	**-334**	**-410**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**866453**	**970663**	**1089398**	**1157341**	**1170009**	**2663**	**2236**	**6083**	**0.2**	**0.2**	**0.5**
by sector											
Industry[1]	272481	284781	308931	325205	327750	2162	2148	1618	0.7	0.7	0.5
- energy intensive industries	182306	182967	193145	196817	191362	1631	1526	1109	0.9	0.8	0.6
- other industrial sectors	90175	101814	115785	128389	136389	531	622	509	0.5	0.5	0.4
Residential	220020	238404	269848	288053	294472	727	1055	1359	0.3	0.4	0.5
Tertiary	121346	137376	161381	176217	187553	-240	-1000	3064	-0.1	-0.6	1.7
Transport	252606	310102	349238	367865	360233	14	33	43	0.0	0.0	0.0
by fuel [1]											
Solids	79761	35330	27940	24845	21286	-685	-470	-326	-2.4	-1.9	-1.5
Oil	393325	434547	462067	446987	408297	-11070	-30269	-45558	-2.3	-6.3	-10.0
Gas	173014	226415	241457	258634	261464	-3209	-6859	-9637	-1.3	-2.6	-3.6
Electricity	155929	191711	230612	262502	284103	-2552	-4104	-4994	-1.1	-1.5	-1.7
Heat (from CHP and District Heating)	36558	50708	58320	63806	68970	-1571	-950	-21	-2.6	-1.5	0.0
Other	27865	31953	69003	100568	125890	21750	44888	66618	46.0	80.6	112.4
CO2 Emissions (Mt of CO2)	**3068.4**	**3127.0**	**3120.6**	**2940.7**	**2844.4**	**-170.3**	**-360.3**	**-466.6**	**-5.2**	**-10.9**	**-14.1**
Power generation/District heating	1021.1	1014.7	948.1	798.5	839.5	-115.6	-238.1	-293.1	-10.9	-23.0	-25.9
Energy Branch	127.2	127.0	101.2	88.3	76.2	-11.5	-14.4	-13.2	-10.2	-14.0	-14.8
Industry	545.2	471.6	457.6	454.0	428.5	-18.2	-26.6	-22.8	-3.8	-5.5	-5.0
Residential	419.7	401.5	424.3	430.9	420.9	-3.0	-3.9	-4.3	-0.7	-0.9	-1.0
Tertiary	220.7	207.4	224.3	220.8	194.5	-1.4	-12.5	-38.2	-0.6	-5.4	-16.4
Transport	734.5	904.8	965.2	948.1	884.8	-20.6	-64.9	-95.1	-2.1	-6.4	-9.7
CO2 Emissions Index (1990=100)	**100.0**	**101.9**	**101.7**	**95.8**	**92.7**	-5.5	-11.7	-15.2	-5.2	-10.9	-14.1

Source: PRIMES

EU15: High renewables case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	365.749	378.062	390.652	397.458	398.737	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	6981.9	8572.2	10391.5	12835.7	14948.8	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	189.1	170.0	152.6	125.2	105.6	-0.1	-1.3	-2.0	-0.1	-1.0	-1.8
Gross Inl. Cons./Capita (toe/inhabitant)	3.61	3.85	4.06	4.04	3.96	0.00	-0.04	-0.07	-0.1	-1.0	-1.8
Electricity Generated/Capita (kWh/inhabitant)	5848	6815	7788	8590	9143	-103	-177	-225	-1.3	-2.0	-2.4
Carbon intensity (t of CO_2/toe of GIC)	2.32	2.15	1.97	1.83	1.80	-0.11	-0.20	-0.26	-5.1	-10.0	-12.5
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.39	8.27	7.99	7.40	7.13	-0.44	-0.91	-1.17	-5.2	-10.9	-14.1
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	439.5	364.8	300.3	229.1	190.3	-16.4	-28.1	-31.2	-5.2	-10.9	-14.1
Import Dependency %	47.5	49.5	53.8	60.3	60.0	-2.7	-5.1	-6.8	-4.8	-7.8	-10.1
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	90.9	85.9	73.8	64.4	0.6	0.5	0.3	0.7	0.7	0.5
Residential (Energy on Private Income)	100.0	88.8	83.3	72.8	64.2	0.2	0.3	0.3	0.3	0.4	0.5
Tertiary (Energy on Value added)	100.0	88.7	82.8	72.0	65.2	-0.1	-0.4	1.1	-0.1	-0.6	1.7
Transport (Energy on GDP)	100.0	100.0	92.9	79.2	66.6	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.39	0.27	0.21	0.16	0.16	-0.03	-0.05	-0.06	-11.1	-22.7	-25.4
Final energy demand (t of CO_2/toe)	2.22	2.05	1.90	1.77	1.65	-0.04	-0.10	-0.15	-2.3	-5.2	-8.2
Industry	2.00	1.66	1.48	1.40	1.31	-0.07	-0.09	-0.08	-4.5	-6.2	-5.5
Residential	1.91	1.68	1.57	1.50	1.43	-0.02	-0.02	-0.02	-1.0	-1.3	-1.5
Tertiary	1.82	1.51	1.39	1.25	1.04	-0.01	-0.06	-0.22	-0.5	-4.8	-17.8
Transport	2.91	2.92	2.76	2.58	2.46	-0.06	-0.18	-0.26	-2.1	-6.4	-9.7
Electricity and steam generation											
Generation Capacity in MW_e		**588083**	**745541**	**893788**	**1014282**	**21372**	**65698**	**84728**	**3.0**	**7.9**	**9.1**
Nuclear		131758	127644	102603	58601	0	-3596	-26067	0.0	-3.4	-30.8
Hydro (pumping excluded)		90794	100717	103906	105729	3603	2638	1333	3.7	2.6	1.3
Wind		12769	104649	192543	249045	28517	71212	82235	37.5	58.7	49.3
Solar		176	1645	27544	56767	0	22831	46940	0.0	484.5	477.7
Thermal		352586	410886	467193	544140	-10749	-27389	-19713	-2.5	-5.5	-3.5
of which cogeneration units		88543	119426	176358	197512	-5273	809	3498	-4.2	0.5	1.8
Solids fired		144882	113157	86415	101169	-3364	-30734	-53017	-2.9	-26.2	-34.4
Gas fired		125804	217083	259013	301600	-10869	-30609	-13780	-4.8	-10.6	-4.4
Oil fired		67470	57201	36774	31106	-1779	-4955	1690	-3.0	-11.9	5.7
Biomass-waste fired		13407	20074	79907	104618	3248	35343	41389	19.3	79.3	65.5
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3371	5084	5647	2015	3567	4004	148.6	235.1	243.7
Indicators											
Efficiency for thermal electricity production (%)		36.9	38.8	44.1	46.4	-1.6	-2.1	-1.5	-4.0	-4.6	-3.2
Load factor for gross electric capacities (%)		50.0	46.6	43.6	41.0	-2.0	-4.4	-4.8	-4.1	-9.2	-10.6
CHP indicator (% of electricity from CHP)		13.4	17.3	21.2	22.8	0.6	0.8	1.2	3.7	3.9	5.5
Non fossil fuels in electricity generation (%)		49.4	53.7	58.6	57.7	5.2	10.7	10.0	10.8	22.4	20.9
- nuclear		33.5	29.5	20.3	13.2	0.4	-2.7	-5.3	1.3	-11.9	-28.6
- renewable energy forms		15.9	24.2	38.3	44.6	4.8	13.5	15.3	24.9	54.4	52.1
Transport sector											
Passenger transport activity (Gpkm)	**4130.1**	**4997.7**	**5831.6**	**6644.7**	**7227.6**	-0.4	-1.1	-1.2	0.0	0.0	0.0
Public road transport	369.0	401.8	422.5	414.1	404.5	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3265.7	3928.0	4546.2	5175.3	5612.8	0.3	0.9	1.1	0.0	0.0	0.0
Rail	309.8	351.3	395.4	427.4	454.6	-0.8	-2.2	-2.5	-0.2	-0.5	-0.6
Aviation	157.3	283.6	428.4	583.2	706.9	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	28.4	33.0	39.1	44.8	48.7	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	11292	13219	14928	16718	18126	-1.1	-2.8	-3.1	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1419.2**	**1825.6**	**2142.9**	**2490.9**	**2775.7**	-0.2	-0.5	-0.5	0.0	0.0	0.0
Trucks	914.2	1309.3	1590.4	1900.1	2157.1	0.1	0.4	0.6	0.0	0.0	0.0
Rail	254.9	249.5	267.8	279.7	287.6	-0.3	-1.0	-1.2	-0.1	-0.3	-0.4
Inland navigation	250.1	266.8	284.8	311.1	331.1	0.0	0.0	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	203	213	206	194	186	0.0	0.0	0.0	0.0	0.0	0.0
Energy demand in transport (ktoe)	**252606**	**310102**	**349238**	**367865**	**360233**	14	33	43	0.0	0.0	0.0
Public road transport	6250	5860	5957	5358	4554	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	129911	146708	155194	152194	140761	12	25	26	0.0	0.0	0.0
Trucks	75351	100615	123196	140526	145756	12	36	43	0.0	0.0	0.0
Rail	6970	7579	7099	5506	5095	-14	-39	-38	-0.2	-0.7	-0.7
Aviation	27742	44025	52040	58136	57776	4	10	10	0.0	0.0	0.0
Inland navigation	6383	5314	5751	6145	6290	0	1	1	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	41.2	40.7	37.7	33.3	28.8	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	58.0	58.5	60.5	58.9	54.8	0.0	0.0	0.0	0.0	0.0	0.0

Source: PRIMES

NMS: High renewables case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**169598**	**136955**	**138817**	**143011**	**156329**	**12038**	**16989**	**22960**	**9.5**	**13.5**	**17.2**
Solids	140913	103966	84375	53592	48214	-1894	-17494	-13366	-2.2	-24.6	-21.7
Oil	2614	3079	2359	2115	1825	-2	-15	-27	-0.1	-0.7	-1.4
Natural gas	6749	6084	5757	5302	4784	-2	-13	-5	0.0	-0.2	-0.1
Nuclear	15481	14818	17254	17587	16475	0	-3890	-16746	0.0	-18.1	-50.4
Renewable energy sources	3841	9008	29072	64414	85031	13935	38400	53104	92.1	147.6	166.3
Hydro	1116	1355	1724	1859	1950	262	199	83	17.9	12.0	4.5
Biomass & Waste	2725	7609	23963	55310	71103	10874	32342	44631	83.1	140.8	168.6
Wind	0	1	1107	2952	4648	701	1890	1613	173.1	177.8	53.2
Solar and others	0	35	316	1210	3961	151	909	3433	91.3	301.2	650.1
Geothermal	0	8	1963	3082	3368	1948	3061	3344	12579.4	14583.5	13522.5
Net Imports	**68016**	**59470**	**90217**	**117941**	**127371**	**-9633**	**-18849**	**-27353**	**-9.6**	**-13.8**	**-17.7**
Solids	-14214	-15836	-6780	2942	3926	-3987	-1975	-9041	142.7	-40.2	-69.7
Oil	51224	45604	54757	62008	66208	-2182	-4294	-6824	-3.8	-6.5	-9.3
- Crude oil and Feedstocks	43747	41220	45577	51746	55473	-1949	-3797	-5877	-4.1	-6.8	-9.6
- Oil products	7477	4384	9180	10261	10735	-233	-497	-947	-2.5	-4.6	-8.1
Natural gas	31158	31202	43905	54753	59997	-3386	-12471	-11488	-7.2	-18.6	-16.1
Electricity	-152	-1500	-1664	-1761	-2760	-77	-109	-1	4.9	6.6	0.0
Gross Inland Consumption	**236229**	**196904**	**227893**	**259679**	**282344**	**2405**	**-1860**	**-4394**	**1.1**	**-0.7**	**-1.5**
Solids	128332	90799	77594	56535	52139	-5881	-19469	-22407	-7.0	-25.6	-30.1
Oil	51587	46785	55974	62850	66677	-2184	-4309	-6850	-3.8	-6.4	-9.3
Natural gas	37140	36994	49661	60054	64782	-3388	-12484	-11493	-6.4	-17.2	-15.1
Nuclear	15481	14818	17254	17587	16475	0	-3890	-16746	0.0	-18.1	-50.4
Electricity	-152	-1500	-1664	-1761	-2760	-77	-109	-1	4.9	6.6	0.0
Renewable energy forms	3841	9008	29072	64414	85031	13935	38400	53104	92.1	147.6	166.3
as % in Gross Inland Consumption											
Solids	54.3	46.1	34.0	21.8	18.5	-3.0	-7.3	-7.5	-8.0	-25.1	-29.0
Oil	21.8	23.8	24.6	24.2	23.6	-1.2	-1.5	-2.0	-4.8	-5.7	-7.9
Natural gas	15.7	18.8	21.8	23.1	22.9	-1.7	-4.6	-3.7	-7.4	-16.6	-13.7
Nuclear	6.6	7.5	7.6	6.8	5.8	-0.1	-1.4	-5.8	-1.1	-17.5	-49.6
Renewable energy forms	1.6	4.6	12.8	24.8	30.1	6.0	14.9	19.0	90.0	149.4	170.5
Electricity Generation in GWh_e	**316734**	**324333**	**393925**	**505833**	**613358**	**-6511**	**-15200**	**-17796**	**-1.6**	**-2.9**	**-2.8**
Nuclear	59996	57434	66876	68167	63859	0	-15079	-64913	0.0	-18.1	-50.4
Hydro & wind	12978	15771	32924	56118	77389	11196	24291	19732	51.5	76.3	34.2
Thermal (incl. biomass)	243760	251128	294125	381548	472110	-17706	-24413	27385	-5.7	-6.0	6.2
Fuel Inputs for Thermal Power Generation [1]	**73176**	**66652**	**76909**	**84157**	**92144**	**649**	**-1390**	**7668**	**0.9**	**-1.6**	**9.1**
Solids	62206	56391	53059	37410	35279	-5535	-18286	-20846	-9.4	-32.8	-37.1
Oil (including refinery gas)	5236	3281	3025	2318	2316	91	-36	-6	3.1	-1.5	-0.3
Gas	5360	6292	9474	8870	7749	-2417	-10009	-7664	-20.3	-53.0	-49.7
Biomass & Waste	374	687	9411	32512	43475	6571	23893	32859	231.3	277.2	309.5
Geothermal heat	0	0	1939	3047	3324	1939	3047	3324			
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**93232**	**70786**	**72259**	**80521**	**86199**	**-688**	**-723**	**-1044**	**-0.9**	**-0.9**	**-1.2**
Refineries	47239	44972	48865	54999	58546	-1971	-3839	-5945	-3.9	-6.5	-9.2
Biofuels and hydrogen production	0	33	2226	5965	8484	959	3154	4630	75.7	112.2	120.1
District heating	17949	8544	8854	8328	9324	340	-28	237	4.0	-0.3	2.6
Others	28043	17236	12315	11228	9845	-16	-10	34	-0.1	-0.1	0.3
Energy Branch Consumption	**9477**	**12681**	**12372**	**13252**	**13650**	**-281**	**-393**	**-276**	**-2.2**	**-2.9**	**-2.0**
Non-Energy Uses	**10089**	**10135**	**10734**	**13366**	**15324**	**-51**	**-37**	**-58**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**155460**	**124696**	**151512**	**183137**	**207062**	**240**	**-263**	**535**	**0.2**	**-0.1**	**0.3**
by sector											
Industry[1]	68606	45281	50002	59683	65773	351	338	341	0.7	0.6	0.5
- energy intensive industries	34503	28649	29451	33282	34852	206	180	174	0.7	0.5	0.5
- other industrial sectors	34103	16632	20551	26401	30921	144	157	167	0.7	0.6	0.5
Residential	40986	34898	43015	51827	58343	171	84	172	0.4	0.2	0.3
Tertiary	25276	21599	26581	33944	40832	-284	-694	5	-1.1	-2.0	0.0
Transport	20592	22917	31913	37682	42113	3	9	17	0.0	0.0	0.0
by fuel [1]											
Solids	44176	21303	16715	13909	12223	138	-196	-189	0.8	-1.4	-1.5
Oil	34795	33764	43105	49317	52501	-1101	-3323	-5482	-2.5	-6.3	-9.5
Gas	27229	25471	34377	43883	48719	-131	-350	-1579	-0.4	-0.8	-3.1
Electricity	20539	19641	25599	35117	43546	-548	-1194	-1401	-2.1	-3.3	-3.1
Heat (from CHP and District Heating)	26534	18005	19942	22080	25517	-344	-856	-818	-1.7	-3.7	-3.1
Other	2188	6512	11774	18831	24557	2226	5656	10003	23.3	42.9	68.7
CO2 Emissions (Mt of CO2)	**707.7**	**547.1**	**553.3**	**508.3**	**508.5**	**-37.7**	**-119.3**	**-135.5**	**-6.4**	**-19.0**	**-21.0**
Power generation/District heating	341.5	280.2	265.5	190.8	178.6	-32.7	-105.9	-112.8	-11.0	-35.7	-38.7
Energy Branch	14.3	17.9	9.3	9.4	8.3	-1.9	-1.8	-1.9	-17.0	-16.3	-18.2
Industry	153.7	96.1	101.2	112.7	115.9	0.0	-1.9	-2.7	0.0	-1.7	-2.3
Residential	86.4	50.6	54.9	59.8	61.0	-0.5	-0.2	-0.5	-0.8	-0.4	-0.8
Tertiary	53.5	37.2	35.7	40.3	42.5	-0.4	-2.2	-6.7	-1.2	-5.1	-13.6
Transport	58.2	65.1	86.7	95.2	102.2	-2.1	-7.2	-10.9	-2.4	-7.1	-9.6
CO2 Emissions Index (1990=100)	**100.0**	**77.3**	**78.2**	**71.8**	**71.9**	-5.3	-16.9	-19.1	-6.4	-19.0	-21.0

Source: PRIMES

NMS: High renewables case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	75.039	74.853	73.401	71.813	70.628	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	312.8	374.8	555.3	820.6	1102.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	755.2	525.3	410.4	316.4	256.1	4.3	-2.3	-4.0	1.1	-0.7	-1.5
Gross Inl. Cons./Capita (toe/inhabitant)	3.15	2.63	3.10	3.62	4.00	0.03	-0.03	-0.06	1.1	-0.7	-1.5
Electricity Generated/Capita (kWh/inhabitant)	4221	4333	5367	7044	8684	-89	-212	-252	-1.6	-2.9	-2.8
Carbon intensity (t of CO_2/toe of GIC)	3.00	2.78	2.43	1.96	1.80	-0.19	-0.44	-0.44	-7.4	-18.4	-19.8
CO_2 Emissions/Capita (t of CO_2/inhabitant)	9.43	7.31	7.54	7.08	7.20	-0.51	-1.66	-1.92	-6.4	-19.0	-21.0
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	2262.2	1459.6	996.4	619.4	461.2	-67.9	-145.3	-122.9	-6.4	-19.0	-21.0
Import Dependency %	28.7	30.1	39.4	45.2	44.9	-4.7	-6.9	-8.8	-10.6	-13.2	-16.4
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	52.9	35.5	28.4	24.1	0.2	0.2	0.1	0.7	0.6	0.5
Residential (Energy on Private Income)	100.0	70.0	57.3	46.2	38.5	0.2	0.1	0.1	0.4	0.2	0.3
Tertiary (Energy on Value added)	100.0	65.9	54.5	46.3	40.1	-0.6	-0.9	0.0	-1.1	-2.0	0.0
Transport (Energy on GDP)	100.0	92.9	87.3	69.8	58.0	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.50	0.46	0.36	0.22	0.17	-0.04	-0.11	-0.10	-11.0	-34.6	-37.8
Final energy demand (t of CO_2/toe)	2.26	2.00	1.84	1.68	1.55	-0.02	-0.06	-0.10	-1.2	-3.5	-6.3
Industry	2.24	2.12	2.02	1.89	1.76	-0.02	-0.04	-0.05	-0.7	-2.2	-2.8
Residential	2.11	1.45	1.28	1.15	1.05	-0.02	-0.01	-0.01	-1.2	-0.5	-1.1
Tertiary	2.12	1.72	1.34	1.19	1.04	0.00	-0.04	-0.16	-0.1	-3.2	-13.6
Transport	2.83	2.84	2.72	2.53	2.43	-0.07	-0.19	-0.26	-2.4	-7.1	-9.7
Electricity and steam generation											
Generation Capacity in MW_e		**73667**	**86987**	**120162**	**170559**	**650**	**5672**	**3820**	**0.8**	**5.0**	**2.3**
Nuclear		9324	8786	8786	8268	0	-1952	-8280	0.0	-18.2	-50.0
Hydro (pumping excluded)		6374	7386	7750	8025	566	400	220	8.3	5.4	2.8
Wind		16	6186	16100	26040	3926	9808	9919	173.8	155.9	61.5
Solar		0	13	138	537	0	0	0	0.0	0.0	0.0
Thermal		57953	64617	87388	127688	-3842	-2585	1961	-5.6	-2.9	1.6
of which cogeneration units		24415	24739	31410	52396	-1433	-2003	-1589	-5.5	-6.0	-2.9
Solids fired		43996	39035	25716	36447	-981	-13941	-20603	-2.5	-35.2	-36.1
Gas fired		6071	11375	21207	34943	-6111	-10378	-9811	-34.9	-32.9	-21.9
Oil fired		6832	7200	5141	4534	131	-1061	-1016	1.9	-17.1	-18.3
Biomass-waste fired		1055	6578	34650	51028	2689	22121	32656	69.2	176.5	177.7
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		0	429	674	735	429	674	735			
Indicators											
Efficiency for thermal electricity production (%)		32.4	32.9	39.0	44.1	-2.3	-1.8	-1.2	-6.5	-4.5	-2.7
Load factor for gross electric capacities (%)		50.3	51.7	48.1	41.1	-1.2	-3.9	-2.2	-2.4	-7.5	-5.0
CHP indicator (% of electricity from CHP)		23.5	28.0	29.8	38.9	1.3	-1.2	-1.0	4.9	-3.9	-2.5
Non fossil fuels in electricity generation (%)		23.3	35.1	60.5	62.2	10.4	30.1	24.3	41.9	99.4	64.3
- nuclear		17.7	17.0	13.5	10.4	0.3	-2.5	-10.0	1.7	-15.7	-49.0
- renewable energy forms		5.6	18.2	47.0	51.7	10.1	32.6	34.3	125.1	227.4	196.7
Transport sector											
Passenger transport activity (Gpkm)	**510.7**	**468.6**	**617.3**	**756.0**	**901.2**	-0.1	-0.2	-0.2	0.0	0.0	0.0
Public road transport	135.1	78.3	72.6	66.6	62.3	0.0	0.0	0.0	0.0	0.0	0.0
Private cars and motorcycles	263.6	325.1	470.8	606.5	747.1	0.0	0.1	0.2	0.0	0.0	0.0
Rail	102.1	51.4	50.1	48.6	48.1	-0.1	-0.3	-0.4	-0.2	-0.7	-0.9
Aviation	9.0	13.3	23.2	33.6	42.9	0.0	0.0	0.0	0.0	0.0	0.0
Inland navigation	0.8	0.6	0.7	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	6805	6261	8410	10527	12760	-0.7	-2.5	-2.8	0.0	0.0	0.0
Freight transport activity (Gtkm)	**334.6**	**305.9**	**438.9**	**557.0**	**655.3**	-0.2	-0.3	-0.4	0.0	-0.1	-0.1
Trucks	119.9	177.1	301.0	412.3	501.3	0.1	0.3	0.5	0.0	0.1	0.1
Rail	206.8	124.7	133.6	140.2	149.4	-0.3	-0.6	-0.8	-0.2	-0.4	-0.6
Inland navigation	7.9	4.2	4.3	4.5	4.6	0.0	0.0	0.0	0.0	0.1	0.1
Freight activity per unit of GDP (tkm/000 Euro'00)	1070	816	790	679	594	-0.4	-0.4	-0.3	0.0	-0.1	-0.1
Energy demand in transport (ktoe)	**20592**	**22917**	**31913**	**37682**	**42113**	3	9	17	0.0	0.0	0.0
Public road transport	1591	1159	1064	917	767	0	0	0	0.0	0.0	0.0
Private cars and motorcycles	8290	11641	14996	16735	19122	1	4	6	0.0	0.0	0.0
Trucks	7093	7453	12467	16349	18689	4	9	16	0.0	0.1	0.1
Rail	2096	1317	1192	969	879	-2	-5	-6	-0.2	-0.5	-0.7
Aviation	1190	1294	2138	2651	2593	0	1	1	0.0	0.0	0.0
Inland navigation	331	54	57	61	63	0	0	0	0.0	0.1	0.1
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	23.9	31.4	30.3	27.3	25.3	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	25.0	26.7	30.1	30.6	29.5	0.0	0.0	0.0	0.1	0.1	0.1

Source: PRIMES

EU27: High renewables case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**928078**	**937145**	**935850**	**848746**	**859460**	**57663**	**97677**	**126815**	**6.6**	**13.0**	**17.3**
Solids	364706	214324	157239	107545	110646	-8636	-35444	-20878	-5.2	-24.8	-15.9
Oil	128402	170011	123005	58705	49114	-420	-466	-540	-0.3	-0.8	-1.1
Natural gas	162645	207644	183635	109116	89971	-1270	-410	221	-0.7	-0.4	0.2
Nuclear	200702	243761	253537	202766	149762	0	-32926	-71545	0.0	-14.0	-32.3
Renewable energy sources	71623	101405	218435	370614	459967	67989	166924	219557	45.2	81.9	91.3
Hydro	25013	30483	34191	36451	37555	2474	2075	1144	7.8	6.0	3.1
Biomass & Waste	43297	65264	142811	254179	305431	45657	119357	150066	47.0	88.5	96.6
Wind	67	1913	23173	43406	55687	7338	17005	17556	46.3	64.4	46.0
Solar and others	145	417	2732	12564	34376	1217	9691	29755	80.4	337.3	643.9
Geothermal	3101	3329	15529	24014	26918	11303	18796	21037	267.5	360.2	357.7
Net Imports	**749474**	**817569**	**992640**	**1155423**	**1155471**	**-55904**	**-116391**	**-159857**	**-5.3**	**-9.2**	**-12.2**
Solids	81418	98469	116998	109062	112858	-20979	-28478	-71815	-15.2	-20.7	-38.9
Oil	529724	525771	595148	647187	616089	-17081	-39256	-56288	-2.8	-5.7	-8.4
- Crude oil and Feedstocks	503451	507009	560406	621430	598874	-17018	-36159	-52297	-2.9	-5.5	-8.0
- Oil products	26273	18762	34742	25757	17215	-63	-3097	-3991	-0.2	-10.7	-18.8
Natural gas	135011	191643	278955	397699	424784	-17767	-48548	-31753	-6.0	-10.9	-7.0
Electricity	3321	1687	1538	1476	1740	-78	-110	-2	-4.8	-6.9	-0.1
Gross Inland Consumption	**1645474**	**1709133**	**1880210**	**1951131**	**1959300**	**1758**	**-18715**	**-33043**	**0.1**	**-1.0**	**-1.7**
Solids	450795	320708	274238	216607	223504	-29615	-63922	-92693	-9.7	-22.8	-29.3
Oil	624250	648970	669872	652854	609572	-17501	-39722	-56828	-2.5	-5.7	-8.5
Natural gas	294782	392603	462590	506815	514755	-19037	-48958	-31532	-4.0	-8.8	-5.8
Nuclear	200702	243761	253537	202766	149762	0	-32926	-71545	0.0	-14.0	-32.3
Electricity	3321	1687	1538	1476	1740	-78	-110	-2	-4.8	-6.9	-0.1
Renewable energy forms	71623	101405	218435	370614	459967	67989	166924	219557	45.2	81.9	91.3
as % in Gross Inland Consumption											
Solids	27.4	18.8	14.6	11.1	11.4	-1.6	-3.1	-4.5	-9.8	-22.0	-28.1
Oil	37.9	38.0	35.6	33.5	31.1	-1.0	-1.7	-2.3	-2.6	-4.8	-7.0
Natural gas	17.9	23.0	24.6	26.0	26.3	-1.0	-2.2	-1.1	-4.0	-7.9	-4.2
Nuclear	12.2	14.3	13.5	10.4	7.6	0.0	-1.6	-3.5	-0.1	-13.1	-31.2
Renewable energy forms	4.4	5.9	11.6	19.0	23.5	3.6	8.7	11.4	45.1	83.7	94.6
Electricity Generation in GWh_e	**2561205**	**2993398**	**3552884**	**4073644**	**4451329**	**-49282**	**-90064**	**-113088**	**-1.4**	**-2.2**	**-2.5**
Nuclear	794718	944823	982718	785921	580476	0	-127625	-277312	0.0	-14.0	-32.3
Hydro & wind	291642	376697	668590	967922	1164893	114089	256919	289464	20.6	36.1	33.1
Thermal (incl. biomass)	1474844	1671878	1901576	2319801	2705960	-163371	-219359	-125240	-7.9	-8.6	-4.4
Fuel Inputs for Thermal Power Generation [1]	**384763**	**402753**	**436726**	**467843**	**510146**	**-15703**	**-20170**	**-5052**	**-3.5**	**-4.1**	**-1.0**
Solids	261342	225135	200792	153665	168989	-27301	-61882	-90248	-12.0	-28.7	-34.8
Oil (including refinery gas)	56108	43691	34464	24348	21068	685	109	933	2.0	0.5	4.6
Gas	54301	109769	141841	151701	145860	-15455	-37523	-14443	-9.8	-19.8	-9.0
Biomass & Waste	10237	21219	44684	114827	148047	15108	60432	77784	51.1	111.1	110.7
Geothermal heat	2774	2939	14945	23302	26183	11260	18694	20922	305.6	405.7	397.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**840016**	**818581**	**831070**	**849901**	**823939**	**-7920**	**-5058**	**-8199**	**-0.9**	**-0.6**	**-1.0**
Refineries	673728	727122	732710	722144	683036	-18524	-39008	-56192	-2.5	-5.1	-7.6
Biofuels and hydrogen production	2	637	27027	62820	83177	10124	31496	45806	59.9	100.5	122.6
District heating	38458	19291	17395	16619	16826	1959	2703	1982	12.7	19.4	13.3
Others	127829	71530	53938	48319	40899	-1479	-248	205	-2.7	-0.5	0.5
Energy Branch Consumption	**78427**	**85834**	**86644**	**86114**	**83375**	**-1942**	**-3241**	**-3691**	**-2.2**	**-3.6**	**-4.2**
Non-Energy Uses	**98844**	**109187**	**109883**	**113783**	**115106**	**-503**	**-382**	**-482**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1071205**	**1126314**	**1284290**	**1399556**	**1450192**	**3130**	**2368**	**6928**	**0.2**	**0.2**	**0.5**
by sector											
Industry[1]	372041	342654	376667	409129	423932	2597	2608	1996	0.7	0.6	0.5
- energy intensive industries	239834	220752	235111	246585	246664	1909	1814	1332	0.8	0.7	0.5
- other industrial sectors	132206	121902	141556	162544	177268	688	794	664	0.5	0.5	0.4
Residential	267394	283857	324921	354884	369486	1041	1434	1827	0.3	0.4	0.5
Tertiary	151680	161545	191374	215024	234742	-527	-1721	3040	-0.3	-0.8	1.3
Transport	280091	338258	391327	420519	422032	18	46	65	0.0	0.0	0.0
by fuel [1]											
Solids	128087	58191	46721	40871	35434	-598	-740	-1056	-1.3	-1.8	-2.9
Oil	441141	476894	519177	515195	482679	-12292	-34087	-52447	-2.3	-6.2	-9.8
Gas	219636	259889	287337	318958	330989	-3385	-7442	-11890	-1.2	-2.3	-3.5
Electricity	183815	216343	263327	307876	341067	-3258	-5606	-6827	-1.2	-1.8	-2.0
Heat (from CHP and District Heating)	67635	73194	81993	90810	101258	-1930	-1718	25	-2.3	-1.9	0.0
Other	30892	41802	85734	125846	158765	24593	51961	79122	40.2	70.3	99.3
CO2 Emissions (Mt of CO2)	**4009.9**	**3800.2**	**3830.2**	**3645.8**	**3571.8**	**-212.7**	**-485.9**	**-608.6**	**-5.3**	**-11.8**	**-14.6**
Power generation/District heating	1483.5	1359.8	1281.2	1073.9	1109.9	-152.9	-347.8	-404.6	-10.7	-24.5	-26.7
Energy Branch	151.1	154.0	120.8	105.4	89.0	-12.9	-16.4	-15.0	-9.6	-13.5	-14.4
Industry	761.0	594.1	593.2	609.5	592.6	-18.5	-29.4	-28.9	-3.0	-4.6	-4.7
Residential	516.6	459.7	490.0	505.2	498.2	-3.8	-4.5	-5.3	-0.8	-0.9	-1.0
Tertiary	285.7	247.7	263.8	266.2	242.9	-1.8	-14.9	-45.9	-0.7	-5.3	-15.9
Transport	812.0	984.9	1081.1	1085.5	1039.2	-22.8	-72.9	-109.0	-2.1	-6.3	-9.5
CO2 Emissions Index (1990=100)	**100.0**	**94.8**	**95.5**	**90.9**	**89.1**	-5.3	-12.1	-15.2	-5.3	-11.8	-14.6

Source: PRIMES

EU27: High renewables case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	472.712	483.520	492.838	496.408	494.784	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7358.9	9001.0	11044.1	13825.4	16315.6	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	223.6	189.9	170.2	141.1	120.1	0.2	-1.4	-2.0	0.1	-1.0	-1.7
Gross Inl. Cons./Capita (toe/inhabitant)	3.48	3.53	3.82	3.93	3.96	0.00	-0.04	-0.07	0.1	-1.0	-1.7
Electricity Generated/Capita (kWh/inhabitant)	5418	6191	7209	8206	8997	-100	-181	-229	-1.4	-2.2	-2.5
Carbon intensity (t of CO_2/toe of GIC)	2.44	2.22	2.04	1.87	1.82	-0.12	-0.23	-0.28	-5.3	-10.9	-13.1
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.48	7.86	7.77	7.34	7.22	-0.43	-0.98	-1.23	-5.3	-11.8	-14.6
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	544.9	422.2	346.8	263.7	218.9	-19.3	-35.1	-37.3	-5.3	-11.8	-14.6
Import Dependency %	44.6	46.7	51.5	57.7	57.3	-2.9	-5.2	-6.9	-5.4	-8.3	-10.7
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	80.2	74.9	65.1	57.5	0.5	0.4	0.3	0.7	0.6	0.5
Residential (Energy on Private Income)	100.0	87.2	81.6	71.9	63.7	0.3	0.3	0.3	0.3	0.4	0.5
Tertiary (Energy on Value added)	100.0	83.5	78.0	69.1	63.5	-0.2	-0.6	0.8	-0.3	-0.8	1.3
Transport (Energy on GDP)	100.0	98.7	93.1	79.9	68.0	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.24	0.18	0.17	-0.03	-0.06	-0.06	-10.9	-24.1	-26.2
Final energy demand (t of CO_2/toe)	2.22	2.03	1.89	1.76	1.64	-0.04	-0.09	-0.14	-2.1	-4.9	-7.8
Industry	2.05	1.73	1.57	1.49	1.40	-0.06	-0.08	-0.08	-3.7	-5.2	-5.1
Residential	1.93	1.62	1.51	1.42	1.35	-0.02	-0.02	-0.02	-1.1	-1.3	-1.5
Tertiary	1.88	1.53	1.38	1.24	1.03	-0.01	-0.06	-0.21	-0.4	-4.5	-17.0
Transport	2.90	2.91	2.76	2.58	2.46	-0.06	-0.17	-0.26	-2.1	-6.3	-9.5
Electricity and steam generation											
Generation Capacity in MW_e		**697174**	**871734**	**1057773**	**1247539**	**22412**	**74299**	**91222**	**2.6**	**7.6**	**7.9**
Nuclear		145542	139130	114872	71626	0	-5896	-34810	0.0	-4.9	-32.7
Hydro (pumping excluded)		105185	117294	121543	124185	4918	3662	2016	4.4	3.1	1.6
Wind		12786	112014	212892	280248	33208	83936	95745	42.1	65.1	51.9
Solar		176	1661	27696	57376	0	22831	46940	0.0	469.3	449.8
Thermal		433485	501636	580769	714104	-15714	-30235	-18668	-3.0	-4.9	-2.5
of which cogeneration units		120284	155909	224291	276321	-7732	-1426	2146	-4.7	-0.6	0.8
Solids fired		203503	165889	128480	159330	-4554	-43555	-72030	-2.7	-25.3	-31.1
Gas fired		135927	236104	287070	352793	-18265	-42627	-26506	-7.2	-12.9	-7.0
Oil fired		78309	68238	43118	35987	-1648	-6033	657	-2.4	-12.3	1.9
Biomass-waste fired		14723	27478	116145	159398	6183	57542	74257	29.0	98.2	87.2
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3927	5955	6597	2570	4438	4953	189.5	292.5	301.5
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.4	42.6	45.6	-1.8	-2.1	-1.6	-4.6	-4.7	-3.5
Load factor for gross electric capacities (%)		49.0	46.5	44.0	40.7	-1.9	-4.4	-4.3	-3.9	-9.0	-9.6
CHP indicator (% of electricity from CHP)		14.9	19.1	23.2	26.6	0.5	0.5	0.8	2.9	2.1	3.0
Non fossil fuels in electricity generation (%)		46.4	51.3	58.1	57.6	5.8	12.9	11.6	12.9	28.5	25.3
- nuclear		31.6	27.7	19.3	13.0	0.4	-2.6	-5.8	1.4	-12.1	-30.6
- renewable energy forms		14.9	23.6	38.8	44.5	5.5	15.6	17.4	30.1	66.8	64.1
Transport sector											
Passenger transport activity (Gpkm)	**4769.3**	**5568.5**	**6595.5**	**7621.1**	**8423.5**	-0.5	-1.3	-1.5	0.0	0.0	0.0
Public road transport	554.1	502.3	517.0	504.4	494.2	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3567.1	4316.4	5126.8	5954.9	6589.1	0.4	1.1	1.3	0.0	0.0	0.0
Rail	450.2	417.8	456.8	491.2	522.8	-0.9	-2.6	-3.0	-0.2	-0.5	-0.6
Aviation	168.5	298.4	455.1	625.1	767.7	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	29.4	33.6	39.8	45.5	49.6	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	10089	11517	13383	15352	17025	-1.0	-2.7	-2.9	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1861.5**	**2177.1**	**2684.4**	**3201.0**	**3644.8**	-0.4	-0.9	-0.9	0.0	0.0	0.0
Trucks	1075.1	1507.0	1959.3	2426.1	2825.4	0.3	0.8	1.1	0.0	0.0	0.0
Rail	524.7	396.1	425.5	444.7	464.2	-0.7	-1.7	-2.1	-0.2	-0.4	-0.4
Inland navigation	261.8	274.0	299.6	330.2	355.2	0.0	0.1	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	253	242	243	232	223	0.0	-0.1	-0.1	0.0	0.0	0.0
Energy demand in transport (ktoe)	**280091**	**338258**	**391327**	**420519**	**422032**	18	46	65	0.0	0.0	0.0
Public road transport	8685	7514	7473	6706	5745	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	139578	160719	173948	174117	166336	13	29	33	0.0	0.0	0.0
Trucks	85770	109568	140465	164509	174744	17	49	64	0.0	0.0	0.0
Rail	9564	9423	8595	6746	6257	-17	-45	-46	-0.2	-0.7	-0.7
Aviation	29449	45553	54631	61702	61904	4	10	11	0.0	0.0	0.0
Inland navigation	7044	5481	6215	6738	7046	1	1	2	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.8	36.9	32.6	28.4	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	50.8	53.6	55.2	53.8	50.1	0.0	0.0	0.0	0.0	0.1	0.1

Source: PRIMES

EU28: High renewables case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**961237**	**963855**	**967836**	**901469**	**942894**	**63536**	**115726**	**164173**	**7.0**	**14.7**	**21.1**
Solids	377116	227617	166465	120629	125534	-9945	-36013	-20878	-5.6	-23.0	-14.3
Oil	132112	172757	126249	62087	52853	-420	-466	-540	-0.3	-0.7	-1.0
Natural gas	162820	208170	184634	110451	91392	-1345	-430	221	-0.7	-0.4	0.2
Nuclear	200702	243761	253537	202766	153233	0	-32926	-71543	0.0	-14.0	-31.8
Renewable energy sources	88487	111549	236951	405536	519883	75246	185562	256914	46.5	84.4	97.7
Hydro	27003	33138	37756	40264	41705	2891	2359	1144	8.3	6.2	2.8
Biomass & Waste	57710	71804	149636	263461	317068	46469	121200	152856	45.0	85.2	93.1
Wind	67	1916	23605	44636	57517	7615	17495	18087	47.6	64.5	45.9
Solar and others	173	679	3923	24030	66069	1615	17981	54829	69.9	297.2	487.8
Geothermal	3534	4012	22031	33146	37524	16657	26527	29998	309.9	400.8	398.6
Net Imports	**776740**	**868442**	**1060438**	**1251315**	**1289507**	**-58696**	**-127902**	**-179295**	**-5.2**	**-9.3**	**-12.2**
Solids	85626	107717	129017	123743	131179	-21642	-29629	-74613	-14.4	-19.3	-36.3
Oil	550163	555056	627768	697273	686380	-17446	-40989	-57919	-2.7	-5.6	-7.8
- Crude oil and Feedstocks	523502	528467	590721	668080	664407	-17360	-37780	-53823	-2.9	-5.4	-7.5
- Oil products	26661	26589	37047	29193	21973	-86	-3209	-4096	-0.2	-9.9	-15.7
Natural gas	137693	203694	302432	429055	470519	-19530	-57174	-46761	-6.1	-11.8	-9.0
Electricity	3259	1975	1222	1244	1429	-78	-110	-2	-6.0	-8.1	-0.1
Gross Inland Consumption	**1704962**	**1786487**	**1979494**	**2099105**	**2175991**	**4841**	**-12175**	**-15121**	**0.2**	**-0.6**	**-0.7**
Solids	467717	343986	295482	244372	256713	-31587	-65642	-95491	-9.7	-21.2	-27.1
Oil	647159	679975	705237	705681	682824	-17866	-41455	-58459	-2.5	-5.5	-7.9
Natural gas	297637	405241	487066	539506	561910	-20875	-57604	-46540	-4.1	-9.6	-7.6
Nuclear	200702	243761	253537	202766	153233	0	-32926	-71543	0.0	-14.0	-31.8
Electricity	3259	1975	1222	1244	1429	-78	-110	-2	-6.0	-8.1	-0.1
Renewable energy forms	88487	111549	236951	405536	519883	75246	185562	256914	46.5	84.4	97.7
as % in Gross Inland Consumption											
Solids	27.4	19.3	14.9	11.6	11.8	-1.6	-3.0	-4.3	-9.9	-20.7	-26.6
Oil	38.0	38.1	35.6	33.6	31.4	-1.0	-1.8	-2.5	-2.7	-5.0	-7.2
Natural gas	17.5	22.7	24.6	25.7	25.8	-1.1	-2.6	-1.9	-4.3	-9.1	-7.0
Nuclear	11.8	13.6	12.8	9.7	7.0	0.0	-1.5	-3.2	-0.2	-13.5	-31.4
Renewable energy forms	5.2	6.2	12.0	19.3	23.9	3.8	8.9	11.9	46.2	85.4	99.1
Electricity Generation in GWh_e	**2618738**	**3118298**	**3724589**	**4328103**	**4846773**	**-50514**	**-94419**	**-117125**	**-1.3**	**-2.1**	**-2.4**
Nuclear	794718	944823	982718	785921	593929	0	-127625	-277304	0.0	-14.0	-31.8
Hydro & wind	314786	407604	715069	1042589	1253193	122167	281907	314210	20.6	37.1	33.5
Thermal (incl. biomass)	1509233	1765871	2026803	2499594	2999651	-172681	-248702	-154032	-7.9	-9.0	-4.9
Fuel Inputs for Thermal Power Generation [1]	**393649**	**424378**	**466584**	**510789**	**568129**	**-13574**	**-16743**	**-772**	**-2.8**	**-3.2**	**-0.1**
Solids	266482	235098	209023	171290	194522	-29200	-63336	-92484	-12.3	-27.0	-32.2
Oil (including refinery gas)	57294	46624	36455	25466	21963	733	130	918	2.1	0.5	4.4
Gas	56793	118348	155133	166031	166065	-17128	-41168	-17332	-9.9	-19.9	-9.5
Biomass & Waste	10237	21304	45493	116795	150179	15419	61224	78274	51.3	110.2	108.9
Geothermal heat	2842	3004	20480	31208	35399	16602	26407	29852	428.1	550.1	538.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**867592**	**846345**	**868001**	**903516**	**898007**	**-8249**	**-6384**	**-8634**	**-0.9**	**-0.7**	**-1.0**
Refineries	696742	750941	766269	772175	752308	-18866	-40629	-57718	-2.4	-5.0	-7.1
Biofuels and hydrogen production	2	637	27139	63373	85192	10146	31775	46896	59.7	100.6	122.5
District heating	38458	19291	17432	16740	17040	1960	2698	1977	12.7	19.2	13.1
Others	132391	75474	57161	51227	43467	-1489	-228	211	-2.5	-0.4	0.5
Energy Branch Consumption	**80396**	**88538**	**89547**	**90014**	**88313**	**-2019**	**-3299**	**-3777**	**-2.2**	**-3.5**	**-4.1**
Non-Energy Uses	**101612**	**112692**	**113259**	**117749**	**119620**	**-517**	**-401**	**-508**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1109885**	**1180941**	**1358559**	**1514448**	**1626822**	**3499**	**3165**	**18301**	**0.3**	**0.2**	**1.1**
by sector											
Industry[1]	384219	363322	403873	449947	485844	2626	2635	2014	0.7	0.6	0.4
- energy intensive industries	245670	228215	243448	257047	260089	1935	1842	1359	0.8	0.7	0.5
- other industrial sectors	138549	135107	160425	192900	225755	690	793	655	0.4	0.4	0.3
Residential	281949	300854	344703	383913	410480	1385	2104	2780	0.4	0.6	0.7
Tertiary	154275	166339	200076	228950	262950	-531	-1622	13439	-0.3	-0.7	5.4
Transport	289441	350426	409907	451637	467548	19	49	67	0.0	0.0	0.0
by fuel [1]											
Solids	136126	68674	58097	49556	41905	-669	-1010	-1579	-1.1	-2.0	-3.6
Oil	458929	499706	549025	563030	550814	-12592	-35817	-54039	-2.2	-6.0	-8.9
Gas	220792	264489	299121	337914	358077	-3593	-12395	-23943	-1.2	-3.5	-6.3
Electricity	187680	224587	275564	327123	371141	-3304	-5924	-7099	-1.2	-1.8	-1.9
Heat (from CHP and District Heating)	67875	74443	82869	92467	105549	-1838	-1563	301	-2.2	-1.7	0.3
Other	38483	49041	93884	144358	199337	25496	59874	104660	37.3	70.9	110.5
CO2 Emissions (Mt of CO2)	**4136.3**	**3998.9**	**4065.8**	**3976.4**	**4016.4**	**-226.1**	**-518.2**	**-659.5**	**-5.3**	**-11.5**	**-14.1**
Power generation/District heating	1515.0	1431.1	1353.0	1183.7	1264.5	-164.4	-362.1	-420.3	-10.8	-23.4	-24.9
Energy Branch	155.8	159.9	122.5	105.9	89.4	-13.1	-16.4	-15.0	-9.6	-13.4	-14.4
Industry	796.2	650.1	665.1	704.7	720.5	-19.1	-30.8	-31.5	-2.8	-4.2	-4.2
Residential	538.0	481.6	515.4	543.7	551.3	-3.9	-4.4	-5.8	-0.7	-0.8	-1.0
Tertiary	291.5	255.8	274.7	264.2	225.0	-2.8	-31.0	-75.4	-1.0	-10.5	-25.1
Transport	839.9	1020.5	1135.0	1174.3	1165.6	-22.8	-73.6	-111.5	-2.0	-5.9	-8.7
CO2 Emissions Index (1990=100)	**100.0**	**96.7**	**98.3**	**96.1**	**97.1**	-5.5	-12.5	-15.9	-5.3	-11.5	-14.1

Source: PRIMES

EU28: High renewables case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	528.913	550.981	569.992	582.152	587.546	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7511.4	9217.8	11370.5	14408.7	17374.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	227.0	193.8	174.1	145.7	125.2	0.4	-0.8	-0.9	0.2	-0.6	-0.7
Gross Inl. Cons./Capita (toe/inhabitant)	3.22	3.24	3.47	3.61	3.70	0.01	-0.02	-0.03	0.2	-0.6	-0.7
Electricity Generated/Capita (kWh/inhabitant)	4951	5660	6534	7435	8249	-89	-162	-199	-1.3	-2.1	-2.4
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.24	2.05	1.89	1.85	-0.12	-0.23	-0.29	-5.5	-11.0	-13.5
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.82	7.26	7.13	6.83	6.84	-0.40	-0.89	-1.12	-5.3	-11.5	-14.1
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	550.7	433.8	357.6	276.0	231.2	-19.9	-36.0	-38.0	-5.3	-11.5	-14.1
Import Dependency %	44.6	47.5	52.3	58.1	57.8	-3.0	-5.6	-7.6	-5.5	-8.8	-11.6
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.8	76.4	66.9	59.6	0.5	0.4	0.2	0.7	0.6	0.4
Residential (Energy on Private Income)	100.0	87.3	81.4	72.2	64.2	0.3	0.4	0.4	0.4	0.6	0.7
Tertiary (Energy on Value added)	100.0	84.3	79.6	71.0	67.2	-0.2	-0.5	3.4	-0.3	-0.7	5.4
Transport (Energy on GDP)	100.0	98.7	93.6	81.3	69.8	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.24	0.19	0.18	-0.03	-0.06	-0.06	-11.1	-23.0	-24.5
Final energy demand (t of CO_2/toe)	2.22	2.04	1.91	1.77	1.64	-0.04	-0.10	-0.16	-2.1	-5.1	-8.8
Industry	2.07	1.79	1.65	1.57	1.48	-0.06	-0.08	-0.07	-3.4	-4.7	-4.6
Residential	1.91	1.60	1.50	1.42	1.34	-0.02	-0.02	-0.02	-1.1	-1.3	-1.7
Tertiary	1.89	1.54	1.37	1.15	0.86	-0.01	-0.13	-0.35	-0.8	-9.9	-28.9
Transport	2.90	2.91	2.77	2.60	2.49	-0.06	-0.16	-0.24	-2.0	-5.9	-8.7
Electricity and steam generation											
Generation Capacity in MW_e		**725459**	**914219**	**1122194**	**1349943**	**25397**	**84109**	**104817**	**2.9**	**8.1**	**8.4**
Nuclear		145542	139130	114872	73342	0	-5896	-34809	0.0	-4.9	-32.2
Hydro (pumping excluded)		116592	129406	134369	138040	5472	4205	2221	4.4	3.2	1.6
Wind		12806	113708	220170	293933	34289	87888	101679	43.2	66.4	52.9
Solar		176	1661	38157	69644	0	33261	59061	0.0	679.3	558.1
Thermal		450343	530314	614627	774984	-14365	-35349	-23335	-2.6	-5.4	-2.9
of which cogeneration units		122684	160992	233530	294581	-7571	-2210	2719	-4.5	-0.9	0.9
Solids fired		210547	175981	138418	180986	-4554	-46273	-76517	-2.5	-25.1	-29.7
Gas fired		143140	249304	305290	383588	-18305	-47508	-30829	-6.8	-13.5	-7.4
Oil fired		80801	71743	45148	37891	-1712	-6097	594	-2.3	-11.9	1.6
Biomass-waste fired		14814	28124	118056	163868	6467	58398	76501	29.9	97.9	87.6
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	5163	7716	8652	3739	6131	6916	262.6	386.9	398.5
Indicators											
Efficiency for thermal electricity production (%)		35.8	37.4	42.1	45.4	-2.0	-2.7	-2.3	-5.2	-6.1	-4.8
Load factor for gross electric capacities (%)		49.1	46.5	44.0	41.0	-2.0	-4.6	-4.5	-4.1	-9.5	-9.9
CHP indicator (% of electricity from CHP)		14.8	18.8	22.8	26.0	0.5	0.4	0.8	2.8	1.7	3.1
Non fossil fuels in electricity generation (%)		45.6	50.4	56.8	55.4	6.0	13.0	11.4	13.5	29.7	26.0
- nuclear		30.3	26.4	18.2	12.3	0.4	-2.5	-5.3	1.4	-12.1	-30.2
- renewable energy forms		15.3	24.0	38.7	43.1	5.6	15.5	16.7	30.7	67.1	63.4
Transport sector											
Passenger transport activity (Gpkm)	**4881.2**	**5752.9**	**6896.7**	**8263.5**	**9492.9**	-0.5	-1.4	-1.5	0.0	0.0	0.0
Public road transport	618.4	589.7	618.6	625.7	606.4	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3601.6	4397.4	5301.1	6414.1	7428.9	0.4	1.1	1.4	0.0	0.0	0.0
Rail	456.6	423.6	465.4	511.6	562.1	-1.0	-2.7	-3.2	-0.2	-0.5	-0.6
Aviation	170.7	304.7	466.6	656.7	832.3	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	33.9	37.4	45.1	55.4	63.2	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	9229	10441	12100	14195	16157	-0.9	-2.4	-2.6	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1958.3**	**2352.3**	**2946.9**	**3611.1**	**4230.5**	-0.4	-0.9	-1.0	0.0	0.0	0.0
Trucks	1159.5	1668.6	2204.6	2810.0	3374.7	0.3	0.8	1.2	0.0	0.0	0.0
Rail	532.6	405.9	437.3	463.0	490.4	-0.7	-1.8	-2.2	-0.2	-0.4	-0.5
Inland navigation	266.3	277.8	305.0	338.1	365.3	0.0	0.1	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	261	255	259	251	243	0.0	-0.1	-0.1	0.0	0.0	0.0
Energy demand in transport (ktoe)	**289441**	**350426**	**409907**	**451637**	**467548**	19	49	67	0.0	0.0	0.0
Public road transport	9634	8758	8911	8329	7120	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	140266	162549	177497	182365	181011	13	30	34	0.0	0.0	0.0
Trucks	92511	116941	151636	181056	196786	17	51	67	0.0	0.0	0.0
Rail	9807	9691	8864	7038	6693	-17	-46	-48	-0.2	-0.7	-0.7
Aviation	29928	46814	56516	65667	68312	4	11	11	0.0	0.0	0.0
Inland navigation	7295	5673	6483	7182	7624	1	1	2	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.5	39.3	36.3	31.8	27.7	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	51.8	52.8	54.1	52.3	48.4	0.0	0.0	0.0	0.0	0.1	0.1

Source: PRIMES

Europe-30: High renewables case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (A)										
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**1091087**	**1200143**	**1210632**	**1174921**	**1168215**	**52302**	**115029**	**158796**	**4.5**	**10.9**	**15.7**
Solids	377317	228042	166999	120907	125829	-9945	-36062	-20886	-5.6	-23.0	-14.2
Oil	216359	337714	255032	186406	134689	-3174	-466	-540	-1.2	-0.2	-0.4
Natural gas	186970	253987	269995	227523	203503	-10980	-3511	-5593	-3.9	-1.5	-2.7
Nuclear	206883	250675	260539	209908	157814	0	-32926	-73948	0.0	-13.6	-31.9
Renewable energy sources	103557	129725	258068	430177	546380	76400	187995	259764	42.1	77.6	90.6
Hydro	40003	48250	53075	56955	58958	3132	2667	1487	6.3	4.9	2.6
Biomass & Waste	59720	74749	154851	270698	325206	47272	123332	155296	43.9	83.7	91.4
Wind	67	1919	24049	45163	58402	7703	17434	18081	47.1	62.9	44.8
Solar and others	173	703	3972	24120	66200	1636	18033	54902	70.0	296.3	485.9
Geothermal	3595	4103	22121	33241	37615	16657	26528	29998	304.8	395.2	393.9
Net Imports	**695727**	**684878**	**875845**	**1039423**	**1124259**	**-47889**	**-127205**	**-175139**	**-5.2**	**-10.9**	**-13.5**
Solids	86632	108508	129674	124151	131500	-21798	-29758	-74714	-14.4	-19.3	-36.2
Oil	490237	412700	521621	594743	625217	-15043	-41933	-59040	-2.8	-6.6	-8.6
- Crude oil and Feedstocks	458354	384418	482355	563645	601908	-15027	-38515	-54754	-3.0	-6.4	-8.3
- Oil products	31883	28282	39266	31097	23309	-16	-3418	-4286	0.0	-9.9	-15.5
Natural gas	117149	163941	224732	320610	367495	-10971	-55403	-41383	-4.7	-14.7	-10.1
Electricity	1710	-272	-182	-81	47	-78	-110	-2	74.3	-385.7	-3.7
Gross Inland Consumption	**1751588**	**1839144**	**2036637**	**2159373**	**2234551**	**4413**	**-12176**	**-16343**	**0.2**	**-0.6**	**-0.7**
Solids	468937	345317	296673	245058	257329	-31743	-65820	-95601	-9.7	-21.2	-27.1
Oil	669257	702393	726813	726178	701983	-18217	-42400	-59580	-2.4	-5.5	-7.8
Natural gas	301245	411306	494726	548133	570998	-21950	-58915	-46976	-4.2	-9.7	-7.6
Nuclear	206883	250675	260539	209908	157814	0	-32926	-73948	0.0	-13.6	-31.9
Electricity	1710	-272	-182	-81	47	-78	-110	-2	74.3	-385.7	-3.7
Renewable energy forms	103557	129725	258068	430177	546380	76400	187995	259764	42.1	77.6	90.6
as % in Gross Inland Consumption											
Solids	26.8	18.8	14.6	11.3	11.5	-1.6	-3.0	-4.2	-9.9	-20.7	-26.6
Oil	38.2	38.2	35.7	33.6	31.4	-1.0	-1.8	-2.4	-2.7	-5.0	-7.1
Natural gas	17.2	22.4	24.3	25.4	25.6	-1.1	-2.6	-1.9	-4.5	-9.2	-6.9
Nuclear	11.8	13.6	12.8	9.7	7.1	0.0	-1.5	-3.2	-0.2	-13.1	-31.4
Renewable energy forms	5.9	7.1	12.7	19.9	24.5	3.7	8.8	11.7	41.7	78.6	92.0
Electricity Generation in GWh_e	**2794856**	**3323905**	**3940360**	**4566772**	**5098853**	**-51229**	**-95567**	**-118784**	**-1.3**	**-2.0**	**-2.3**
Nuclear	818651	971593	1009830	813578	611669	0	-127625	-286617	0.0	-13.6	-31.9
Hydro & wind	465941	583374	898386	1242863	1464241	125991	284790	318136	16.3	29.7	27.8
Thermal (incl. biomass)	1510263	1768938	2032145	2510332	3022943	-177220	-252733	-150302	-8.0	-9.1	-4.7
Fuel Inputs for Thermal Power Generation [1]	**394358**	**425676**	**468467**	**513640**	**572944**	**-14119**	**-17239**	**-292**	**-2.9**	**-3.2**	**-0.1**
Solids	266510	235114	209152	171311	194522	-29266	-63336	-92484	-12.3	-27.0	-32.2
Oil (including refinery gas)	57394	46636	36633	25553	22020	751	149	909	2.1	0.6	4.3
Gas	56913	118562	155155	166186	167302	-17977	-41947	-16749	-10.4	-20.2	-9.1
Biomass & Waste	10698	22359	47047	119381	153701	15770	61487	78180	50.4	106.2	103.5
Geothermal heat	2842	3004	20480	31208	35399	16602	26407	29852	428.1	550.1	538.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**884427**	**866713**	**888404**	**924981**	**919614**	**-8548**	**-6126**	**-8217**	**-1.0**	**-0.7**	**-0.9**
Refineries	713481	771184	785912	791449	771122	-19281	-41361	-58646	-2.4	-5.0	-7.1
Biofuels and hydrogen production	2	637	27572	65158	87532	10243	32758	48219	59.1	101.1	122.7
District heating	38512	19379	17734	17131	17486	1979	2712	2007	12.6	18.8	13.0
Others	132432	75512	57187	51243	43474	-1489	-236	203	-2.5	-0.5	0.5
Energy Branch Consumption	**83789**	**92950**	**93897**	**94431**	**91929**	**-2317**	**-3369**	**-3894**	**-2.4**	**-3.4**	**-4.1**
Non-Energy Uses	**103762**	**115166**	**115464**	**119885**	**121797**	**-523**	**-406**	**-514**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1145388**	**1220510**	**1402583**	**1561417**	**1674169**	**3562**	**3249**	**18397**	**0.3**	**0.2**	**1.1**
by sector											
Industry[1]	394004	375356	416473	463733	500119	2668	2699	2090	0.6	0.6	0.4
- energy intensive industries	252212	236839	252406	266683	269840	1970	1889	1413	0.8	0.7	0.5
- other industrial sectors	141792	138517	164067	197050	230280	698	810	677	0.4	0.4	0.3
Residential	290806	310280	354990	394801	421391	1414	2154	2834	0.4	0.5	0.7
Tertiary	160718	172911	208247	237840	272151	-539	-1654	13405	-0.3	-0.7	5.2
Transport	299860	361964	422873	465043	480508	19	50	68	0.0	0.0	0.0
by fuel [1]											
Solids	137278	69933	59063	50178	42478	-747	-1153	-1662	-1.2	-2.2	-3.8
Oil	477192	518412	568120	581551	567966	-12809	-36757	-55163	-2.2	-5.9	-8.9
Gas	222317	266915	303057	342361	362576	-3637	-12817	-24681	-1.2	-3.6	-6.4
Electricity	200044	238509	291062	344742	389953	-3364	-6020	-7229	-1.1	-1.7	-1.8
Heat (from CHP and District Heating)	68198	75229	83906	94015	107747	-1777	-1480	341	-2.1	-1.6	0.3
Other	40359	51512	97375	148570	203450	25896	61475	106791	36.2	70.6	110.5
CO2 Emissions (Mt of CO2)	**4207.7**	**4076.8**	**4146.2**	**4054.7**	**4091.1**	**-230.2**	**-524.8**	**-664.3**	**-5.3**	**-11.5**	**-14.0**
Power generation/District heating	1515.7	1431.7	1354.5	1184.8	1268.0	-166.7	-364.1	-419.5	-11.0	-23.5	-24.9
Energy Branch	163.4	170.4	131.4	114.8	96.5	-13.8	-16.6	-15.3	-9.5	-12.6	-13.7
Industry	807.4	663.2	676.3	716.4	732.6	-19.8	-32.7	-33.5	-2.8	-4.4	-4.4
Residential	551.3	493.5	527.7	555.3	561.5	-3.9	-4.4	-5.8	-0.7	-0.8	-1.0
Tertiary	300.2	264.5	285.2	274.6	234.9	-2.9	-31.2	-75.6	-1.0	-10.2	-24.3
Transport	869.6	1053.4	1171.2	1208.9	1197.6	-23.0	-75.8	-114.7	-1.9	-5.9	-8.7
CO2 Emissions Index (1990=100)	**100.0**	**96.9**	**98.5**	**96.4**	**97.2**	-5.5	-12.5	-15.8	-5.3	-11.5	-14.0

Source: PRIMES

Europe-30: High renewables case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	539.950	562.681	582.130	594.587	600.252	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7877.3	9665.6	11898.8	15057.8	18137.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	222.4	190.3	171.2	143.4	123.2	0.4	-0.8	-0.9	0.2	-0.6	-0.7
Gross Inl. Cons./Capita (toe/inhabitant)	3.24	3.27	3.50	3.63	3.72	0.01	-0.02	-0.03	0.2	-0.6	-0.7
Electricity Generated/Capita (kWh/inhabitant)	5176	5907	6769	7681	8495	-88	-161	-198	-1.3	-2.0	-2.3
Carbon intensity (t of CO_2/toe of GIC)	2.40	2.22	2.04	1.88	1.83	-0.12	-0.23	-0.28	-5.5	-11.0	-13.3
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.79	7.25	7.12	6.82	6.82	-0.40	-0.88	-1.11	-5.3	-11.5	-14.0
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	534.2	421.8	348.5	269.3	225.6	-19.3	-34.8	-36.6	-5.3	-11.5	-14.0
Import Dependency %	38.9	36.4	42.0	46.9	49.0	-2.4	-5.5	-7.2	-5.4	-10.4	-12.9
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.7	76.3	66.8	59.5	0.5	0.4	0.2	0.6	0.6	0.4
Residential (Energy on Private Income)	100.0	87.4	81.4	72.1	64.1	0.3	0.4	0.4	0.4	0.5	0.7
Tertiary (Energy on Value added)	100.0	84.5	80.0	71.3	67.3	-0.2	-0.5	3.3	-0.3	-0.7	5.2
Transport (Energy on GDP)	100.0	98.4	93.4	81.1	69.6	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.40	0.29	0.23	0.18	0.17	-0.03	-0.05	-0.06	-11.2	-23.1	-24.4
Final energy demand (t of CO_2/toe)	2.21	2.03	1.90	1.76	1.63	-0.04	-0.10	-0.16	-2.1	-5.2	-8.8
Industry	2.05	1.77	1.62	1.54	1.46	-0.06	-0.08	-0.07	-3.5	-4.9	-4.8
Residential	1.90	1.59	1.49	1.41	1.33	-0.02	-0.02	-0.02	-1.1	-1.3	-1.7
Tertiary	1.87	1.53	1.37	1.15	0.86	-0.01	-0.12	-0.34	-0.8	-9.6	-28.1
Transport	2.90	2.91	2.77	2.60	2.49	-0.05	-0.16	-0.24	-1.9	-5.9	-8.8
Electricity and steam generation											
Generation Capacity in MW_e		**769539**	**963914**	**1175557**	**1406336**	**26105**	**84318**	**104778**	**2.8**	**7.7**	**8.1**
Nuclear		148992	142580	118322	75575	0	-5896	-36000	0.0	-4.7	-32.3
Hydro (pumping excluded)		155831	171008	177954	182097	5792	4640	2758	3.5	2.7	1.5
Wind		12886	115821	223035	298227	34860	88017	102003	43.1	65.2	52.0
Solar		195	1705	38267	69875	0	33261	59061	0.0	664.3	546.1
Thermal		451636	532800	617979	780563	-14547	-35703	-23044	-2.7	-5.5	-2.9
of which cogeneration units		123656	162370	235554	298189	-7420	-1985	2941	-4.4	-0.8	1.0
Solids fired		210703	176074	138433	180986	-4554	-46273	-76517	-2.5	-25.1	-29.7
Gas fired		143723	250786	306772	385970	-18652	-48135	-30363	-6.9	-13.6	-7.3
Oil fired		80968	71898	45225	37955	-1700	-6087	598	-2.3	-11.9	1.6
Biomass-waste fired		15202	28879	119834	167000	6619	58661	76323	29.7	95.9	84.2
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	5163	7716	8652	3739	6131	6916	262.6	386.9	398.5
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.3	42.0	45.4	-2.1	-2.7	-2.2	-5.2	-6.1	-4.7
Load factor for gross electric capacities (%)		49.3	46.7	44.3	41.4	-1.9	-4.4	-4.4	-4.0	-9.1	-9.6
CHP indicator (% of electricity from CHP)		14.0	17.9	21.8	25.1	0.5	0.4	0.8	2.7	1.6	3.2
Non fossil fuels in electricity generation (%)		48.9	53.1	59.0	57.4	5.8	12.5	10.9	12.4	26.9	23.3
- nuclear		29.2	25.6	17.8	12.0	0.3	-2.4	-5.2	1.3	-11.8	-30.3
- renewable energy forms		19.6	27.4	41.2	45.4	5.5	14.9	16.1	25.1	56.5	54.7
Transport sector											
Passenger transport activity (Gpkm)	**5032.5**	**5925.5**	**7097.8**	**8486.6**	**9728.2**	-0.5	-1.4	-1.6	0.0	0.0	0.0
Public road transport	625.6	596.9	626.8	634.4	615.5	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3720.2	4530.1	5454.5	6583.8	7607.6	0.4	1.1	1.4	0.0	0.0	0.0
Rail	473.5	443.8	488.2	536.1	587.4	-1.0	-2.7	-3.2	-0.2	-0.5	-0.5
Aviation	178.7	316.3	482.0	675.6	853.1	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	34.5	38.4	46.2	56.7	64.6	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	9320	10531	12193	14273	16207	-0.9	-2.3	-2.6	0.0	0.0	0.0
Freight transport activity (Gtkm)	**2026.8**	**2447.9**	**3059.5**	**3742.7**	**4375.9**	-0.4	-0.9	-1.0	0.0	0.0	0.0
Trucks	1179.2	1705.6	2256.0	2879.7	3461.3	0.3	0.8	1.2	0.0	0.0	0.0
Rail	544.1	419.3	453.1	479.5	507.0	-0.8	-1.9	-2.3	-0.2	-0.4	-0.4
Inland navigation	303.5	323.0	350.4	383.5	407.7	0.0	0.1	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	257	253	257	249	241	0.0	-0.1	-0.1	0.0	0.0	0.0
Energy demand in transport (ktoe)	**299860**	**361964**	**422873**	**465043**	**480508**	19	50	68	0.0	0.0	0.0
Public road transport	9802	8917	9088	8501	7272	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	145794	168062	183293	187799	185944	14	31	34	0.0	0.0	0.0
Trucks	94266	119351	155004	185375	201523	18	52	68	0.0	0.0	0.0
Rail	10142	10079	9262	7361	6982	-17	-47	-48	-0.2	-0.6	-0.7
Aviation	31627	49160	59006	68097	70492	4	11	12	0.0	0.0	0.0
Inland navigation	8229	6394	7218	7910	8296	1	1	2	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.6	36.5	31.9	27.8	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	51.4	52.0	53.5	51.8	48.0	0.0	0.0	0.0	0.0	0.0	0.1

Source: PRIMES

(1) EUROSTAT Energy Balances do not take into account non-marketed steam, i.e. steam generated - either in boilers or in CHP plants - and used on site by industrial consumers. Using statistical information provided by EUROSTAT on CHP, the non-marketed steam generated in CHP units as well as the corresponding fuel input have been estimated for this study. In the PRIMES model, steam has been attributed to the demand side and the fuel input to the supply side. This approach ensures a better comparability of historical figures with the projections. However, slight differences exist for certain figures related to steam generation - both in terms of final energy demand and transformation input - in this report compared to EUROSTAT energy balances.

Disclaimer: Energy and transport statistics reported in this publication and used for the modelling are taken mainly from EUROSTAT and from the publication "EU Energy and Transport in Figures" of the Directorate General for Energy and Transport. Energy and transport statistical concepts have developed differently in the past according to their individual purposes. Energy demand in transport reflects usually sales of fuels at the point of refuelling, which can differ from the region of consumption. This is particularly relevant for airplanes and trucks. Transport statistics deal with the transport activity within a country but may not always fully include transit shipments. These differences should be borne in mind when comparing energy and transport figures. This applies in particular to transport activity ratios, such as energy efficiency in freight transport, which is measured in tonnes of oil equivalent per million tonne-km.

Abbreviations

GIC: Gross Inland Consumption
CHP: combined heat and power

Geographical regions
EU15: EU15 Member States
EU25: EU15 Member States + New Member States
NMS: New Member States (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia)
EU27: EU25 Member States + Bulgaria + Romania
EU28: EU27 + Turkey
Europe 30: EU28 + Norway + Switzerland

Units
toe: tonne of oil equivalent, or 10^{7} kilocalories, or 41.86 GJ (Gigajoule)
Mtoe: million toe

GW: Gigawatt or 10^{9} watt
kWh: kilowatt-hour or 10^{3} watt-hour
MWh: megawatt-hour or 10^{6} watt-hour
TWh: Terawatt-hour or 10^{12} watt-hour

t: metric tonnes, or 1000 kilogrammes
Mt: Million metric tonnes

km: kilometre
pkm: passenger-kilometre (one passenger transported a distance of one kilometre)
tkm: tonne-kilometre (one tonne transported a distance of one kilometre)
Gpkm: Giga passenger-kilometre, or 10^{9} passenger-kilometre
Gtkm: Giga tonne-kilometre, or 10^{9} tonne-kilometre

APPENDIX 3: "12% renewables share in 2010" case results

Summary results by groups of countries (comparison to Baseline)

EU25: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**877543**	**898598**	**892051**	**780333**	**764966**	**55635**	**73812**	**79863**	**6.7**	**10.4**	**11.7**
Solids	351650	204139	146468	101031	106456	-8059	-30051	-13741	-5.2	-22.9	-11.4
Oil	120396	163631	116780	52753	43279	-399	-205	-171	-0.3	-0.4	-0.4
Natural gas	139723	196665	171122	97988	80031	-1057	-361	226	-0.6	-0.4	0.3
Nuclear	196920	237664	248776	205782	156672	0	-22856	-54136	0.0	-10.0	-25.7
Renewable energy sources	68855	96499	208905	322779	378527	65150	127286	147685	45.3	65.1	64.0
Hydro	23391	28982	31986	34034	34923	2108	1831	1042	7.1	5.7	3.1
Biomass & Waste	42151	61865	136548	218725	247648	44141	89533	98768	47.8	69.3	66.3
Wind	67	1913	22993	40729	53691	7207	14488	15749	45.7	55.2	41.5
Solar and others	145	417	2690	8013	16542	1200	5267	12148	80.5	191.7	276.5
Geothermal	3101	3322	14689	21278	25724	10495	16168	19978	250.3	316.4	347.7
Net Imports	**711300**	**801061**	**969632**	**1144127**	**1152738**	**-54643**	**-87564**	**-112829**	**-5.3**	**-7.1**	**-8.9**
Solids	75449	94307	111743	102115	109241	-20544	-26279	-63679	-15.5	-20.5	-36.8
Oil	510017	518147	584029	648443	625578	-15669	-21422	-26871	-2.6	-3.2	-4.1
- Crude oil and Feedstocks	479112	496826	545723	616890	601216	-15634	-19785	-25034	-2.8	-3.1	-4.0
- Oil products	30905	21321	38306	31553	24362	-35	-1637	-1837	-0.1	-4.9	-7.0
Natural gas	123653	186463	271700	391459	415719	-18352	-39851	-22278	-6.3	-9.2	-5.1
Electricity	2181	2144	2159	2110	2200	-77	-12	-1	-3.4	-0.6	-0.1
Gross Inland Consumption	**1556194**	**1653841**	**1813524**	**1871584**	**1862272**	**992**	**-13752**	**-32966**	**0.1**	**-0.7**	**-1.7**
Solids	431944	306538	258212	203146	215697	-28603	-56331	-77419	-10.0	-21.7	-26.4
Oil	595746	634711	652650	648321	613424	-16068	-21627	-27042	-2.4	-3.2	-4.2
Natural gas	260548	376284	442822	489447	495750	-19409	-40212	-22052	-4.2	-7.6	-4.3
Nuclear	196920	237664	248776	205782	156672	0	-22856	-54136	0.0	-10.0	-25.7
Electricity	2181	2144	2159	2110	2200	-77	-12	-1	-3.4	-0.6	-0.1
Renewable energy forms	68855	96499	208905	322779	378527	65150	127286	147685	45.3	65.1	64.0
as % in Gross Inland Consumption											
Solids	27.8	18.5	14.2	10.9	11.6	-1.6	-2.9	-3.9	-10.0	-21.1	-25.1
Oil	38.3	38.4	36.0	34.6	32.9	-0.9	-0.9	-0.9	-2.5	-2.5	-2.5
Natural gas	16.7	22.8	24.4	26.2	26.6	-1.1	-1.9	-0.7	-4.3	-6.9	-2.6
Nuclear	12.7	14.4	13.7	11.0	8.4	0.0	-1.1	-2.7	-0.1	-9.3	-24.4
Renewable energy forms	4.4	5.8	11.5	17.2	20.3	3.6	6.9	8.1	45.2	66.3	66.9
Electricity Generation in GWh_e	**2455674**	**2900835**	**3436495**	**3935119**	**4280133**	**-46690**	**-70656**	**-86466**	**-1.3**	**-1.8**	**-2.0**
Nuclear	780056	921193	964265	797614	607261	0	-88592	-209830	0.0	-10.0	-25.7
Hydro & wind	272788	359249	640851	898338	1092825	108307	214487	249102	20.3	31.4	29.5
Thermal (incl. biomass)	1402830	1620392	1831379	2239167	2580046	-154997	-196550	-125738	-7.8	-8.1	-4.6
Fuel Inputs for Thermal Power Generation [1]	**355362**	**385987**	**416917**	**444834**	**483017**	**-15324**	**-17937**	**-7021**	**-3.5**	**-3.9**	**-1.4**
Solids	246377	214488	188674	144106	164817	-26275	-54396	-75494	-12.2	-27.4	-31.4
Oil (including refinery gas)	48954	41870	32410	23613	20863	777	302	1069	2.5	1.3	5.4
Gas	47057	105480	137878	151915	145014	-14948	-30816	-10234	-9.8	-16.9	-6.6
Biomass & Waste	10201	21211	43799	104450	127108	14652	50831	57684	50.3	94.8	83.1
Geothermal heat	2774	2939	14156	20749	25215	10471	16142	19954	284.2	350.3	379.3
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**797634**	**796450**	**806265**	**820390**	**791063**	**-6632**	**-3705**	**-6002**	**-0.8**	**-0.4**	**-0.8**
Refineries	642275	710448	711806	712790	681157	-17116	-21234	-26946	-2.3	-2.9	-3.8
Biofuels and hydrogen production	2	637	26888	46701	56156	10095	15696	19781	60.1	50.6	54.4
District heating	31035	17261	17186	15958	15808	1936	2140	1075	12.7	15.5	7.3
Others	124322	68104	50386	44941	37942	-1547	-307	88	-3.0	-0.7	0.2
Energy Branch Consumption	**73032**	**80377**	**79696**	**78960**	**75355**	**-1802**	**-2206**	**-2779**	**-2.2**	**-2.7**	**-3.6**
Non-Energy Uses	**94476**	**105950**	**107358**	**110853**	**111727**	**-490**	**-347**	**-438**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1021913**	**1095359**	**1241027**	**1340618**	**1372376**	**3020**	**2114**	**1923**	**0.2**	**0.2**	**0.1**
by sector											
Industry[1]	341087	330062	359040	384970	393674	2619	2568	2109	0.7	0.7	0.5
- energy intensive industries	216809	211616	222660	230133	226274	1901	1741	1342	0.9	0.8	0.6
- other industrial sectors	124278	118446	136379	154837	167400	719	827	767	0.5	0.5	0.5
Residential	261006	273302	312870	339636	352280	904	895	995	0.3	0.3	0.3
Tertiary	146622	158975	187966	210474	224091	-521	-1382	-1226	-0.3	-0.7	-0.5
Transport	273198	333020	381151	405538	402331	18	32	45	0.0	0.0	0.0
by fuel [1]											
Solids	123937	56633	44646	38760	33466	-556	-660	-558	-1.2	-1.7	-1.6
Oil	428121	468312	505494	511703	486995	-11848	-18192	-24842	-2.3	-3.4	-4.9
Gas	200242	251885	275806	304031	315569	-3369	-5695	-5828	-1.2	-1.8	-1.8
Electricity	176468	211352	256211	298560	329035	-3099	-4358	-5008	-1.2	-1.4	-1.5
Heat (from CHP and District Heating)	63092	68712	78389	85834	94876	-1788	-1857	-449	-2.2	-2.1	-0.5
Other	30053	38465	80481	101730	112435	23680	32876	38609	41.7	47.7	52.3
CO2 Emissions (Mt of CO2)	**3776.1**	**3674.1**	**3677.0**	**3547.7**	**3518.2**	**-204.9**	**-380.9**	**-436.8**	**-5.3**	**-9.7**	**-11.0**
Power generation/District heating	1362.6	1294.9	1215.1	1034.0	1090.1	-146.8	-299.3	-334.0	-10.8	-22.4	-23.5
Energy Branch	141.5	144.9	111.2	102.1	86.9	-12.8	-11.9	-12.7	-10.3	-10.4	-12.8
Industry	698.9	567.7	559.7	570.6	547.4	-17.3	-24.6	-22.5	-3.0	-4.1	-3.9
Residential	506.1	452.1	479.2	492.2	484.0	-3.5	-2.7	-2.8	-0.7	-0.5	-0.6
Tertiary	274.2	244.6	260.0	269.6	263.9	-1.8	-6.2	-18.0	-0.7	-2.3	-6.4
Transport	792.7	969.9	1051.9	1079.2	1045.9	-22.7	-36.3	-47.0	-2.1	-3.3	-4.3
CO2 Emissions Index (1990=100)	**100.0**	**97.3**	**97.4**	**93.9**	**93.2**	-5.4	-10.1	-11.6	-5.3	-9.7	-11.0

Source: PRIMES

EU25: 12% renewables share in 2010 case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	440.788	452.915	464.054	469.270	469.365	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7294.7	8947.0	10946.8	13656.3	16051.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	213.3	184.8	165.7	137.0	116.0	0.1	-1.0	-2.1	0.1	-0.7	-1.7
Gross Inl. Cons./Capita (toe/inhabitant)	3.53	3.65	3.91	3.99	3.97	0.00	-0.03	-0.07	0.1	-0.7	-1.7
Electricity Generated/Capita (kWh/inhabitant)	5571	6405	7405	8386	9119	-101	-151	-184	-1.3	-1.8	-2.0
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.22	2.03	1.90	1.89	-0.11	-0.19	-0.20	-5.3	-9.0	-9.5
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.57	8.11	7.92	7.56	7.50	-0.44	-0.81	-0.93	-5.3	-9.7	-11.0
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	517.7	410.7	335.9	259.8	219.2	-18.7	-27.9	-27.2	-5.3	-9.7	-11.0
Import Dependency %	44.7	47.2	52.1	59.5	60.1	-3.0	-4.1	-4.8	-5.4	-6.4	-7.3
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	83.8	77.8	67.1	58.8	0.6	0.4	0.3	0.7	0.7	0.5
Residential (Energy on Private Income)	100.0	85.8	80.6	70.8	62.7	0.2	0.2	0.2	0.3	0.3	0.3
Tertiary (Energy on Value added)	100.0	84.9	79.3	70.2	63.0	-0.2	-0.5	-0.3	-0.3	-0.7	-0.5
Transport (Energy on GDP)	100.0	99.4	93.0	79.3	66.9	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.41	0.30	0.24	0.18	0.18	-0.03	-0.05	-0.05	-11.0	-22.2	-23.1
Final energy demand (t of CO_2/toe)	2.22	2.04	1.89	1.80	1.71	-0.04	-0.05	-0.07	-2.1	-3.0	-3.8
Industry	2.05	1.72	1.56	1.48	1.39	-0.06	-0.07	-0.06	-3.7	-4.8	-4.5
Residential	1.94	1.65	1.53	1.45	1.37	-0.02	-0.01	-0.01	-1.0	-0.8	-0.8
Tertiary	1.87	1.54	1.38	1.28	1.18	-0.01	-0.02	-0.07	-0.4	-1.6	-5.9
Transport	2.90	2.91	2.76	2.66	2.60	-0.06	-0.09	-0.12	-2.1	-3.3	-4.3
Electricity and steam generation											
Generation Capacity in MW_e		**661750**	**833066**	**998432**	**1169772**	**22559**	**55851**	**73480**	**2.8**	**5.9**	**6.7**
Nuclear		141082	136430	111389	74925	0	-5547	-26291	0.0	-4.7	-26.0
Hydro (pumping excluded)		97168	108102	111655	113742	4168	3038	1541	4.0	2.8	1.4
Wind		12785	110612	197261	263863	32221	69637	80932	41.1	54.6	44.2
Solar		176	1658	20983	45495	0	16134	35131	0.0	332.7	339.0
Thermal		410539	476264	557144	671746	-13830	-27410	-17833	-2.8	-4.7	-2.6
of which cogeneration units		112958	145634	207981	251457	-5237	-980	3458	-3.5	-0.5	1.4
Solids fired		188879	152347	115015	148994	-4189	-41790	-62242	-2.7	-26.7	-29.5
Gas fired		131875	228478	287512	341190	-16960	-33695	-18944	-6.9	-10.5	-5.3
Oil fired		74302	65077	42583	35753	-972	-5347	787	-1.5	-11.2	2.3
Biomass-waste fired		14462	26610	106668	139430	5896	49574	57829	28.5	86.8	70.9
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3752	5365	6380	2396	3848	4736	176.6	253.7	288.3
Indicators											
Efficiency for thermal electricity production (%)		36.1	37.8	43.3	45.9	-1.7	-2.0	-1.5	-4.4	-4.4	-3.3
Load factor for gross electric capacities (%)		50.0	47.1	45.0	41.8	-2.0	-3.5	-3.7	-4.0	-7.3	-8.1
CHP indicator (% of electricity from CHP)		14.5	18.7	22.2	25.1	0.8	0.3	0.8	4.5	1.5	3.3
Non fossil fuels in electricity generation (%)		46.5	51.5	57.2	56.2	5.8	11.6	9.9	12.6	25.5	21.3
- nuclear		31.8	28.1	20.3	14.2	0.4	-1.9	-4.5	1.4	-8.4	-24.2
- renewable energy forms		14.7	23.5	36.9	42.0	5.4	13.5	14.4	29.8	57.5	52.1
Transport sector											
Passenger transport activity (Gpkm)	**4640.8**	**5466.3**	**6448.9**	**7401.0**	**8129.1**	-0.5	-1.0	-1.1	0.0	0.0	0.0
Public road transport	504.1	480.1	495.1	480.6	466.8	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3529.3	4253.1	5017.0	5781.6	6359.6	0.4	0.8	1.0	0.0	0.0	0.0
Rail	411.9	402.7	445.5	476.5	503.4	-0.9	-2.0	-2.3	-0.2	-0.4	-0.5
Aviation	166.3	296.9	451.6	616.8	749.8	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	29.2	33.6	39.7	45.5	49.5	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	10528	12069	13897	15771	17319	-1.0	-2.2	-2.3	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1753.9**	**2131.5**	**2581.8**	**3048.1**	**3431.3**	-0.4	-0.7	-0.6	0.0	0.0	0.0
Trucks	1034.1	1486.3	1891.4	2312.2	2658.1	0.3	0.6	0.8	0.0	0.0	0.0
Rail	461.7	374.2	401.3	420.2	437.5	-0.7	-1.3	-1.4	-0.2	-0.3	-0.3
Inland navigation	258.1	271.0	289.0	315.6	335.7	0.0	0.0	0.0	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	240	238	236	223	214	0.0	0.0	0.0	0.0	0.0	0.0
Energy demand in transport (ktoe)	**273198**	**333020**	**381151**	**405538**	**402331**	18	32	45	0.0	0.0	0.0
Public road transport	7841	7018	7021	6275	5321	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	138202	158349	170190	168923	159876	13	22	25	0.0	0.0	0.0
Trucks	82444	108068	135664	156865	164429	16	34	44	0.0	0.0	0.0
Rail	9066	8897	8290	6484	5985	-17	-34	-34	-0.2	-0.5	-0.6
Aviation	28932	45320	54178	60785	60367	4	8	9	0.0	0.0	0.0
Inland navigation	6714	5368	5808	6206	6353	0	1	1	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	39.3	39.9	37.0	32.7	28.4	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	51.7	53.9	55.3	53.7	49.9	0.0	0.0	0.0	0.0	0.0	0.0

Source: PRIMES

EU15: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**707946**	**761643**	**753408**	**640504**	**612763**	**43771**	**60004**	**61029**	**6.2**	**10.3**	**11.1**
Solids	210737	100172	62219	44799	53034	-6039	-15197	-5584	-8.8	-25.3	-9.5
Oil	117782	160552	114420	50633	41445	-398	-195	-152	-0.3	-0.4	-0.4
Natural gas	132975	190581	165365	92686	75242	-1055	-349	226	-0.6	-0.4	0.3
Nuclear	181439	222846	231522	188195	134636	0	-18967	-42950	0.0	-9.2	-24.2
Renewable energy sources	65014	87491	179881	264191	308405	51262	94712	109490	39.9	55.9	55.0
Hydro	22275	27627	30263	32174	32973	1846	1632	959	6.5	5.3	3.0
Biomass & Waste	39426	54257	112600	168379	188575	33281	62155	66169	42.0	58.5	54.1
Wind	67	1912	21919	38187	49642	6539	13009	14735	42.5	51.7	42.2
Solar and others	145	381	2374	7244	14852	1049	4799	10986	79.2	196.3	284.2
Geothermal	3101	3315	12726	18206	22363	8547	13117	16642	204.6	257.7	290.9
Net Imports	**643284**	**741591**	**879392**	**1022839**	**1020453**	**-45033**	**-72061**	**-90390**	**-4.9**	**-6.6**	**-8.1**
Solids	89663	110142	118514	99033	105225	-16567	-24444	-54728	-12.3	-19.8	-34.2
Oil	458793	472543	529246	584797	556362	-13513	-18766	-23056	-2.5	-3.1	-4.0
- Crude oil and Feedstocks	435365	455606	500122	563711	543237	-13710	-17421	-21664	-2.7	-3.0	-3.8
- Oil products	23428	16937	29124	21087	13124	197	-1345	-1392	0.7	-6.0	-9.6
Natural gas	92495	155262	227809	335236	353906	-14953	-28850	-12605	-6.2	-7.9	-3.4
Electricity	2333	3644	3823	3773	4961	-1	-1	-1	0.0	0.0	0.0
Gross Inland Consumption	**1319965**	**1456936**	**1585782**	**1611741**	**1579139**	**-1263**	**-12056**	**-29361**	**-0.1**	**-0.7**	**-1.8**
Solids	303612	215739	180733	143832	158259	-22606	-39641	-60312	-11.1	-21.6	-27.6
Oil	544159	587926	596649	583828	543731	-13911	-18961	-23208	-2.3	-3.1	-4.1
Natural gas	223408	339289	393174	427922	429148	-16007	-29198	-12379	-3.9	-6.4	-2.8
Nuclear	181439	222846	231522	188195	134636	0	-18967	-42950	0.0	-9.2	-24.2
Electricity	2333	3644	3823	3773	4961	-1	-1	-1	0.0	0.0	0.0
Renewable energy forms	65014	87491	179881	264191	308405	51262	94712	109490	39.9	55.9	55.0
as % in Gross Inland Consumption											
Solids	23.0	14.8	11.4	8.9	10.0	-1.4	-2.4	-3.6	-11.0	-21.0	-26.2
Oil	41.2	40.4	37.6	36.2	34.4	-0.8	-0.9	-0.8	-2.2	-2.4	-2.3
Natural gas	16.9	23.3	24.8	26.6	27.2	-1.0	-1.6	-0.3	-3.8	-5.7	-1.0
Nuclear	13.7	15.3	14.6	11.7	8.5	0.0	-1.1	-2.5	0.1	-8.5	-22.8
Renewable energy forms	4.9	6.0	11.3	16.4	19.5	3.2	6.0	7.2	40.0	57.1	57.9
Electricity Generation in GWh$_e$	**2138940**	**2576502**	**3042512**	**3427902**	**3662550**	**-40238**	**-56840**	**-72895**	**-1.3**	**-1.6**	**-2.0**
Nuclear	720059	863760	897389	729447	521845	0	-73514	-166474	0.0	-9.2	-24.2
Hydro & wind	259810	343478	608316	846996	1022405	97501	194972	236338	19.1	29.9	30.1
Thermal (incl. biomass)	1159070	1369264	1536806	1851459	2118301	-137739	-178298	-142759	-8.2	-8.8	-6.3
Fuel Inputs for Thermal Power Generation [1]	**282186**	**319336**	**340138**	**359581**	**393375**	**-15842**	**-17644**	**-12187**	**-4.5**	**-4.7**	**-3.0**
Solids	184170	158097	135730	103925	124180	-20625	-38880	-60006	-13.2	-27.2	-32.6
Oil (including refinery gas)	43718	38588	29412	21283	18550	712	325	1077	2.5	1.5	6.2
Gas	41697	99188	128445	142324	136772	-12490	-21529	-3063	-8.9	-13.1	-2.2
Biomass & Waste	9827	20524	34335	74339	91983	8029	29338	33175	30.5	65.2	56.4
Geothermal heat	2774	2939	12216	17710	21890	8532	13102	16630	231.5	284.4	316.1
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**704402**	**725664**	**733976**	**740091**	**705307**	**-5973**	**-2761**	**-4514**	**-0.8**	**-0.4**	**-0.6**
Refineries	595036	665476	662916	656343	620068	-15170	-18844	-23544	-2.2	-2.8	-3.7
Biofuels and hydrogen production	2	604	24662	42360	50512	9137	14166	17991	58.9	50.2	55.3
District heating	13085	8717	8327	7652	6581	1591	2191	934	23.6	40.1	16.5
Others	96279	50868	38071	33737	28147	-1530	-274	105	-3.9	-0.8	0.4
Energy Branch Consumption	**63555**	**67696**	**67323**	**65636**	**61718**	**-1521**	**-1885**	**-2490**	**-2.2**	**-2.8**	**-3.9**
Non-Energy Uses	**84387**	**95815**	**96624**	**97483**	**96394**	**-439**	**-314**	**-388**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**866453**	**970663**	**1089515**	**1157464**	**1165776**	**2780**	**2359**	**1851**	**0.3**	**0.2**	**0.2**
by sector											
Industry[1]	272481	284781	309038	325313	327874	2270	2255	1742	0.7	0.7	0.5
- energy intensive industries	182306	182967	193209	196862	191410	1695	1571	1157	0.9	0.8	0.6
- other industrial sectors	90175	101814	115829	128451	136464	575	684	585	0.5	0.5	0.4
Residential	220020	238404	269854	287829	294015	733	832	901	0.3	0.3	0.3
Tertiary	121346	137376	161384	176464	183662	-237	-753	-827	-0.1	-0.4	-0.4
Transport	252606	310102	349238	367858	360225	14	26	35	0.0	0.0	0.0
by fuel [1]											
Solids	79761	35330	27931	24838	21268	-694	-477	-343	-2.4	-1.9	-1.6
Oil	393325	434547	462383	460794	431522	-10754	-16462	-22333	-2.3	-3.4	-4.9
Gas	173014	226415	241415	259879	265845	-3251	-5613	-5255	-1.3	-2.1	-1.9
Electricity	155929	191711	230610	263280	285130	-2554	-3326	-3966	-1.1	-1.2	-1.4
Heat (from CHP and District Heating)	36558	50708	58454	63615	69224	-1438	-1141	233	-2.4	-1.8	0.3
Other	27865	31953	68722	85058	92787	21469	29379	33515	45.4	52.8	56.5
CO2 Emissions (Mt of CO2)	**3068.4**	**3127.0**	**3124.1**	**3019.8**	**2975.5**	**-166.7**	**-281.2**	**-335.5**	**-5.1**	**-8.5**	**-10.1**
Power generation/District heating	1021.1	1014.7	950.1	829.0	888.2	-113.6	-207.5	-244.4	-10.7	-20.0	-21.6
Energy Branch	127.2	127.0	101.8	92.7	78.8	-10.9	-10.0	-10.7	-9.6	-9.8	-11.9
Industry	545.2	471.6	458.5	457.7	431.6	-17.3	-23.0	-19.6	-3.6	-4.8	-4.3
Residential	419.7	401.5	424.2	432.2	422.7	-3.0	-2.6	-2.5	-0.7	-0.6	-0.6
Tertiary	220.7	207.4	224.3	228.0	217.0	-1.4	-5.3	-15.6	-0.6	-2.3	-6.7
Transport	734.5	904.8	965.2	980.2	937.0	-20.6	-32.8	-42.8	-2.1	-3.2	-4.4
CO2 Emissions Index (1990=100)	**100.0**	**101.9**	**101.8**	**98.4**	**97.0**	-5.4	-9.2	-10.9	-5.1	-8.5	-10.1

Source: PRIMES

EU15: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (B)					
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	365.749	378.062	390.652	397.458	398.737	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	6981.9	8572.2	10391.5	12835.7	14948.8	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	189.1	170.0	152.6	125.6	105.6	-0.1	-0.9	-2.0	-0.1	-0.7	-1.8
Gross Inl. Cons./Capita (toe/inhabitant)	3.61	3.85	4.06	4.06	3.96	0.00	-0.03	-0.07	-0.1	-0.7	-1.8
Electricity Generated/Capita (kWh/inhabitant)	5848	6815	7788	8625	9185	-103	-143	-183	-1.3	-1.6	-2.0
Carbon intensity (t of CO_2/toe of GIC)	2.32	2.15	1.97	1.87	1.88	-0.10	-0.16	-0.17	-5.0	-7.8	-8.5
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.39	8.27	8.00	7.60	7.46	-0.43	-0.71	-0.84	-5.1	-8.5	-10.1
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	439.5	364.8	300.6	235.3	199.0	-16.0	-21.9	-22.4	-5.1	-8.5	-10.1
Import Dependency %	47.5	49.5	53.9	61.5	62.5	-2.7	-3.9	-4.3	-4.8	-5.9	-6.5
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	90.9	86.0	73.9	64.5	0.6	0.5	0.3	0.7	0.7	0.5
Residential (Energy on Private Income)	100.0	88.8	83.3	72.7	64.1	0.2	0.2	0.2	0.3	0.3	0.3
Tertiary (Energy on Value added)	100.0	88.7	82.8	72.1	63.9	-0.1	-0.3	-0.3	-0.1	-0.4	-0.4
Transport (Energy on GDP)	100.0	100.0	92.9	79.2	66.6	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.39	0.27	0.22	0.17	0.17	-0.03	-0.04	-0.05	-11.0	-19.9	-21.3
Final energy demand (t of CO_2/toe)	2.22	2.05	1.90	1.81	1.72	-0.04	-0.06	-0.07	-2.2	-3.1	-4.0
Industry	2.00	1.66	1.48	1.41	1.32	-0.07	-0.08	-0.07	-4.3	-5.4	-4.9
Residential	1.91	1.68	1.57	1.50	1.44	-0.02	-0.01	-0.01	-1.0	-0.9	-0.9
Tertiary	1.82	1.51	1.39	1.29	1.18	-0.01	-0.02	-0.08	-0.5	-1.9	-6.3
Transport	2.91	2.92	2.76	2.66	2.60	-0.06	-0.09	-0.12	-2.1	-3.2	-4.4
Electricity and steam generation											
Generation Capacity in MW_e		**588083**	**746156**	**879789**	**1000621**	**21986**	**51698**	**71067**	**3.0**	**6.2**	**7.6**
Nuclear		131758	127644	102603	63901	0	-3596	-20767	0.0	-3.4	-24.5
Hydro (pumping excluded)		90794	100717	103906	105719	3603	2638	1323	3.7	2.6	1.3
Wind		12769	104630	183775	241875	28497	62443	75066	37.4	51.5	45.0
Solar		176	1645	20846	44958	0	16134	35131	0.0	342.4	357.5
Thermal		352586	411521	468660	544168	-10114	-25922	-19686	-2.4	-5.2	-3.5
of which cogeneration units		88543	120148	176102	198030	-4551	553	4016	-3.6	0.3	2.1
Solids fired		144882	113312	87886	107457	-3209	-29263	-46728	-2.8	-25.0	-30.3
Gas fired		125804	217027	264676	304250	-10925	-24947	-11129	-4.8	-8.6	-3.5
Oil fired		67470	57867	37429	31199	-1113	-4300	1783	-1.9	-10.3	6.1
Biomass-waste fired		13407	19991	73975	95617	3166	29412	32388	18.8	66.0	51.2
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3323	4693	5644	1966	3176	4001	145.0	209.3	243.5
Indicators											
Efficiency for thermal electricity production (%)		36.9	38.9	44.3	46.3	-1.6	-2.0	-1.6	-4.0	-4.3	-3.4
Load factor for gross electric capacities (%)		50.0	46.5	44.5	41.8	-2.0	-3.6	-4.1	-4.2	-7.4	-8.9
CHP indicator (% of electricity from CHP)		13.4	17.3	21.0	22.5	0.6	0.5	0.8	3.7	2.5	3.8
Non fossil fuels in electricity generation (%)		49.4	53.7	57.3	56.0	5.2	9.4	8.3	10.7	19.7	17.3
- nuclear		33.5	29.5	21.3	14.2	0.4	-1.8	-4.2	1.3	-7.6	-22.7
- renewable energy forms		15.9	24.2	36.0	41.7	4.8	11.2	12.4	24.7	45.1	42.4
Transport sector											
Passenger transport activity (Gpkm)	**4130.1**	**4997.7**	**5831.6**	**6645.0**	**7227.8**	-0.4	-0.9	-1.0	0.0	0.0	0.0
Public road transport	369.0	401.8	422.5	414.1	404.5	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3265.7	3928.0	4546.2	5175.1	5612.6	0.3	0.7	0.9	0.0	0.0	0.0
Rail	309.8	351.3	395.4	427.8	455.1	-0.8	-1.7	-2.0	-0.2	-0.4	-0.4
Aviation	157.3	283.6	428.4	583.2	706.9	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	28.4	33.0	39.1	44.8	48.7	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	11292	13219	14928	16719	18127	-1.1	-2.2	-2.4	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1419.2**	**1825.6**	**2142.9**	**2491.0**	**2775.8**	-0.2	-0.4	-0.4	0.0	0.0	0.0
Trucks	914.2	1309.3	1590.4	1900.0	2157.0	0.2	0.3	0.5	0.0	0.0	0.0
Rail	254.9	249.5	267.7	279.9	287.8	-0.4	-0.8	-0.9	-0.1	-0.3	-0.3
Inland navigation	250.1	266.8	284.8	311.1	331.1	0.0	0.0	0.0	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	203	213	206	194	186	0.0	0.0	0.0	0.0	0.0	0.0
Energy demand in transport (ktoe)	**252606**	**310102**	**349238**	**367858**	**360225**	14	26	35	0.0	0.0	0.0
Public road transport	6250	5860	5957	5358	4554	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	129911	146708	155194	152189	140756	12	20	21	0.0	0.0	0.0
Trucks	75351	100615	123197	140518	145747	13	28	34	0.0	0.0	0.0
Rail	6970	7579	7099	5513	5103	-15	-31	-30	-0.2	-0.6	-0.6
Aviation	27742	44025	52040	58135	57775	4	8	8	0.0	0.0	0.0
Inland navigation	6383	5314	5751	6145	6290	0	1	1	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	41.2	40.7	37.7	33.3	28.8	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	58.0	58.5	60.5	58.9	54.8	0.0	0.0	0.0	0.0	0.0	0.0

Source: PRIMES

NMS: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**169598**	**136955**	**138643**	**139829**	**152204**	**11864**	**13807**	**18834**	**9.4**	**11.0**	**14.1**
Solids	140913	103966	84249	56232	53423	-2020	-14855	-8157	-2.3	-20.9	-13.2
Oil	2614	3079	2359	2120	1834	-1	-10	-18	-0.1	-0.5	-1.0
Natural gas	6749	6084	5757	5302	4789	-2	-12	0	0.0	-0.2	0.0
Nuclear	15481	14818	17254	17587	22036	0	-3890	-11185	0.0	-18.1	-33.7
Renewable energy sources	3841	9008	29024	58588	70122	13887	32574	38195	91.7	125.2	119.6
Hydro	1116	1355	1723	1859	1950	261	199	83	17.9	12.0	4.5
Biomass & Waste	2725	7609	23949	50346	59073	10860	27377	32600	83.0	119.2	123.1
Wind	0	1	1073	2542	4049	668	1479	1014	164.8	139.2	33.4
Solar and others	0	35	316	769	1690	151	468	1162	91.3	155.0	220.1
Geothermal	0	8	1963	3072	3361	1948	3051	3336	12579.4	14536.1	13491.4
Net Imports	**68016**	**59470**	**90241**	**121287**	**132285**	**-9610**	**-15503**	**-22439**	**-9.6**	**-11.3**	**-14.5**
Solids	-14214	-15836	-6770	3082	4016	-3977	-1835	-8950	142.4	-37.3	-69.0
Oil	51224	45604	54783	63646	69217	-2156	-2656	-3815	-3.8	-4.0	-5.2
- Crude oil and Feedstocks	43747	41220	45601	53179	57979	-1924	-2364	-3371	-4.0	-4.3	-5.5
- Oil products	7477	4384	9182	10467	11238	-232	-292	-445	-2.5	-2.7	-3.8
Natural gas	31158	31202	43891	56223	61813	-3400	-11001	-9673	-7.2	-16.4	-13.5
Electricity	-152	-1500	-1663	-1663	-2760	-77	-11	-1	4.8	0.7	0.0
Gross Inland Consumption	**236229**	**196904**	**227742**	**259843**	**283132**	**2255**	**-1696**	**-3605**	**1.0**	**-0.6**	**-1.3**
Solids	128332	90799	77478	59313	57438	-5997	-16690	-17108	-7.2	-22.0	-22.9
Oil	51587	46785	56001	64493	69694	-2157	-2666	-3834	-3.7	-4.0	-5.2
Natural gas	37140	36994	49648	61525	66602	-3402	-11013	-9673	-6.4	-15.2	-12.7
Nuclear	15481	14818	17254	17587	22036	0	-3890	-11185	0.0	-18.1	-33.7
Electricity	-152	-1500	-1663	-1663	-2760	-77	-11	-1	4.8	0.7	0.0
Renewable energy forms	3841	9008	29024	58588	70122	13887	32574	38195	91.7	125.2	119.6
as % in Gross Inland Consumption											
Solids	54.3	46.1	34.0	22.8	20.3	-3.0	-6.2	-5.7	-8.1	-21.5	-22.0
Oil	21.8	23.8	24.6	24.8	24.6	-1.2	-0.9	-1.0	-4.7	-3.3	-4.0
Natural gas	15.7	18.8	21.8	23.7	23.5	-1.7	-4.1	-3.1	-7.3	-14.6	-11.6
Nuclear	6.6	7.5	7.6	6.8	7.8	-0.1	-1.4	-3.8	-1.0	-17.6	-32.8
Renewable energy forms	1.6	4.6	12.7	22.5	24.8	6.0	12.6	13.6	89.8	126.7	122.4
Electricity Generation in GWh_e	**316734**	**324333**	**393984**	**507217**	**617583**	**-6452**	**-13816**	**-13571**	**-1.6**	**-2.7**	**-2.2**
Nuclear	59996	57434	66876	68167	85417	0	-15079	-43356	0.0	-18.1	-33.7
Hydro & wind	12978	15771	32535	51342	70420	10806	19515	12763	49.7	61.3	22.1
Thermal (incl. biomass)	243760	251128	294573	387708	461746	-17259	-18252	17021	-5.5	-4.5	3.8
Fuel Inputs for Thermal Power Generation [1]	**73176**	**66652**	**76779**	**85253**	**89642**	**519**	**-293**	**5166**	**0.7**	**-0.3**	**6.1**
Solids	62206	56391	52944	40181	40637	-5651	-15516	-15488	-9.6	-27.9	-27.6
Oil (including refinery gas)	5236	3281	2999	2330	2313	65	-23	-9	2.2	-1.0	-0.4
Gas	5360	6292	9434	9592	8242	-2458	-9287	-7171	-20.7	-49.2	-46.5
Biomass & Waste	374	687	9464	30111	35125	6623	21493	24509	233.2	249.4	230.9
Geothermal heat	0	0	1939	3040	3324	1939	3040	3324			
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**93232**	**70786**	**72289**	**80299**	**85756**	**-659**	**-944**	**-1487**	**-0.9**	**-1.2**	**-1.7**
Refineries	47239	44972	48890	56447	61089	-1946	-2390	-3402	-3.8	-4.1	-5.3
Biofuels and hydrogen production	0	33	2226	4341	5644	959	1530	1789	75.7	54.4	46.4
District heating	17949	8544	8859	8306	9228	345	-50	141	4.0	-0.6	1.6
Others	28043	17236	12315	11205	9795	-16	-34	-16	-0.1	-0.3	-0.2
Energy Branch Consumption	**9477**	**12681**	**12373**	**13324**	**13637**	**-280**	**-321**	**-289**	**-2.2**	**-2.4**	**-2.1**
Non-Energy Uses	**10089**	**10135**	**10734**	**13370**	**15333**	**-51**	**-33**	**-50**	**-0.5**	**-0.2**	**-0.3**
Final Energy Demand	**155460**	**124696**	**151512**	**183154**	**206599**	**241**	**-246**	**72**	**0.2**	**-0.1**	**0.0**
by sector											
Industry[1]	68606	45281	50002	59658	65799	350	313	367	0.7	0.5	0.6
- energy intensive industries	34503	28649	29451	33272	34864	206	170	185	0.7	0.5	0.5
- other industrial sectors	34103	16632	20551	26386	30936	144	143	182	0.7	0.5	0.6
Residential	40986	34898	43016	51806	58265	172	63	93	0.4	0.1	0.2
Tertiary	25276	21599	26581	34010	40429	-284	-628	-399	-1.1	-1.8	-1.0
Transport	20592	22917	31913	37680	42107	3	7	10	0.0	0.0	0.0
by fuel [1]											
Solids	44176	21303	16715	13922	12197	138	-184	-215	0.8	-1.3	-1.7
Oil	34795	33764	43111	50910	55473	-1094	-1730	-2509	-2.5	-3.3	-4.3
Gas	27229	25471	34391	44152	49724	-118	-82	-573	-0.3	-0.2	-1.1
Electricity	20539	19641	25601	35280	43905	-546	-1031	-1042	-2.1	-2.8	-2.3
Heat (from CHP and District Heating)	26534	18005	19935	22219	25652	-351	-716	-682	-1.7	-3.1	-2.6
Other	2188	6512	11759	16672	19648	2211	3497	5094	23.2	26.5	35.0
CO2 Emissions (Mt of CO2)	**707.7**	**547.1**	**552.9**	**527.8**	**542.7**	**-38.1**	**-99.7**	**-101.3**	**-6.5**	**-15.9**	**-15.7**
Power generation/District heating	341.5	280.2	265.0	204.9	201.8	-33.2	-91.7	-89.5	-11.1	-30.9	-30.7
Energy Branch	14.3	17.9	9.3	9.4	8.1	-1.9	-1.8	-2.1	-16.9	-16.3	-20.2
Industry	153.7	96.1	101.2	112.9	115.7	0.0	-1.6	-2.9	0.0	-1.4	-2.4
Residential	86.4	50.6	54.9	60.0	61.2	-0.5	-0.1	-0.3	-0.8	-0.1	-0.5
Tertiary	53.5	37.2	35.7	41.6	46.9	-0.4	-0.9	-2.4	-1.2	-2.2	-4.8
Transport	58.2	65.1	86.7	99.0	108.9	-2.1	-3.5	-4.2	-2.4	-3.4	-3.7
CO2 Emissions Index (1990=100)	**100.0**	**77.3**	**78.1**	**74.6**	**76.7**	-5.4	-14.1	-14.3	-6.5	-15.9	-15.7

Source: PRIMES

NMS: 12% renewables share in 2010 case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	75.039	74.853	73.401	71.813	70.628	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	312.8	374.8	555.3	820.6	1102.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	755.2	525.3	410.1	316.7	256.8	4.1	-2.1	-3.3	1.0	-0.6	-1.3
Gross Inl. Cons./Capita (toe/inhabitant)	3.15	2.63	3.10	3.62	4.01	0.03	-0.02	-0.05	1.0	-0.6	-1.3
Electricity Generated/Capita (kWh/inhabitant)	4221	4333	5368	7063	8744	-88	-192	-192	-1.6	-2.7	-2.2
Carbon intensity (t of CO_2/toe of GIC)	3.00	2.78	2.43	2.03	1.92	-0.19	-0.37	-0.33	-7.4	-15.3	-14.7
CO_2 Emissions/Capita (t of CO_2/inhabitant)	9.43	7.31	7.53	7.35	7.68	-0.52	-1.39	-1.43	-6.5	-15.9	-15.7
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	2262.2	1459.6	995.6	643.2	492.2	-68.7	-121.5	-91.9	-6.5	-15.9	-15.7
Import Dependency %	28.7	30.1	39.4	46.4	46.5	-4.6	-5.6	-7.2	-10.5	-10.8	-13.4
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	52.9	35.5	28.4	24.1	0.2	0.1	0.1	0.7	0.5	0.6
Residential (Energy on Private Income)	100.0	70.0	57.3	46.2	38.4	0.2	0.1	0.1	0.4	0.1	0.2
Tertiary (Energy on Value added)	100.0	65.9	54.5	46.4	39.7	-0.6	-0.9	-0.4	-1.1	-1.8	-1.0
Transport (Energy on GDP)	100.0	92.9	87.3	69.8	58.0	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.50	0.46	0.36	0.23	0.19	-0.05	-0.10	-0.08	-11.2	-30.0	-30.1
Final energy demand (t of CO_2/toe)	2.26	2.00	1.84	1.71	1.61	-0.02	-0.03	-0.05	-1.2	-1.8	-2.9
Industry	2.24	2.12	2.02	1.89	1.76	-0.01	-0.04	-0.05	-0.7	-1.9	-3.0
Residential	2.11	1.45	1.28	1.16	1.05	-0.02	0.00	-0.01	-1.2	-0.2	-0.6
Tertiary	2.12	1.72	1.34	1.22	1.16	0.00	0.00	-0.05	-0.1	-0.4	-3.9
Transport	2.83	2.84	2.72	2.63	2.59	-0.07	-0.09	-0.10	-2.4	-3.4	-3.7
Electricity and steam generation											
Generation Capacity in MW_e		**73667**	**86911**	**118644**	**169152**	**573**	**4153**	**2413**	**0.7**	**3.6**	**1.4**
Nuclear		9324	8786	8786	11024	0	-1952	-5524	0.0	-18.2	-33.4
Hydro (pumping excluded)		6374	7385	7749	8023	565	399	218	8.3	5.4	2.8
Wind		16	5983	13486	21988	3723	7194	5867	164.8	114.3	36.4
Solar		0	13	138	537	0	0	0	0.0	0.0	0.0
Thermal		57953	64744	88485	127579	-3715	-1488	1852	-5.4	-1.7	1.5
of which cogeneration units		24415	25486	31879	53427	-686	-1534	-558	-2.6	-4.6	-1.0
Solids fired		43996	39035	27129	41536	-981	-12528	-15514	-2.5	-31.6	-27.2
Gas fired		6071	11451	22837	36940	-6035	-8749	-7814	-34.5	-27.7	-17.5
Oil fired		6832	7210	5154	4554	141	-1047	-996	2.0	-16.9	-17.9
Biomass-waste fired		1055	6619	32692	43813	2730	20163	25441	70.2	160.9	138.5
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		0	429	672	735	429	672	735			
Indicators											
Efficiency for thermal electricity production (%)		32.4	33.0	39.1	44.3	-2.2	-1.7	-1.0	-6.2	-4.2	-2.2
Load factor for gross electric capacities (%)		50.3	51.7	48.8	41.7	-1.2	-3.1	-1.5	-2.3	-6.1	-3.5
CHP indicator (% of electricity from CHP)		23.5	29.0	30.2	40.5	2.3	-0.8	0.6	8.5	-2.7	1.5
Non fossil fuels in electricity generation (%)		23.3	35.1	56.7	57.2	10.3	26.4	19.3	41.7	87.0	51.1
- nuclear		17.7	17.0	13.4	13.8	0.3	-2.5	-6.6	1.6	-15.9	-32.2
- renewable energy forms		5.6	18.1	43.3	43.3	10.1	28.9	25.9	124.7	201.4	148.6
Transport sector											
Passenger transport activity (Gpkm)	**510.7**	**468.6**	**617.3**	**756.0**	**901.3**	-0.1	-0.1	-0.1	0.0	0.0	0.0
Public road transport	135.1	78.3	72.6	66.6	62.3	0.0	0.0	0.0	0.0	0.0	0.0
Private cars and motorcycles	263.6	325.1	470.8	606.5	747.0	0.0	0.1	0.1	0.0	0.0	0.0
Rail	102.1	51.4	50.1	48.7	48.3	-0.1	-0.3	-0.3	-0.2	-0.5	-0.6
Aviation	9.0	13.3	23.2	33.6	42.9	0.0	0.0	0.0	0.0	0.0	0.0
Inland navigation	0.8	0.6	0.7	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	6805	6261	8410	10527	12761	-0.7	-2.0	-1.8	0.0	0.0	0.0
Freight transport activity (Gtkm)	**334.6**	**305.9**	**438.9**	**557.0**	**655.5**	-0.2	-0.3	-0.2	0.0	-0.1	0.0
Trucks	119.9	177.1	301.0	412.2	501.2	0.1	0.2	0.3	0.0	0.1	0.1
Rail	206.8	124.7	133.6	140.3	149.7	-0.3	-0.5	-0.5	-0.2	-0.4	-0.3
Inland navigation	7.9	4.2	4.3	4.5	4.6	0.0	0.0	0.0	0.0	0.1	0.1
Freight activity per unit of GDP (tkm/000 Euro'00)	1070	816	790	679	594	-0.4	-0.3	-0.2	0.0	-0.1	0.0
Energy demand in transport (ktoe)	**20592**	**22917**	**31913**	**37680**	**42107**	3	7	10	0.0	0.0	0.0
Public road transport	1591	1159	1064	917	767	0	0	0	0.0	0.0	0.0
Private cars and motorcycles	8290	11641	14996	16734	19120	1	3	4	0.0	0.0	0.0
Trucks	7093	7453	12467	16346	18682	4	6	10	0.0	0.0	0.1
Rail	2096	1317	1192	970	881	-2	-3	-4	-0.2	-0.3	-0.5
Aviation	1190	1294	2138	2651	2593	0	1	1	0.0	0.0	0.0
Inland navigation	331	54	57	61	63	0	0	0	0.0	0.1	0.1
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	23.9	31.4	30.3	27.3	25.3	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	25.0	26.7	30.1	30.6	29.5	0.0	0.0	0.0	0.1	0.1	0.1

Source: PRIMES

EU27: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**928078**	**937145**	**935300**	**826852**	**814403**	**57113**	**75783**	**81758**	**6.5**	**10.1**	**11.2**
Solids	364706	214324	157536	112895	117492	-8340	-30094	-14032	-5.0	-21.0	-10.7
Oil	128402	170011	123026	58966	49483	-399	-205	-171	-0.3	-0.3	-0.3
Natural gas	162645	207644	183634	109165	89976	-1270	-361	226	-0.7	-0.3	0.3
Nuclear	200702	243761	253537	212326	166512	0	-23366	-54796	0.0	-9.9	-24.8
Renewable energy sources	71623	101405	217567	333500	390941	67122	129809	150531	44.6	63.7	62.6
Hydro	25013	30483	34190	36451	37554	2473	2075	1143	7.8	6.0	3.1
Biomass & Waste	43297	65264	142202	225410	255446	45048	90588	100080	46.4	67.2	64.4
Wind	67	1913	23134	41061	54080	7299	14660	15949	46.1	55.5	41.8
Solar and others	145	417	2732	8247	16981	1218	5374	12360	80.4	187.1	267.5
Geothermal	3101	3329	15309	22331	26880	11083	17112	20999	262.3	327.9	357.0
Net Imports	**749474**	**817569**	**992917**	**1182401**	**1201120**	**-55627**	**-89414**	**-114209**	**-5.3**	**-7.0**	**-8.7**
Solids	81418	98469	117299	111344	121766	-20678	-26195	-62907	-15.0	-19.0	-34.1
Oil	529724	525771	596188	664628	644839	-16041	-21814	-27538	-2.6	-3.2	-4.1
- Crude oil and Feedstocks	503451	507009	561357	637342	625348	-16067	-20247	-25823	-2.8	-3.1	-4.0
- Oil products	26273	18762	34831	27287	19491	26	-1567	-1715	0.1	-5.4	-8.1
Natural gas	135011	191643	277891	404854	432775	-18831	-41393	-23763	-6.3	-9.3	-5.2
Electricity	3321	1687	1539	1574	1740	-77	-12	-1	-4.8	-0.7	-0.1
Gross Inland Consumption	**1645474**	**1709133**	**1879937**	**1956215**	**1959892**	**1485**	**-13631**	**-32451**	**0.1**	**-0.7**	**-1.6**
Solids	450795	320708	274835	224239	239258	-29018	-56289	-76939	-9.5	-20.1	-24.3
Oil	624250	648970	670933	670556	638692	-16440	-22020	-27709	-2.4	-3.2	-4.2
Natural gas	294782	392603	461525	514019	522750	-20101	-41754	-23537	-4.2	-7.5	-4.3
Nuclear	200702	243761	253537	212326	166512	0	-23366	-54796	0.0	-9.9	-24.8
Electricity	3321	1687	1539	1574	1740	-77	-12	-1	-4.8	-0.7	-0.1
Renewable energy forms	71623	101405	217567	333500	390941	67122	129809	150531	44.6	63.7	62.6
as % in Gross Inland Consumption											
Solids	27.4	18.8	14.6	11.5	12.2	-1.6	-2.8	-3.7	-9.6	-19.5	-23.1
Oil	37.9	38.0	35.7	34.3	32.6	-0.9	-0.9	-0.9	-2.5	-2.5	-2.6
Natural gas	17.9	23.0	24.6	26.3	26.7	-1.1	-1.9	-0.7	-4.2	-6.9	-2.7
Nuclear	12.2	14.3	13.5	10.9	8.5	0.0	-1.1	-2.6	-0.1	-9.3	-23.5
Renewable energy forms	4.4	5.9	11.6	17.0	19.9	3.6	6.7	7.9	44.5	64.9	65.3
Electricity Generation in GWh_e	**2561205**	**2993398**	**3553069**	**4089622**	**4473993**	**-49097**	**-74086**	**-90424**	**-1.4**	**-1.8**	**-2.0**
Nuclear	794718	944823	982718	822979	645398	0	-90567	-212390	0.0	-9.9	-24.8
Hydro & wind	291642	376697	668133	930326	1128025	113631	219323	252596	20.5	30.8	28.9
Thermal (incl. biomass)	1474844	1671878	1902219	2336317	2700570	-162728	-202842	-130629	-7.9	-8.0	-4.6
Fuel Inputs for Thermal Power Generation [1]	**384763**	**402753**	**436397**	**469820**	**509102**	**-16032**	**-18192**	**-6097**	**-3.5**	**-3.7**	**-1.2**
Solids	261342	225135	201431	161264	184839	-26661	-54284	-74398	-11.7	-25.2	-28.7
Oil (including refinery gas)	56108	43691	34466	24526	21189	687	287	1054	2.0	1.2	5.2
Gas	54301	109769	141265	157137	148944	-16031	-32087	-11359	-10.2	-17.0	-7.1
Biomass & Waste	10237	21219	44508	105255	127947	14932	50860	57684	50.5	93.5	82.1
Geothermal heat	2774	2939	14726	21638	26183	11041	17031	20922	299.7	369.6	397.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**840016**	**818581**	**831990**	**850965**	**825854**	**-7000**	**-3994**	**-6284**	**-0.8**	**-0.5**	**-0.8**
Refineries	673728	727122	733686	739456	711494	-17549	-21696	-27734	-2.3	-2.9	-3.8
Biofuels and hydrogen production	2	637	27027	47209	57697	10124	15885	20326	59.9	50.7	54.4
District heating	38458	19291	17409	16031	15867	1974	2115	1022	12.8	15.2	6.9
Others	127829	71530	53868	48269	40796	-1549	-298	102	-2.8	-0.6	0.3
Energy Branch Consumption	**78427**	**85834**	**86749**	**87064**	**84231**	**-1837**	**-2290**	**-2835**	**-2.1**	**-2.6**	**-3.3**
Non-Energy Uses	**98844**	**109187**	**109883**	**113807**	**115137**	**-503**	**-357**	**-452**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1071205**	**1126314**	**1284408**	**1399634**	**1445418**	**3248**	**2446**	**2154**	**0.3**	**0.2**	**0.1**
by sector											
Industry[1]	372041	342654	376776	409198	424069	2705	2678	2133	0.7	0.7	0.5
- energy intensive industries	239834	220752	235176	246608	246709	1974	1837	1377	0.8	0.8	0.6
- other industrial sectors	132206	121902	141600	162590	177360	732	840	756	0.5	0.5	0.4
Residential	267394	283857	324927	354583	368874	1047	1133	1215	0.3	0.3	0.3
Tertiary	151680	161545	191377	215345	230459	-524	-1401	-1243	-0.3	-0.6	-0.5
Transport	280091	338258	391327	420508	422017	19	35	49	0.0	0.0	0.0
by fuel [1]											
Solids	128087	58191	46737	40908	35390	-583	-703	-1100	-1.2	-1.7	-3.0
Oil	441141	476894	519494	530753	509660	-11974	-18529	-25466	-2.3	-3.4	-4.8
Gas	219636	259889	287305	320480	336602	-3417	-5920	-6277	-1.2	-1.8	-1.8
Electricity	183815	216343	263327	308880	342571	-3259	-4602	-5322	-1.2	-1.5	-1.5
Heat (from CHP and District Heating)	67635	73194	82108	90733	101482	-1815	-1796	249	-2.2	-1.9	0.2
Other	30892	41802	85437	107880	119713	24296	33995	40070	39.7	46.0	50.3
CO2 Emissions (Mt of CO2)	**4009.9**	**3800.2**	**3833.6**	**3746.2**	**3740.1**	**-209.3**	**-385.4**	**-440.4**	**-5.2**	**-9.3**	**-10.5**
Power generation/District heating	1483.5	1359.8	1282.8	1119.6	1181.9	-151.3	-302.0	-332.6	-10.5	-21.2	-22.0
Energy Branch	151.1	154.0	121.6	109.8	91.4	-12.1	-11.9	-12.5	-9.1	-9.8	-12.0
Industry	761.0	594.1	594.2	613.5	596.0	-17.5	-25.4	-25.5	-2.9	-4.0	-4.1
Residential	516.6	459.7	490.0	506.7	500.5	-3.8	-3.0	-3.1	-0.8	-0.6	-0.6
Tertiary	285.7	247.7	263.8	274.8	270.4	-1.8	-6.4	-18.4	-0.7	-2.3	-6.4
Transport	812.0	984.9	1081.1	1121.8	1100.0	-22.8	-36.7	-48.3	-2.1	-3.2	-4.2
CO2 Emissions Index (1990=100)	**100.0**	**94.8**	**95.6**	**93.4**	**93.3**	-5.2	-9.6	-11.0	-5.2	-9.3	-10.5

Source: PRIMES

EU27: 12% renewables share in 2010 case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	472.712	483.520	492.838	496.408	494.784	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7358.9	9001.0	11044.1	13825.4	16315.6	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	223.6	189.9	170.2	141.5	120.1	0.1	-1.0	-2.0	0.1	-0.7	-1.6
Gross Inl. Cons./Capita (toe/inhabitant)	3.48	3.53	3.81	3.94	3.96	0.00	-0.03	-0.07	0.1	-0.7	-1.6
Electricity Generated/Capita (kWh/inhabitant)	5418	6191	7209	8238	9042	-100	-149	-183	-1.4	-1.8	-2.0
Carbon intensity (t of CO_2/toe of GIC)	2.44	2.22	2.04	1.92	1.91	-0.11	-0.18	-0.19	-5.3	-8.7	-9.1
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.48	7.86	7.78	7.55	7.56	-0.42	-0.78	-0.89	-5.2	-9.3	-10.5
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	544.9	422.2	347.1	271.0	229.2	-18.9	-27.9	-27.0	-5.2	-9.3	-10.5
Import Dependency %	44.6	46.7	51.5	58.8	59.6	-2.9	-4.0	-4.6	-5.4	-6.4	-7.2
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	80.2	75.0	65.1	57.5	0.5	0.4	0.3	0.7	0.7	0.5
Residential (Energy on Private Income)	100.0	87.2	81.6	71.8	63.5	0.3	0.2	0.2	0.3	0.3	0.3
Tertiary (Energy on Value added)	100.0	83.5	78.0	69.2	62.3	-0.2	-0.5	-0.3	-0.3	-0.6	-0.5
Transport (Energy on GDP)	100.0	98.7	93.1	79.9	68.0	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.24	0.18	0.18	-0.03	-0.05	-0.05	-10.8	-21.0	-21.7
Final energy demand (t of CO_2/toe)	2.22	2.03	1.89	1.80	1.71	-0.04	-0.05	-0.07	-2.1	-2.9	-3.9
Industry	2.05	1.73	1.58	1.50	1.41	-0.06	-0.07	-0.07	-3.6	-4.6	-4.6
Residential	1.93	1.62	1.51	1.43	1.36	-0.02	-0.01	-0.01	-1.1	-0.9	-0.9
Tertiary	1.88	1.53	1.38	1.28	1.17	-0.01	-0.02	-0.07	-0.4	-1.6	-5.9
Transport	2.90	2.91	2.76	2.67	2.61	-0.06	-0.09	-0.11	-2.1	-3.2	-4.2
Electricity and steam generation											
Generation Capacity in MW_e		**697174**	**872171**	**1041208**	**1231586**	**22849**	**57733**	**75268**	**2.7**	**5.9**	**6.5**
Nuclear		145542	139130	114962	79812	0	-5807	-26625	0.0	-4.8	-25.0
Hydro (pumping excluded)		105185	117293	121543	124173	4917	3661	2003	4.4	3.1	1.6
Wind		12786	111790	200613	267749	32984	71657	83245	41.9	55.6	45.1
Solar		176	1661	20999	45567	0	16134	35131	0.0	331.6	336.7
Thermal		433485	502296	583092	714286	-15053	-27912	-18487	-2.9	-4.6	-2.5
of which cogeneration units		120284	157209	224393	277830	-6432	-1323	3655	-3.9	-0.6	1.3
Solids fired		203503	166008	131224	170637	-4435	-40811	-60722	-2.6	-23.7	-26.2
Gas fired		135927	236060	294437	357764	-18309	-35260	-21534	-7.2	-10.7	-5.7
Oil fired		78309	68914	43788	36101	-972	-5363	770	-1.4	-10.9	2.2
Biomass-waste fired		14723	27437	108081	143191	6141	49478	58049	28.8	84.4	68.2
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3878	5562	6594	2522	4045	4951	185.9	266.6	301.3
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.5	42.8	45.6	-1.8	-2.0	-1.6	-4.5	-4.4	-3.5
Load factor for gross electric capacities (%)		49.0	46.5	44.8	41.5	-1.9	-3.5	-3.6	-3.9	-7.2	-8.0
CHP indicator (% of electricity from CHP)		14.9	19.2	23.0	26.5	0.6	0.3	0.7	3.3	1.1	2.8
Non fossil fuels in electricity generation (%)		46.4	51.2	56.5	55.5	5.8	11.3	9.5	12.8	25.0	20.7
- nuclear		31.6	27.7	20.1	14.4	0.4	-1.8	-4.4	1.4	-8.3	-23.2
- renewable energy forms		14.9	23.6	36.4	41.0	5.4	13.1	13.9	29.9	56.4	51.1
Transport sector											
Passenger transport activity (Gpkm)	**4769.3**	**5568.5**	**6595.5**	**7621.4**	**8423.8**	-0.5	-1.0	-1.1	0.0	0.0	0.0
Public road transport	554.1	502.3	517.0	504.4	494.2	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3567.1	4316.4	5126.8	5954.7	6588.8	0.4	0.8	1.0	0.0	0.0	0.0
Rail	450.2	417.8	456.8	491.7	523.5	-1.0	-2.0	-2.3	-0.2	-0.4	-0.4
Aviation	168.5	298.4	455.1	625.1	767.7	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	29.4	33.6	39.8	45.5	49.6	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	10089	11517	13383	15353	17025	-1.0	-2.1	-2.3	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1861.5**	**2177.1**	**2684.4**	**3201.2**	**3645.1**	-0.4	-0.7	-0.6	0.0	0.0	0.0
Trucks	1075.1	1507.0	1959.3	2425.9	2825.1	0.3	0.6	0.8	0.0	0.0	0.0
Rail	524.7	396.1	425.4	445.0	464.8	-0.8	-1.3	-1.5	-0.2	-0.3	-0.3
Inland navigation	261.8	274.0	299.6	330.2	355.2	0.0	0.0	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	253	242	243	232	223	0.0	-0.1	0.0	0.0	0.0	0.0
Energy demand in transport (ktoe)	**280091**	**338258**	**391327**	**420508**	**422017**	19	35	49	0.0	0.0	0.0
Public road transport	8685	7514	7473	6706	5744	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	139578	160719	173948	174111	166328	13	23	25	0.0	0.0	0.0
Trucks	85770	109568	140466	164497	174728	18	37	48	0.0	0.0	0.0
Rail	9564	9423	8595	6755	6268	-17	-35	-35	-0.2	-0.5	-0.6
Aviation	29449	45553	54631	61701	61902	4	9	9	0.0	0.0	0.0
Inland navigation	7044	5481	6215	6738	7046	1	1	1	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.8	36.9	32.6	28.4	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	50.8	53.6	55.2	53.8	50.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: PRIMES

EU28: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**961237**	**963855**	**967269**	**874771**	**881860**	**62969**	**89029**	**103139**	**7.0**	**11.3**	**13.2**
Solids	377116	227617	166762	125984	132380	-9648	-30658	-14032	-5.5	-19.6	-9.6
Oil	132112	172757	126270	62348	53222	-399	-205	-171	-0.3	-0.3	-0.3
Natural gas	162820	208170	184635	110520	91396	-1345	-361	226	-0.7	-0.3	0.2
Nuclear	200702	243761	253537	212326	169981	0	-23366	-54795	0.0	-9.9	-24.4
Renewable energy sources	88487	111549	236066	363593	434880	74361	143619	171911	46.0	65.3	65.4
Hydro	27003	33138	37756	40234	41703	2891	2329	1143	8.3	6.1	2.8
Biomass & Waste	57710	71804	149009	234556	266194	45842	92296	101983	44.4	64.9	62.1
Wind	67	1916	23566	42283	55761	7576	15142	16331	47.4	55.8	41.4
Solar and others	173	679	3924	15058	33748	1615	9009	22508	70.0	148.9	200.2
Geothermal	3534	4012	21811	31462	37474	16437	24844	29948	305.8	375.4	397.9
Net Imports	**776740**	**868442**	**1060727**	**1283941**	**1343318**	**-58407**	**-95275**	**-125483**	**-5.2**	**-6.9**	**-8.5**
Solids	85626	107717	129317	127115	140115	-21342	-26257	-65677	-14.2	-17.1	-31.9
Oil	550163	555056	628807	715742	715681	-16407	-22519	-28619	-2.5	-3.1	-3.8
- Crude oil and Feedstocks	523502	528467	591672	684953	691396	-16409	-20907	-26834	-2.7	-3.0	-3.7
- Oil products	26661	26589	37136	30789	24284	2	-1613	-1785	0.0	-5.0	-6.8
Natural gas	137693	203694	301380	439742	486093	-20581	-46487	-31186	-6.4	-9.6	-6.0
Electricity	3259	1975	1223	1342	1429	-77	-12	-1	-5.9	-0.9	-0.1
Gross Inland Consumption	**1704962**	**1786487**	**1979216**	**2105034**	**2168768**	**4562**	**-6247**	**-22344**	**0.2**	**-0.3**	**-1.0**
Solids	467717	343986	296079	253099	272495	-30990	-56915	-79709	-9.5	-18.4	-22.6
Oil	647159	679975	706297	724412	712493	-16806	-22725	-28789	-2.3	-3.0	-3.9
Natural gas	297637	405241	486015	550262	577490	-21926	-46848	-30960	-4.3	-7.8	-5.1
Nuclear	200702	243761	253537	212326	169981	0	-23366	-54795	0.0	-9.9	-24.4
Electricity	3259	1975	1223	1342	1429	-77	-12	-1	-5.9	-0.9	-0.1
Renewable energy forms	88487	111549	236066	363593	434880	74361	143619	171911	46.0	65.3	65.4
as % in Gross Inland Consumption											
Solids	27.4	19.3	15.0	12.0	12.6	-1.6	-2.7	-3.5	-9.7	-18.1	-21.8
Oil	38.0	38.1	35.7	34.4	32.9	-0.9	-1.0	-1.0	-2.5	-2.8	-2.9
Natural gas	17.5	22.7	24.6	26.1	26.6	-1.2	-2.1	-1.1	-4.5	-7.6	-4.1
Nuclear	11.8	13.6	12.8	10.1	7.8	0.0	-1.1	-2.4	-0.2	-9.6	-23.6
Renewable energy forms	5.2	6.2	11.9	17.3	20.1	3.7	6.9	8.1	45.6	65.8	67.1
Electricity Generation in GWh_e	**2618738**	**3118298**	**3724799**	**4347247**	**4870289**	**-50304**	**-75276**	**-93608**	**-1.3**	**-1.7**	**-1.9**
Nuclear	794718	944823	982718	822979	658846	0	-90567	-212386	0.0	-9.9	-24.4
Hydro & wind	314786	407604	714611	988556	1214596	121709	227875	275614	20.5	30.0	29.4
Thermal (incl. biomass)	1509233	1765871	2027470	2535711	2996847	-172013	-212584	-156835	-7.8	-7.7	-5.0
Fuel Inputs for Thermal Power Generation [1]	**393649**	**424378**	**466253**	**515447**	**567281**	**-13905**	**-12085**	**-1619**	**-2.9**	**-2.3**	**-0.3**
Solids	266482	235098	209663	179995	210372	-28560	-54630	-76634	-12.0	-23.3	-26.7
Oil (including refinery gas)	57294	46624	36443	25633	22075	720	298	1030	2.0	1.2	4.9
Gas	56793	118348	154570	172980	169308	-17692	-34219	-14090	-10.3	-16.5	-7.7
Biomass & Waste	10237	21304	45317	107294	130128	15243	51723	58223	50.7	93.1	81.0
Geothermal heat	2842	3004	20261	29544	35399	16383	24743	29852	422.5	515.4	538.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**867592**	**846345**	**868920**	**905392**	**899814**	**-7330**	**-4508**	**-6827**	**-0.8**	**-0.5**	**-0.8**
Refineries	696742	750941	767244	790448	781281	-17891	-22356	-28745	-2.3	-2.8	-3.5
Biofuels and hydrogen production	2	637	27139	47634	59089	10146	16035	20793	59.7	50.7	54.3
District heating	38458	19291	17447	16157	16080	1974	2115	1018	12.8	15.1	6.8
Others	132391	75474	57091	51153	43363	-1559	-302	108	-2.7	-0.6	0.2
Energy Branch Consumption	**80396**	**88538**	**89655**	**91006**	**89180**	**-1911**	**-2308**	**-2910**	**-2.1**	**-2.5**	**-3.2**
Non-Energy Uses	**101612**	**112692**	**113260**	**117776**	**119658**	**-517**	**-374**	**-470**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1109885**	**1180941**	**1358674**	**1514358**	**1614268**	**3614**	**3076**	**5746**	**0.3**	**0.2**	**0.4**
by sector											
Industry[1]	384219	363322	403978	450023	485949	2731	2711	2120	0.7	0.6	0.4
- energy intensive industries	245670	228215	243511	257071	260126	1999	1866	1397	0.8	0.7	0.5
- other industrial sectors	138549	135107	160466	192952	225823	732	844	723	0.5	0.4	0.3
Residential	281949	300854	344709	383561	409500	1392	1752	1799	0.4	0.5	0.4
Tertiary	154275	166339	200079	229150	251287	-527	-1423	1776	-0.3	-0.6	0.7
Transport	289441	350426	409907	451624	467532	19	36	52	0.0	0.0	0.0
by fuel [1]											
Solids	136126	68674	58111	49590	41891	-655	-976	-1592	-1.1	-1.9	-3.7
Oil	458929	499706	549347	579619	578347	-12271	-19228	-26506	-2.2	-3.2	-4.4
Gas	220792	264489	299086	341449	371081	-3628	-8860	-10939	-1.2	-2.5	-2.9
Electricity	187680	224587	275565	328350	372714	-3303	-4696	-5526	-1.2	-1.4	-1.5
Heat (from CHP and District Heating)	67875	74443	82996	92413	105692	-1711	-1617	444	-2.0	-1.7	0.4
Other	38483	49041	93569	122937	144543	25181	38453	49866	36.8	45.5	52.7
CO2 Emissions (Mt of CO2)	**4136.3**	**3998.9**	**4069.2**	**4092.6**	**4204.0**	**-222.7**	**-402.1**	**-471.9**	**-5.2**	**-8.9**	**-10.1**
Power generation/District heating	1515.0	1431.1	1354.6	1237.3	1336.8	-162.8	-308.5	-348.0	-10.7	-20.0	-20.7
Energy Branch	155.8	159.9	123.3	110.4	91.9	-12.3	-11.9	-12.5	-9.0	-9.8	-12.0
Industry	796.2	650.1	666.1	708.8	724.3	-18.1	-26.7	-27.7	-2.6	-3.6	-3.7
Residential	538.0	481.6	515.4	545.2	554.1	-3.9	-2.9	-3.1	-0.8	-0.5	-0.6
Tertiary	291.5	255.8	274.7	280.1	269.2	-2.8	-15.0	-31.2	-1.0	-5.1	-10.4
Transport	839.9	1020.5	1135.0	1210.8	1227.8	-22.8	-37.0	-49.4	-2.0	-3.0	-3.9
CO2 Emissions Index (1990=100)	**100.0**	**96.7**	**98.4**	**98.9**	**101.6**	-5.4	-9.7	-11.4	-5.2	-8.9	-10.1

Source: PRIMES

EU28: 12% renewables share in 2010 case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	528.913	550.981	569.992	582.152	587.546	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7511.4	9217.8	11370.5	14408.7	17374.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	227.0	193.8	174.1	146.1	124.8	0.4	-0.4	-1.3	0.2	-0.3	-1.0
Gross Inl. Cons./Capita (toe/inhabitant)	3.22	3.24	3.47	3.62	3.69	0.01	-0.01	-0.04	0.2	-0.3	-1.0
Electricity Generated/Capita (kWh/inhabitant)	4951	5660	6535	7468	8289	-88	-129	-159	-1.3	-1.7	-1.9
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.24	2.06	1.94	1.94	-0.12	-0.18	-0.20	-5.4	-8.7	-9.2
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.82	7.26	7.14	7.03	7.16	-0.39	-0.69	-0.80	-5.2	-8.9	-10.1
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	550.7	433.8	357.9	284.0	242.0	-19.6	-27.9	-27.2	-5.2	-8.9	-10.1
Import Dependency %	44.6	47.5	52.3	59.5	60.4	-3.0	-4.2	-5.0	-5.4	-6.6	-7.6
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.8	76.5	67.0	59.6	0.5	0.4	0.3	0.7	0.6	0.4
Residential (Energy on Private Income)	100.0	87.3	81.4	72.1	64.0	0.3	0.3	0.3	0.4	0.5	0.4
Tertiary (Energy on Value added)	100.0	84.3	79.6	71.0	64.2	-0.2	-0.4	0.5	-0.3	-0.6	0.7
Transport (Energy on GDP)	100.0	98.7	93.6	81.3	69.8	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.24	0.19	0.19	-0.03	-0.05	-0.05	-11.0	-19.7	-20.4
Final energy demand (t of CO_2/toe)	2.22	2.04	1.91	1.81	1.72	-0.04	-0.06	-0.08	-2.1	-3.1	-4.2
Industry	2.07	1.79	1.65	1.58	1.49	-0.06	-0.07	-0.06	-3.3	-4.2	-4.1
Residential	1.91	1.60	1.50	1.42	1.35	-0.02	-0.01	-0.01	-1.2	-1.0	-1.0
Tertiary	1.89	1.54	1.37	1.22	1.07	-0.01	-0.06	-0.13	-0.8	-4.5	-11.0
Transport	2.90	2.91	2.77	2.68	2.63	-0.06	-0.08	-0.11	-2.0	-3.0	-3.9
Electricity and steam generation											
Generation Capacity in MW_e		**725459**	**914599**	**1098215**	**1332444**	**25777**	**60130**	**87318**	**2.9**	**5.8**	**7.0**
Nuclear		145542	139130	114962	81526	0	-5807	-26624	0.0	-4.8	-24.6
Hydro (pumping excluded)		116592	129405	134163	137822	5472	3999	2003	4.4	3.1	1.5
Wind		12806	113485	207823	279662	34065	75542	87408	42.9	57.1	45.5
Solar		176	1661	21030	57835	0	16134	47252	0.0	329.5	446.5
Thermal		450343	530918	620238	775599	-13760	-29738	-22721	-2.5	-4.6	-2.8
of which cogeneration units		122684	162255	233719	295932	-6308	-2021	4071	-3.7	-0.9	1.4
Solids fired		210547	176099	141878	192582	-4435	-42812	-64921	-2.5	-23.2	-25.2
Gas fired		143140	249170	315070	388494	-18439	-37728	-25923	-6.9	-10.7	-6.3
Oil fired		80801	72439	45838	38023	-1016	-5407	726	-1.4	-10.6	1.9
Biomass-waste fired		14814	28096	110130	147851	6439	50472	60483	29.7	84.6	69.2
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	5114	7323	8649	3690	5738	6913	259.2	362.1	398.3
Indicators											
Efficiency for thermal electricity production (%)		35.8	37.4	42.3	45.4	-2.0	-2.5	-2.2	-5.1	-5.6	-4.7
Load factor for gross electric capacities (%)		49.1	46.5	45.2	41.7	-2.0	-3.4	-3.8	-4.1	-7.1	-8.3
CHP indicator (% of electricity from CHP)		14.8	18.8	22.6	26.0	0.6	0.2	0.7	3.2	0.8	2.8
Non fossil fuels in electricity generation (%)		45.6	50.3	54.9	53.4	5.9	11.1	9.5	13.4	25.4	21.5
- nuclear		30.3	26.4	18.9	13.5	0.4	-1.7	-4.0	1.4	-8.4	-22.9
- renewable energy forms		15.3	24.0	36.0	39.9	5.6	12.8	13.5	30.5	55.5	51.0
Transport sector											
Passenger transport activity (Gpkm)	**4881.2**	**5752.9**	**6896.7**	**8263.8**	**9493.3**	-0.5	-1.0	-1.2	0.0	0.0	0.0
Public road transport	618.4	589.7	618.6	625.6	606.4	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3601.6	4397.4	5301.1	6413.8	7428.6	0.4	0.8	1.1	0.0	0.0	0.0
Rail	456.6	423.6	465.4	512.3	562.8	-1.0	-2.1	-2.5	-0.2	-0.4	-0.4
Aviation	170.7	304.7	466.6	656.7	832.3	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	33.9	37.4	45.1	55.4	63.2	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	9229	10441	12100	14195	16157	-0.9	-1.8	-2.0	0.0	0.0	0.0
Freight transport activity (Gtkm)	**1958.3**	**2352.3**	**2946.9**	**3611.3**	**4230.8**	-0.5	-0.7	-0.7	0.0	0.0	0.0
Trucks	1159.5	1668.6	2204.6	2809.8	3374.4	0.3	0.6	0.9	0.0	0.0	0.0
Rail	532.6	405.9	437.3	463.5	491.1	-0.8	-1.4	-1.6	-0.2	-0.3	-0.3
Inland navigation	266.3	277.8	305.0	338.0	365.3	0.0	0.0	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	261	255	259	251	244	0.0	0.0	0.0	0.0	0.0	0.0
Energy demand in transport (ktoe)	**289441**	**350426**	**409907**	**451624**	**467532**	19	36	52	0.0	0.0	0.0
Public road transport	9634	8758	8911	8329	7120	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	140266	162549	177497	182358	181003	13	23	26	0.0	0.0	0.0
Trucks	92511	116941	151636	181042	196769	18	38	50	0.0	0.0	0.0
Rail	9807	9691	8864	7048	6704	-18	-36	-36	-0.2	-0.5	-0.5
Aviation	29928	46814	56516	65665	68311	4	9	10	0.0	0.0	0.0
Inland navigation	7295	5673	6483	7182	7624	1	1	1	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.5	39.3	36.3	31.8	27.7	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	51.8	52.8	54.1	52.3	48.4	0.0	0.0	0.0	0.0	0.0	0.0

Source: PRIMES

EU30: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**1091087**	**1200143**	**1210026**	**1150129**	**1106610**	**51697**	**90237**	**97192**	**4.5**	**8.5**	**9.6**
Solids	377317	228042	167296	126262	132681	-9648	-30707	-14034	-5.5	-19.6	-9.6
Oil	216359	337714	255053	186667	135058	-3153	-205	-171	-1.2	-0.1	-0.1
Natural gas	186970	253987	269995	230516	203512	-10979	-518	-5585	-3.9	-0.2	-2.7
Nuclear	206883	250675	260539	219469	175053	0	-23366	-56710	0.0	-9.6	-24.5
Renewable energy sources	103557	129725	257144	387214	460306	75477	145033	173691	41.5	59.9	60.6
Hydro	40003	48250	53075	56862	58858	3132	2574	1387	6.3	4.7	2.4
Biomass & Waste	59720	74749	154186	240852	273389	46607	93486	103479	43.3	63.4	60.9
Wind	67	1919	24010	42817	56651	7664	15088	16331	46.9	54.4	40.5
Solar and others	173	703	3973	15126	33844	1636	9039	22546	70.0	148.5	199.5
Geothermal	3595	4103	21901	31557	37564	16437	24844	29948	300.8	370.1	393.2
Net Imports	**695727**	**684878**	**876169**	**1070063**	**1178705**	**-47564**	**-96565**	**-120694**	**-5.1**	**-8.3**	**-9.3**
Solids	86632	108508	129975	127523	140440	-21498	-26386	-65775	-14.2	-17.1	-31.9
Oil	490237	412700	522659	613604	655147	-14004	-23072	-29110	-2.6	-3.6	-4.3
- Crude oil and Feedstocks	458354	384418	483305	580836	629421	-14077	-21325	-27240	-2.8	-3.5	-4.1
- Oil products	31883	28282	39354	32768	25726	73	-1747	-1870	0.2	-5.1	-6.8
Natural gas	117149	163941	223717	328919	383071	-11985	-47095	-25807	-5.1	-12.5	-6.3
Electricity	1710	-272	-182	17	47	-77	-12	-1	73.8	-41.5	-3.0
Gross Inland Consumption	**1751588**	**1839144**	**2036357**	**2165220**	**2227392**	**4132**	**-6328**	**-23502**	**0.2**	**-0.3**	**-1.0**
Solids	468937	345317	297270	253785	273121	-31146	-57093	-79809	-9.5	-18.4	-22.6
Oil	669257	702393	727873	745300	732283	-17157	-23277	-29281	-2.3	-3.0	-3.8
Natural gas	301245	411306	493712	559435	586583	-22964	-47613	-31392	-4.4	-7.8	-5.1
Nuclear	206883	250675	260539	219469	175053	0	-23366	-56710	0.0	-9.6	-24.5
Electricity	1710	-272	-182	17	47	-77	-12	-1	73.8	-41.5	-3.0
Renewable energy forms	103557	129725	257144	387214	460306	75477	145033	173691	41.5	59.9	60.6
as % in Gross Inland Consumption											
Solids	26.8	18.8	14.6	11.7	12.3	-1.6	-2.6	-3.4	-9.7	-18.1	-21.8
Oil	38.2	38.2	35.7	34.4	32.9	-0.9	-1.0	-1.0	-2.5	-2.7	-2.8
Natural gas	17.2	22.4	24.2	25.8	26.3	-1.2	-2.1	-1.1	-4.6	-7.6	-4.1
Nuclear	11.8	13.6	12.8	10.1	7.9	0.0	-1.0	-2.4	-0.2	-9.4	-23.7
Renewable energy forms	5.9	7.1	12.6	17.9	20.7	3.7	6.7	7.9	41.3	60.4	62.3
Electricity Generation in GWh_e	**2794856**	**3323905**	**3940581**	**4585987**	**5122411**	**-51007**	**-76353**	**-95226**	**-1.3**	**-1.6**	**-1.8**
Nuclear	818651	971593	1009830	850636	678486	0	-90567	-219801	0.0	-9.6	-24.5
Hydro & wind	465941	583374	897928	1188183	1424565	125534	230110	278460	16.3	24.0	24.3
Thermal (incl. biomass)	1510263	1768938	2032824	2547169	3019360	-176541	-215896	-153885	-8.0	-7.8	-4.8
Fuel Inputs for Thermal Power Generation [1]	**394358**	**425676**	**468124**	**518323**	**571940**	**-14462**	**-12556**	**-1296**	**-3.0**	**-2.4**	**-0.2**
Solids	266510	235114	209792	180017	210372	-28626	-54630	-76634	-12.0	-23.3	-26.7
Oil (including refinery gas)	57394	46636	36620	25719	22131	739	316	1021	2.1	1.2	4.8
Gas	56913	118562	154628	173542	170468	-18503	-34591	-13584	-10.7	-16.6	-7.4
Biomass & Waste	10698	22359	46823	109500	133569	15546	51606	58049	49.7	89.1	76.9
Geothermal heat	2842	3004	20261	29544	35399	16383	24743	29852	422.5	515.4	538.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**884427**	**866713**	**889325**	**926715**	**921179**	**-7627**	**-4392**	**-6651**	**-0.9**	**-0.5**	**-0.7**
Refineries	713481	771184	786886	810040	800619	-18306	-22770	-29149	-2.3	-2.7	-3.5
Biofuels and hydrogen production	2	637	27572	48965	60674	10243	16565	21361	59.1	51.1	54.3
District heating	38512	19379	17750	16542	16516	1995	2124	1037	12.7	14.7	6.7
Others	132432	75512	57117	51168	43370	-1559	-310	100	-2.7	-0.6	0.2
Energy Branch Consumption	**83789**	**92950**	**94005**	**95487**	**92796**	**-2209**	**-2313**	**-3027**	**-2.3**	**-2.4**	**-3.2**
Non-Energy Uses	**103762**	**115166**	**115464**	**119912**	**121836**	**-523**	**-379**	**-476**	**-0.5**	**-0.3**	**-0.4**
Final Energy Demand	**1145388**	**1220510**	**1402700**	**1561316**	**1661590**	**3679**	**3148**	**5817**	**0.3**	**0.2**	**0.4**
by sector											
Industry[1]	394004	375356	416580	463805	500220	2775	2772	2191	0.7	0.6	0.4
- energy intensive industries	252212	236839	252471	266705	269874	2035	1911	1447	0.8	0.7	0.5
- other industrial sectors	141792	138517	164109	197101	230346	740	861	743	0.5	0.4	0.3
Residential	290806	310280	354996	394429	420381	1420	1782	1824	0.4	0.5	0.4
Tertiary	160718	172911	208251	238052	260496	-535	-1443	1750	-0.3	-0.6	0.7
Transport	299860	361964	422873	465030	480492	20	37	53	0.0	0.0	0.0
by fuel [1]											
Solids	137278	69933	59077	50212	42472	-732	-1119	-1668	-1.2	-2.2	-3.8
Oil	477192	518412	568442	598534	596131	-12487	-19774	-26998	-2.1	-3.2	-4.3
Gas	222317	266915	303021	345957	375647	-3673	-9221	-11610	-1.2	-2.6	-3.0
Electricity	200044	238509	291064	345976	391529	-3362	-4786	-5653	-1.1	-1.4	-1.4
Heat (from CHP and District Heating)	68198	75229	84026	93954	107876	-1657	-1542	471	-1.9	-1.6	0.4
Other	40359	51512	97070	126684	147935	25590	39589	51276	35.8	45.5	53.0
CO2 Emissions (Mt of CO2)	**4207.7**	**4076.8**	**4149.8**	**4173.3**	**4280.6**	**-226.7**	**-406.2**	**-474.7**	**-5.2**	**-8.9**	**-10.0**
Power generation/District heating	1515.7	1431.7	1356.2	1239.4	1340.2	-165.0	-309.5	-347.3	-10.8	-20.0	-20.6
Energy Branch	163.4	170.4	132.2	119.4	99.0	-13.0	-12.0	-12.8	-9.0	-9.1	-11.4
Industry	807.4	663.2	677.3	720.7	736.5	-18.8	-28.4	-29.6	-2.7	-3.8	-3.9
Residential	551.3	493.5	527.7	556.8	564.2	-3.9	-2.9	-3.1	-0.7	-0.5	-0.5
Tertiary	300.2	264.5	285.2	290.6	279.2	-2.9	-15.1	-31.3	-1.0	-4.9	-10.1
Transport	869.6	1053.4	1171.2	1246.4	1261.6	-23.0	-38.2	-50.7	-1.9	-3.0	-3.9
CO2 Emissions Index (1990=100)	**100.0**	**96.9**	**98.6**	**99.2**	**101.7**	-5.4	-9.7	-11.3	-5.2	-8.9	-10.0

Source: PRIMES

EU30: 12% renewables share in 2010 case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (B)					
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	539.950	562.681	582.130	594.587	600.252	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7877.3	9665.6	11898.8	15057.8	18137.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	222.4	190.3	171.1	143.8	122.8	0.3	-0.4	-1.3	0.2	-0.3	-1.0
Gross Inl. Cons./Capita (toe/inhabitant)	3.24	3.27	3.50	3.64	3.71	0.01	-0.01	-0.04	0.2	-0.3	-1.0
Electricity Generated/Capita (kWh/inhabitant)	5176	5907	6769	7713	8534	-88	-128	-159	-1.3	-1.6	-1.8
Carbon intensity (t of CO_2/toe of GIC)	2.40	2.22	2.04	1.93	1.92	-0.12	-0.18	-0.19	-5.4	-8.6	-9.0
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.79	7.25	7.13	7.02	7.13	-0.39	-0.68	-0.79	-5.2	-8.9	-10.0
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	534.2	421.8	348.8	277.2	236.0	-19.1	-27.0	-26.2	-5.2	-8.9	-10.0
Import Dependency %	38.9	36.4	42.0	48.2	51.6	-2.4	-4.2	-4.7	-5.3	-8.0	-8.4
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.7	76.3	66.8	59.5	0.5	0.4	0.3	0.7	0.6	0.4
Residential (Energy on Private Income)	100.0	87.4	81.4	72.1	63.9	0.3	0.3	0.3	0.4	0.5	0.4
Tertiary (Energy on Value added)	100.0	84.5	80.0	71.3	64.4	-0.2	-0.4	0.4	-0.3	-0.6	0.7
Transport (Energy on GDP)	100.0	98.4	93.4	81.1	69.6	0.0	0.0	0.0	0.0	0.0	0.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.40	0.29	0.23	0.18	0.18	-0.03	-0.05	-0.05	-11.1	-19.8	-20.3
Final energy demand (t of CO_2/toe)	2.21	2.03	1.90	1.80	1.71	-0.04	-0.06	-0.08	-2.1	-3.1	-4.2
Industry	2.05	1.77	1.63	1.55	1.47	-0.06	-0.07	-0.07	-3.4	-4.4	-4.3
Residential	1.90	1.59	1.49	1.41	1.34	-0.02	-0.01	-0.01	-1.1	-1.0	-1.0
Tertiary	1.87	1.53	1.37	1.22	1.07	-0.01	-0.06	-0.13	-0.8	-4.4	-10.7
Transport	2.90	2.91	2.77	2.68	2.63	-0.05	-0.08	-0.11	-1.9	-3.0	-3.9
Electricity and steam generation											
Generation Capacity in MW_e		**769539**	**964303**	**1151342**	**1388905**	**26494**	**60103**	**87346**	**2.8**	**5.5**	**6.7**
Nuclear		148992	142580	118412	84003	0	-5807	-27572	0.0	-4.7	-24.7
Hydro (pumping excluded)		155831	171007	177662	181743	5791	4348	2404	3.5	2.5	1.3
Wind		12886	115597	210714	283979	34636	75696	87755	42.8	56.1	44.7
Solar		195	1705	21140	58067	0	16134	47252	0.0	322.3	436.9
Thermal		451636	533414	623415	781114	-13933	-30267	-22493	-2.5	-4.6	-2.8
of which cogeneration units		123656	163600	235590	299467	-6190	-1950	4218	-3.6	-0.8	1.4
Solids fired		210703	176193	141894	192582	-4435	-42812	-64921	-2.5	-23.2	-25.2
Gas fired		143723	250693	316730	390798	-18745	-38176	-25536	-7.0	-10.8	-6.1
Oil fired		80968	72594	45914	38088	-1004	-5398	730	-1.4	-10.5	2.0
Biomass-waste fired		15202	28821	111554	150998	6560	50381	60320	29.5	82.4	66.5
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	5114	7323	8649	3690	5738	6913	259.2	362.1	398.3
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.3	42.3	45.4	-2.0	-2.5	-2.2	-5.1	-5.6	-4.6
Load factor for gross electric capacities (%)		49.3	46.6	45.5	42.1	-1.9	-3.3	-3.7	-4.0	-6.8	-8.0
CHP indicator (% of electricity from CHP)		14.0	17.9	21.6	25.0	0.5	0.2	0.7	3.1	0.9	2.8
Non fossil fuels in electricity generation (%)		48.9	53.0	57.2	55.5	5.8	10.6	8.9	12.3	22.8	19.2
- nuclear		29.2	25.6	18.5	13.2	0.3	-1.6	-4.0	1.3	-8.1	-23.1
- renewable energy forms		19.6	27.4	38.6	42.3	5.5	12.3	12.9	24.9	46.5	44.0
Transport sector											
Passenger transport activity (Gpkm)	**5032.5**	**5925.5**	**7097.8**	**8487.0**	**9728.5**	-0.5	-1.1	-1.2	0.0	0.0	0.0
Public road transport	625.6	596.9	626.8	634.4	615.4	0.0	0.1	0.1	0.0	0.0	0.0
Private cars and motorcycles	3720.2	4530.1	5454.5	6583.5	7607.3	0.4	0.9	1.1	0.0	0.0	0.0
Rail	473.5	443.8	488.2	536.8	588.1	-1.0	-2.1	-2.5	-0.2	-0.4	-0.4
Aviation	178.7	316.3	482.0	675.6	853.1	0.0	0.1	0.1	0.0	0.0	0.0
Inland navigation	34.5	38.4	46.2	56.7	64.6	0.0	0.0	0.0	0.0	0.0	0.0
Travel per person (km per capita)	9320	10531	12193	14274	16207	-0.9	-1.8	-2.0	0.0	0.0	0.0
Freight transport activity (Gtkm)	**2026.8**	**2447.9**	**3059.5**	**3742.9**	**4376.3**	-0.5	-0.7	-0.7	0.0	0.0	0.0
Trucks	1179.2	1705.6	2256.1	2879.5	3461.0	0.3	0.6	0.9	0.0	0.0	0.0
Rail	544.1	419.3	453.0	479.9	507.6	-0.8	-1.4	-1.6	-0.2	-0.3	-0.3
Inland navigation	303.5	323.0	350.4	383.5	407.7	0.0	0.0	0.1	0.0	0.0	0.0
Freight activity per unit of GDP (tkm/000 Euro'00)	257	253	257	249	241	0.0	0.0	0.0	0.0	0.0	0.0
Energy demand in transport (ktoe)	**299860**	**361964**	**422873**	**465030**	**480492**	20	37	53	0.0	0.0	0.0
Public road transport	9802	8917	9088	8500	7272	1	1	1	0.0	0.0	0.0
Private cars and motorcycles	145794	168062	183293	187793	185937	14	24	27	0.0	0.0	0.0
Trucks	94266	119351	155005	185361	201506	18	38	51	0.0	0.0	0.0
Rail	10142	10079	9262	7372	6993	-18	-36	-37	-0.2	-0.5	-0.5
Aviation	31627	49160	59006	68095	70490	4	9	10	0.0	0.0	0.0
Inland navigation	8229	6394	7218	7910	8295	1	1	1	0.0	0.0	0.0
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.6	36.5	31.9	27.8	0.0	0.0	0.0	0.0	0.0	0.0
Freight transport (toe/Mtkm)	51.4	52.0	53.5	51.8	48.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: PRIMES

(1) EUROSTAT Energy Balances do not take into account non-marketed steam, i.e. steam generated - either in boilers or in CHP plants - and used on site by industrial consumers. Using statistical information provided by EUROSTAT on CHP, the non-marketed steam generated in CHP units as well as the corresponding fuel input have been estimated for this study. In the PRIMES model, steam has been attributed to the demand side and the fuel input to the supply side. This approach ensures a better comparability of historical figures with the projections. However, slight differences exist for certain figures related to steam generation - both in terms of final energy demand and transformation input - in this report compared to EUROSTAT energy balances.

Disclaimer: Energy and transport statistics reported in this publication and used for the modelling are taken mainly from EUROSTAT and from the publication "EU Energy and Transport in Figures" of the Directorate General for Energy and Transport. Energy and transport statistical concepts have developed differently in the past according to their individual purposes. Energy demand in transport reflects usually sales of fuels at the point of refuelling, which can differ from the region of consumption. This is particularly relevant for airplanes and trucks. Transport statistics deal with the transport activity within a country but may not always fully include transit shipments. These differences should be borne in mind when comparing energy and transport figures. This applies in particular to transport activity ratios, such as energy efficiency in freight transport, which is measured in tonnes of oil equivalent per million tonne-km.

Abbreviations

GIC: Gross Inland Consumption
CHP: combined heat and power

Geographical regions
EU15: EU15 Member States
EU25: EU15 Member States + New Member States
NMS: New Member States (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia)
EU27: EU25 Member States + Bulgaria + Romania
EU28: EU27 + Turkey
Europe 30: EU28 + Norway + Switzerland

Units
toe: tonne of oil equivalent, or 10^{7} kilocalories, or 41.86 GJ (Gigajoule)
Mtoe: million toe

GW: Gigawatt or 10^{9} watt
kWh: kilowatt-hour or 10^{3} watt-hour
MWh: megawatt-hour or 10^{6} watt-hour
TWh: Terawatt-hour or 10^{12} watt-hour

t: metric tonnes, or 1000 kilogrammes
Mt: Million metric tonnes

km: kilometre
pkm: passenger-kilometre (one passenger transported a distance of one kilometre)
tkm: tonne-kilometre (one tonne transported a distance of one kilometre)
Gpkm: Giga passenger-kilometre, or 10^{9} passenger-kilometre
Gtkm: Giga tonne-kilometre, or 10^{9} tonne-kilometre

APPENDIX 4: "Combined high renewables and efficiency" case results

Summary results by groups of countries (comparison to Baseline)

EU25: Combined high renewables and efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**877543**	**898598**	**879970**	**713308**	**642448**	**43553**	**6787**	**-42655**	**5.2**	**1.0**	**-6.2**
Solids	351650	204139	138203	78636	55005	-16325	-52446	-65193	-10.6	-40.0	-54.2
Oil	120396	163631	116324	50879	42409	-855	-2080	-1040	-0.7	-3.9	-2.4
Natural gas	139723	196665	167465	97347	77899	-4714	-1002	-1907	-2.7	-1.0	-2.4
Nuclear	196920	237664	248776	161499	73480	0	-67140	-137328	0.0	-29.4	-65.1
Renewable energy sources	68855	96499	209203	324948	393655	65447	129455	162812	45.5	66.2	70.5
Hydro	23391	28982	31557	33481	34004	1679	1278	123	5.6	4.0	0.4
Biomass & Waste	42151	61865	139593	227292	275876	47185	98100	126996	51.1	75.9	85.3
Wind	67	1913	22131	38935	51081	6345	12694	13140	40.2	48.4	34.6
Solar and others	145	417	2107	4516	8743	617	1769	4349	41.4	64.4	99.0
Geothermal	3101	3322	13815	20724	23951	9621	15614	18205	229.4	305.5	316.8
Net Imports	**711300**	**801061**	**929780**	**973000**	**930436**	**-94495**	**-258691**	**-335131**	**-9.2**	**-21.0**	**-26.5**
Solids	75449	94307	107779	78253	69528	-24508	-50142	-103392	-18.5	-39.1	-59.8
Oil	510017	518147	569574	576908	542859	-30124	-92957	-109591	-5.0	-13.9	-16.8
- Crude oil and Feedstocks	479112	496826	531812	549987	522789	-29545	-86688	-103462	-5.3	-13.6	-16.5
- Oil products	30905	21321	37762	26921	20070	-579	-6270	-6129	-1.5	-18.9	-23.4
Natural gas	123653	186463	250328	316304	316400	-39725	-115006	-121597	-13.7	-26.7	-27.8
Electricity	2181	2144	2098	1536	1651	-138	-586	-551	-6.2	-27.6	-25.0
Gross Inland Consumption	**1556194**	**1653841**	**1761590**	**1633433**	**1517452**	**-50942**	**-251904**	**-377786**	**-2.8**	**-13.4**	**-19.9**
Solids	431944	306538	245982	156888	124532	-40833	-102588	-168585	-14.2	-39.5	-57.5
Oil	595746	634711	637739	574911	529835	-30979	-95037	-110631	-4.6	-14.2	-17.3
Natural gas	260548	376284	417793	413651	394299	-44439	-116008	-123504	-9.6	-21.9	-23.9
Nuclear	196920	237664	248776	161499	73480	0	-67140	-137328	0.0	-29.4	-65.1
Electricity	2181	2144	2098	1536	1651	-138	-586	-551	-6.2	-27.6	-25.0
Renewable energy forms	68855	96499	209203	324948	393655	65447	129455	162812	45.5	66.2	70.5
as % in Gross Inland Consumption											
Solids	27.8	18.5	14.0	9.6	8.2	-1.9	-4.2	-7.3	-11.8	-30.2	-46.9
Oil	38.3	38.4	36.2	35.2	34.9	-0.7	-0.3	1.1	-1.9	-1.0	3.3
Natural gas	16.7	22.8	23.7	25.3	26.0	-1.8	-2.8	-1.3	-7.0	-9.9	-4.9
Nuclear	12.7	14.4	14.1	9.9	4.8	0.4	-2.2	-6.3	2.9	-18.5	-56.5
Renewable energy forms	4.4	5.8	11.9	19.9	25.9	3.9	9.5	13.8	49.7	91.9	113.0
Electricity Generation in GWh_e	**2455674**	**2900835**	**3314419**	**3249644**	**3217896**	**-168767**	**-756131**	**-1148703**	**-4.8**	**-18.9**	**-26.3**
Nuclear	780056	921193	964265	625969	284807	0	-260237	-532285	0.0	-29.4	-65.1
Hydro & wind	272788	359249	625846	856745	1041430	93302	172894	197706	17.5	25.3	23.4
Thermal (incl. biomass)	1402830	1620392	1724307	1766930	1891660	-262069	-668788	-814124	-13.2	-27.5	-30.1
Fuel Inputs for Thermal Power Generation [1]	**355362**	**385987**	**390037**	**364572**	**353885**	**-42204**	**-98199**	**-136153**	**-9.8**	**-21.2**	**-27.8**
Solids	246377	214488	177020	99279	77230	-37930	-99222	-163081	-17.6	-50.0	-67.9
Oil (including refinery gas)	48954	41870	31833	21444	22507	200	-1868	2713	0.6	-8.0	13.7
Gas	47057	105480	121161	122572	96951	-31665	-60159	-58297	-20.7	-32.9	-37.6
Biomass & Waste	10201	21211	46713	101025	133663	17566	47406	64239	60.3	88.4	92.5
Geothermal heat	2774	2939	13309	20251	23533	9625	15644	18273	261.2	339.5	347.4
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**797634**	**796450**	**790396**	**760421**	**728192**	**-22501**	**-63674**	**-68873**	**-2.8**	**-7.7**	**-8.6**
Refineries	642275	710448	697116	641621	599501	-31806	-92403	-108602	-4.4	-12.6	-15.3
Biofuels and hydrogen production	2	637	26912	62557	80952	10120	31553	44577	60.3	101.8	122.5
District heating	31035	17261	16729	12145	11268	1479	-1673	-3465	9.7	-12.1	-23.5
Others	124322	68104	49639	44098	36471	-2294	-1151	-1382	-4.4	-2.5	-3.7
Energy Branch Consumption	**73032**	**80377**	**77699**	**69444**	**64054**	**-3799**	**-11722**	**-14080**	**-4.7**	**-14.4**	**-18.0**
Non-Energy Uses	**94476**	**105950**	**107527**	**110791**	**111717**	**-321**	**-408**	**-448**	**-0.3**	**-0.4**	**-0.4**
Final Energy Demand	**1021913**	**1095359**	**1207861**	**1183545**	**1156056**	**-30145**	**-154960**	**-214397**	**-2.4**	**-11.6**	**-15.6**
by sector											
Industry[1]	341087	330062	356650	372952	384703	230	-9450	-6862	0.1	-2.5	-1.8
- energy intensive industries	216809	211616	221402	223618	220928	642	-4775	-4004	0.3	-2.1	-1.8
- other industrial sectors	124278	118446	135248	149335	163775	-412	-4676	-2859	-0.3	-3.0	-1.7
Residential	261006	273302	303182	278795	260278	-8784	-59946	-91007	-2.8	-17.7	-25.9
Tertiary	146622	158975	175016	163976	152603	-13471	-47880	-72713	-7.1	-22.6	-32.3
Transport	273198	333020	373013	367822	358471	-8120	-37684	-43815	-2.1	-9.3	-10.9
by fuel [1]											
Solids	123937	56633	44484	37943	31957	-718	-1477	-2067	-1.6	-3.7	-6.1
Oil	428121	468312	492866	444915	406910	-24476	-84981	-104927	-4.7	-16.0	-20.5
Gas	200242	251885	268037	265293	267076	-11138	-44433	-54321	-4.0	-14.3	-16.9
Electricity	176468	211352	247069	246531	247377	-12241	-56387	-86667	-4.7	-18.6	-25.9
Heat (from CHP and District Heating)	63092	68712	75962	80861	81211	-4215	-6831	-14114	-5.3	-7.8	-14.8
Other	30053	38465	79444	108002	121524	22642	39148	47698	39.9	56.9	64.6
CO2 Emissions (Mt of CO2)	**3776.1**	**3674.1**	**3524.1**	**2968.8**	**2669.5**	**-357.8**	**-959.8**	**-1285.5**	**-9.2**	**-24.4**	**-32.5**
Power generation/District heating	1362.6	1294.9	1123.5	769.5	617.4	-238.4	-563.7	-806.6	-17.5	-42.3	-56.6
Energy Branch	141.5	144.9	106.4	81.3	69.8	-17.6	-32.6	-29.8	-14.2	-28.6	-29.9
Industry	698.9	567.7	554.2	542.6	534.4	-22.7	-52.6	-35.5	-3.9	-8.8	-6.2
Residential	506.1	452.1	465.1	411.7	370.0	-17.6	-83.2	-116.7	-3.6	-16.8	-24.0
Tertiary	274.2	244.6	246.7	232.8	221.0	-15.2	-43.0	-60.8	-5.8	-15.6	-21.6
Transport	792.7	969.9	1028.3	930.8	856.8	-46.4	-184.7	-236.1	-4.3	-16.6	-21.6
CO2 Emissions Index (1990=100)	**100.0**	**97.3**	**93.3**	**78.6**	**70.7**	-9.5	-25.4	-34.0	-9.2	-24.4	-32.5

Source: PRIMES

EU25: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	440.788	452.915	464.054	469.270	469.365	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7294.7	8947.0	10946.8	13656.3	16051.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	213.3	184.8	160.9	119.6	94.5	-4.7	-18.4	-23.5	-2.8	-13.4	-19.9
Gross Inl. Cons./Capita (toe/inhabitant)	3.53	3.65	3.80	3.48	3.23	-0.11	-0.54	-0.80	-2.8	-13.4	-19.9
Electricity Generated/Capita (kWh/inhabitant)	5571	6405	7142	6925	6856	-364	-1611	-2447	-4.8	-18.9	-26.3
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.22	2.00	1.82	1.76	-0.14	-0.27	-0.33	-6.6	-12.8	-15.7
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.57	8.11	7.59	6.33	5.69	-0.77	-2.05	-2.74	-9.2	-24.4	-32.5
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	517.7	410.7	321.9	217.4	166.3	-32.7	-70.3	-80.1	-9.2	-24.4	-32.5
Import Dependency %	44.7	47.2	51.4	57.7	59.2	-3.7	-5.8	-5.7	-6.7	-9.2	-8.8
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	83.8	77.3	65.0	57.5	0.0	-1.6	-1.0	0.1	-2.5	-1.8
Residential (Energy on Private Income)	100.0	85.8	78.1	58.1	46.3	-2.3	-12.5	-16.2	-2.8	-17.7	-25.9
Tertiary (Energy on Value added)	100.0	84.9	73.9	54.7	42.9	-5.7	-16.0	-20.5	-7.1	-22.6	-32.3
Transport (Energy on GDP)	100.0	99.4	91.0	71.9	59.6	-2.0	-7.4	-7.3	-2.1	-9.3	-10.9
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.41	0.30	0.23	0.16	0.13	-0.04	-0.07	-0.10	-14.9	-32.4	-45.3
Final energy demand (t of CO_2/toe)	2.22	2.04	1.90	1.79	1.71	-0.04	-0.06	-0.06	-1.9	-3.5	-3.4
Industry	2.05	1.72	1.55	1.45	1.39	-0.06	-0.10	-0.07	-4.0	-6.5	-4.5
Residential	1.94	1.65	1.53	1.48	1.42	-0.01	0.02	0.04	-0.9	1.1	2.6
Tertiary	1.87	1.54	1.41	1.42	1.45	0.02	0.12	0.20	1.5	9.1	15.8
Transport	2.90	2.91	2.76	2.53	2.39	-0.06	-0.22	-0.33	-2.2	-8.0	-12.0
Electricity and steam generation											
Generation Capacity in MW_e		**661750**	**822508**	**894558**	**958984**	**12001**	**-48023**	**-137308**	**1.5**	**-5.1**	**-12.5**
Nuclear		141082	136430	105839	40435	0	-11097	-60781	0.0	-9.5	-60.1
Hydro (pumping excluded)		97168	106892	110492	112592	2959	1874	391	2.8	1.7	0.3
Wind		12785	106514	190136	252112	28123	62512	69181	35.9	49.0	37.8
Solar		176	1658	11656	38734	0	6807	28370	0.0	140.4	273.7
Thermal		410539	471014	476436	515111	-19080	-108119	-174469	-3.9	-18.5	-25.3
of which cogeneration units		112958	149309	195270	241058	-1562	-13691	-6941	-1.0	-6.6	-2.8
Solids fired		188879	152480	91433	90898	-4057	-65373	-120337	-2.6	-41.7	-57.0
Gas fired		131875	219102	233462	233582	-26337	-87746	-126552	-10.7	-27.3	-35.1
Oil fired		74302	61764	48012	39646	-4285	82	4680	-6.5	0.2	13.4
Biomass-waste fired		14462	34104	98274	144977	13390	41180	63376	64.6	72.1	77.7
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3564	5255	6007	2207	3738	4364	162.7	246.4	265.6
Indicators											
Efficiency for thermal electricity production (%)		36.1	38.0	41.7	46.0	-1.5	-3.6	-1.5	-3.8	-7.9	-3.2
Load factor for gross electric capacities (%)		50.0	46.0	41.5	38.3	-3.1	-7.0	-7.2	-6.2	-14.5	-15.8
CHP indicator (% of electricity from CHP)		14.5	19.4	27.9	35.8	1.5	6.0	11.5	8.4	27.7	47.3
Non fossil fuels in electricity generation (%)		46.5	53.9	62.3	64.5	8.2	16.8	18.2	17.9	36.8	39.4
- nuclear		31.8	29.1	19.3	8.9	1.4	-2.9	-9.9	5.1	-12.9	-52.7
- renewable energy forms		14.7	24.8	43.1	55.7	6.8	19.6	28.1	37.5	83.7	101.9
Transport sector											
Passenger transport activity (Gpkm)	**4640.8**	**5466.3**	**6447.9**	**7389.4**	**8099.8**	-1.5	-12.7	-30.4	0.0	-0.2	-0.4
Public road transport	504.1	480.1	496.0	483.8	472.0	1.0	3.2	5.3	0.2	0.7	1.1
Private cars and motorcycles	3529.3	4253.1	5015.4	5768.7	6329.6	-1.1	-12.0	-29.0	0.0	-0.2	-0.5
Rail	411.9	402.7	445.4	477.6	506.3	-1.0	-0.9	0.6	-0.2	-0.2	0.1
Aviation	166.3	296.9	451.3	613.8	742.5	-0.3	-2.9	-7.2	-0.1	-0.5	-1.0
Inland navigation	29.2	33.6	39.7	45.4	49.3	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	10528	12069	13895	15746	17257	-3.2	-27.0	-64.8	0.0	-0.2	-0.4
Freight transport activity (Gtkm)	**1753.9**	**2131.5**	**2579.6**	**3033.9**	**3402.4**	-2.6	-14.9	-29.5	-0.1	-0.5	-0.9
Trucks	1034.1	1486.3	1889.5	2296.4	2625.3	-1.7	-15.3	-32.0	-0.1	-0.7	-1.2
Rail	461.7	374.2	400.9	420.6	438.7	-1.1	-0.8	-0.2	-0.3	-0.2	0.0
Inland navigation	258.1	271.0	289.2	316.8	338.3	0.2	1.2	2.7	0.1	0.4	0.8
Freight activity per unit of GDP (tkm/000 Euro'00)	240	238	236	222	212	-0.2	-1.1	-1.8	-0.1	-0.5	-0.9
Energy demand in transport (ktoe)	**273198**	**333020**	**373013**	**367822**	**358471**	-8120	-37684	-43815	-2.1	-9.3	-10.9
Public road transport	7841	7018	6984	5904	4924	-37	-370	-396	-0.5	-5.9	-7.4
Private cars and motorcycles	138202	158349	169443	163770	152464	-734	-5130	-7387	-0.4	-3.0	-4.6
Trucks	82444	108068	135131	142380	142989	-517	-14450	-21396	-0.4	-9.2	-13.0
Rail	9066	8897	8094	5963	5536	-213	-555	-483	-2.6	-8.5	-8.0
Aviation	28932	45320	47565	43754	46454	-6609	-17023	-13905	-12.2	-28.0	-23.0
Inland navigation	6714	5368	5797	6050	6104	-11	-155	-248	-0.2	-2.5	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	39.3	39.9	35.8	29.6	25.8	-1.2	-3.0	-2.6	-3.1	-9.3	-9.2
Freight transport (toe/Mtkm)	51.7	53.9	55.1	49.1	43.9	-0.2	-4.6	-6.0	-0.3	-8.6	-12.0

Source: PRIMES

EU15: Combined high renewables and efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**707946**	**761643**	**742999**	**589682**	**520679**	**33362**	**9183**	**-31055**	**4.7**	**1.6**	**-5.6**
Solids	210737	100172	53698	34394	26747	-14561	-25601	-31870	-21.3	-42.7	-54.4
Oil	117782	160552	113974	48798	40602	-844	-2030	-996	-0.7	-4.0	-2.4
Natural gas	132975	190581	161730	92385	73363	-4690	-650	-1654	-2.8	-0.7	-2.2
Nuclear	181439	222846	231522	143980	60829	0	-63182	-116757	0.0	-30.5	-65.7
Renewable energy sources	65014	87491	182076	270125	319138	53457	100646	120223	41.6	59.4	60.4
Hydro	22275	27627	29834	31622	32053	1418	1079	39	5.0	3.5	0.1
Biomass & Waste	39426	54257	117365	180024	210961	38047	73801	88554	48.0	69.5	72.3
Wind	67	1912	21052	36614	47340	5671	11435	12432	36.9	45.4	35.6
Solar and others	145	381	1863	4150	8191	538	1705	4325	40.6	69.7	111.9
Geothermal	3101	3315	11961	17716	20594	7783	12626	14872	186.3	248.1	259.9
Net Imports	**643284**	**741591**	**847057**	**872993**	**826474**	**-77368**	**-221907**	**-284369**	**-8.4**	**-20.3**	**-25.6**
Solids	89663	110142	115996	75351	66611	-19085	-48126	-93342	-14.1	-39.0	-58.4
Oil	458793	472543	516503	520828	484340	-26256	-82735	-95078	-4.8	-13.7	-16.4
- Crude oil and Feedstocks	435365	455606	487630	503016	473652	-26201	-78115	-91249	-5.1	-13.4	-16.2
- Oil products	23428	16937	28873	17812	10688	-55	-4620	-3828	-0.2	-20.6	-26.4
Natural gas	92495	155262	210746	273185	270715	-32016	-90900	-95795	-13.2	-25.0	-26.1
Electricity	2333	3644	3812	3628	4808	-12	-146	-153	-0.3	-3.9	-3.1
Gross Inland Consumption	**1319965**	**1456936**	**1543038**	**1411073**	**1293077**	**-44006**	**-212724**	**-315423**	**-2.8**	**-13.1**	**-19.6**
Solids	303612	215739	169693	109745	93358	-33646	-73728	-125213	-16.5	-40.2	-57.3
Oil	544159	587926	583460	518024	470866	-27100	-84766	-96073	-4.4	-14.1	-16.9
Natural gas	223408	339289	372476	365571	344078	-36706	-91550	-97449	-9.0	-20.0	-22.1
Nuclear	181439	222846	231522	143980	60829	0	-63182	-116757	0.0	-30.5	-65.7
Electricity	2333	3644	3812	3628	4808	-12	-146	-153	-0.3	-3.9	-3.1
Renewable energy forms	65014	87491	182076	270125	319138	53457	100646	120223	41.6	59.4	60.4
as % in Gross Inland Consumption											
Solids	23.0	14.8	11.0	7.8	7.2	-1.8	-3.5	-6.4	-14.2	-31.2	-46.9
Oil	41.2	40.4	37.8	36.7	36.4	-0.7	-0.4	1.2	-1.7	-1.1	3.3
Natural gas	16.9	23.3	24.1	25.9	26.6	-1.6	-2.2	-0.8	-6.4	-8.0	-3.1
Nuclear	13.7	15.3	15.0	10.2	4.7	0.4	-2.6	-6.3	2.9	-20.0	-57.4
Renewable energy forms	4.9	6.0	11.8	19.1	24.7	3.7	8.7	12.3	45.6	83.4	99.6
Electricity Generation in GWh_e	**2138940**	**2576502**	**2937169**	**2840654**	**2779903**	**-145580**	**-644088**	**-955542**	**-4.7**	**-18.5**	**-25.6**
Nuclear	720059	863760	897389	558068	235771	0	-244893	-452548	0.0	-30.5	-65.7
Hydro & wind	259810	343478	593246	807971	974579	82430	155947	188512	16.1	23.9	24.0
Thermal (incl. biomass)	1159070	1369264	1446535	1474615	1569553	-228011	-555143	-691506	-13.6	-27.4	-30.6
Fuel Inputs for Thermal Power Generation [1]	**282186**	**319336**	**318506**	**297850**	**289758**	**-37474**	**-79374**	**-115804**	**-10.5**	**-21.0**	**-28.6**
Solids	184170	158097	125071	70651	60564	-31284	-72154	-123622	-20.0	-50.5	-67.1
Oil (including refinery gas)	43718	38588	29069	19462	20824	370	-1497	3351	1.3	-7.1	19.2
Gas	41697	99188	114196	116912	94068	-26739	-46941	-45767	-19.0	-28.6	-32.7
Biomass & Waste	9827	20524	38692	73554	94093	12386	28553	35285	47.1	63.5	60.0
Geothermal heat	2774	2939	11479	17272	20209	7794	12664	14948	211.5	274.9	284.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**704402**	**725664**	**720382**	**687612**	**652450**	**-19566**	**-55240**	**-57371**	**-2.6**	**-7.4**	**-8.1**
Refineries	595036	665476	649670	591506	547367	-28417	-83681	-96245	-4.2	-12.4	-15.0
Biofuels and hydrogen production	2	604	24682	56501	72402	9157	28308	39882	59.0	100.4	122.6
District heating	13085	8717	8612	6509	5980	1877	1048	333	27.9	19.2	5.9
Others	96279	50868	37418	33095	26701	-2183	-915	-1341	-5.5	-2.7	-4.8
Energy Branch Consumption	**63555**	**67696**	**65703**	**57740**	**52236**	**-3141**	**-9782**	**-11972**	**-4.6**	**-14.5**	**-18.6**
Non-Energy Uses	**84387**	**95815**	**96777**	**97428**	**96401**	**-286**	**-368**	**-381**	**-0.3**	**-0.4**	**-0.4**
Final Energy Demand	**866453**	**970663**	**1060987**	**1026417**	**990836**	**-25748**	**-128688**	**-173090**	**-2.4**	**-11.1**	**-14.9**
by sector											
Industry[1]	272481	284781	306968	315763	320872	200	-7294	-5261	0.1	-2.3	-1.6
- energy intensive industries	182306	182967	192133	191585	187190	619	-3706	-3064	0.3	-1.9	-1.6
- other industrial sectors	90175	101814	114835	124178	133682	-419	-3589	-2197	-0.4	-2.8	-1.6
Residential	220020	238404	261672	236553	218271	-7449	-50444	-74843	-2.8	-17.6	-25.5
Tertiary	121346	137376	150810	140285	129111	-10811	-36932	-55378	-6.7	-20.8	-30.0
Transport	252606	310102	341536	333815	322581	-7688	-34017	-37609	-2.2	-9.2	-10.4
by fuel [1]											
Solids	79761	35330	27849	24458	20802	-776	-856	-810	-2.7	-3.4	-3.7
Oil	393325	434547	450638	400684	361433	-22498	-76572	-92422	-4.8	-16.0	-20.4
Gas	173014	226415	234962	228022	226338	-9704	-37471	-44762	-4.0	-14.1	-16.5
Electricity	155929	191711	222672	218857	217729	-10492	-47750	-71367	-4.5	-17.9	-24.7
Heat (from CHP and District Heating)	36558	50708	56869	62270	62935	-3022	-2486	-6056	-5.0	-3.8	-8.8
Other	27865	31953	67997	92126	101598	20744	36447	42327	43.9	65.5	71.4
CO2 Emissions (Mt of CO2)	**3068.4**	**3127.0**	**2990.7**	**2543.3**	**2300.1**	**-300.1**	**-757.8**	**-1010.9**	**-9.1**	**-23.0**	**-30.5**
Power generation/District heating	1021.1	1014.7	870.6	627.3	535.0	-193.0	-409.3	-597.6	-18.1	-39.5	-52.8
Energy Branch	127.2	127.0	98.4	73.8	60.8	-14.3	-28.9	-28.6	-12.7	-28.1	-32.0
Industry	545.2	471.6	453.8	433.4	421.1	-22.0	-47.2	-30.1	-4.6	-9.8	-6.7
Residential	419.7	401.5	411.7	362.7	324.5	-15.5	-72.1	-100.7	-3.6	-16.6	-23.7
Tertiary	220.7	207.4	213.4	199.6	185.8	-12.3	-33.7	-46.9	-5.4	-14.5	-20.1
Transport	734.5	904.8	942.8	846.4	772.8	-43.0	-166.6	-207.0	-4.4	-16.4	-21.1
CO2 Emissions Index (1990=100)	**100.0**	**101.9**	**97.5**	**82.9**	**75.0**	-9.8	-24.7	-32.9	-9.1	-23.0	-30.5

Source: PRIMES

EU15: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Main Energy System Indicators											
Population (Million)	365.749	378.062	390.652	397.458	398.737	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	6981.9	8572.2	10391.5	12835.7	14948.8	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	189.1	170.0	148.5	109.9	86.5	-4.2	-16.6	-21.1	-2.8	-13.1	-19.6
Gross Inl. Cons./Capita (toe/inhabitant)	3.61	3.85	3.95	3.55	3.24	-0.11	-0.54	-0.79	-2.8	-13.1	-19.6
Electricity Generated/Capita (kWh/inhabitant)	5848	6815	7519	7147	6972	-373	-1621	-2396	-4.7	-18.5	-25.6
Carbon intensity (t of CO_2/toe of GIC)	2.32	2.15	1.94	1.80	1.78	-0.14	-0.23	-0.28	-6.5	-11.3	-13.6
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.39	8.27	7.66	6.40	5.77	-0.77	-1.91	-2.54	-9.1	-23.0	-30.5
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	439.5	364.8	287.8	198.1	153.9	-28.9	-59.0	-67.6	-9.1	-23.0	-30.5
Import Dependency %	47.5	49.5	53.3	59.7	61.3	-3.3	-5.7	-5.5	-5.8	-8.7	-8.2
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	90.9	85.4	71.7	63.1	0.1	-1.7	-1.0	0.1	-2.3	-1.6
Residential (Energy on Private Income)	100.0	88.8	80.8	59.8	47.6	-2.3	-12.7	-16.3	-2.8	-17.6	-25.5
Tertiary (Energy on Value added)	100.0	88.7	77.4	57.3	44.9	-5.5	-15.1	-19.3	-6.7	-20.8	-30.0
Transport (Energy on GDP)	100.0	100.0	90.8	71.9	59.6	-2.0	-7.3	-7.0	-2.2	-9.2	-10.4
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.39	0.27	0.20	0.15	0.13	-0.04	-0.06	-0.09	-15.7	-29.6	-41.1
Final energy demand (t of CO_2/toe)	2.22	2.05	1.91	1.79	1.72	-0.04	-0.08	-0.07	-2.1	-4.1	-4.2
Industry	2.00	1.66	1.48	1.37	1.31	-0.07	-0.12	-0.07	-4.7	-7.7	-5.1
Residential	1.91	1.68	1.57	1.53	1.49	-0.01	0.02	0.04	-0.9	1.2	2.5
Tertiary	1.82	1.51	1.42	1.42	1.44	0.02	0.11	0.18	1.3	8.1	14.1
Transport	2.91	2.92	2.76	2.54	2.40	-0.06	-0.22	-0.32	-2.2	-7.9	-11.9
Electricity and steam generation											
Generation Capacity in MW_e		**588083**	**735140**	**795482**	**833792**	**10971**	**-32609**	**-95761**	**1.5**	**-3.9**	**-10.3**
Nuclear		131758	127644	97053	33913	0	-9145	-50755	0.0	-8.6	-59.9
Hydro (pumping excluded)		90794	99507	102743	104580	2394	1475	185	2.5	1.5	0.2
Wind		12769	100507	177922	232658	24375	56590	65848	32.0	46.6	39.5
Solar		176	1645	11519	38197	0	6807	28370	0.0	144.4	288.7
Thermal		352586	405837	406246	424445	-15798	-88335	-139409	-3.7	-17.9	-24.7
of which cogeneration units		88543	122719	165526	196489	-1979	-10023	2476	-1.6	-5.7	1.3
Solids fired		144882	113445	68191	73006	-3076	-48958	-81179	-2.6	-41.8	-52.7
Gas fired		125804	208478	221527	215647	-19474	-68095	-99733	-8.5	-23.5	-31.6
Oil fired		67470	54728	43367	36156	-4253	1639	6740	-7.2	3.9	22.9
Biomass-waste fired		13407	26028	68565	94364	9202	24002	31135	54.7	53.9	49.2
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3159	4596	5272	1802	3078	3628	132.9	202.9	220.8
Indicators											
Efficiency for thermal electricity production (%)		36.9	39.1	42.6	46.6	-1.4	-3.7	-1.4	-3.5	-8.0	-2.8
Load factor for gross electric capacities (%)		50.0	45.6	40.8	38.1	-3.0	-7.3	-7.8	-6.1	-15.1	-17.0
CHP indicator (% of electricity from CHP)		13.4	18.1	27.0	34.3	1.4	6.6	12.6	8.3	32.2	58.3
Non fossil fuels in electricity generation (%)		49.4	56.2	61.7	62.5	7.7	13.9	14.8	15.9	29.1	31.0
- nuclear		33.5	30.6	19.6	8.5	1.4	-3.4	-9.9	5.0	-14.7	-54.0
- renewable energy forms		15.9	25.6	42.1	54.0	6.3	17.3	24.7	32.3	69.7	84.4
Transport sector											
Passenger transport activity (Gpkm)	**4130.1**	**4997.7**	**5830.9**	**6635.5**	**7205.0**	-1.1	-10.3	-23.8	0.0	-0.2	-0.3
Public road transport	369.0	401.8	423.3	416.6	408.7	0.8	2.6	4.2	0.2	0.6	1.0
Private cars and motorcycles	3265.7	3928.0	4545.0	5164.8	5589.3	-0.9	-9.6	-22.4	0.0	-0.2	-0.4
Rail	309.8	351.3	395.5	429.1	458.4	-0.7	-0.5	1.3	-0.2	-0.1	0.3
Aviation	157.3	283.6	428.1	580.4	700.1	-0.3	-2.7	-6.7	-0.1	-0.5	-0.9
Inland navigation	28.4	33.0	39.1	44.7	48.5	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	11292	13219	14926	16695	18070	-2.8	-26.0	-59.6	0.0	-0.2	-0.3
Freight transport activity (Gtkm)	**1419.2**	**1825.6**	**2141.5**	**2480.6**	**2755.1**	-1.6	-10.8	-21.1	-0.1	-0.4	-0.8
Trucks	914.2	1309.3	1589.1	1888.4	2132.5	-1.1	-11.3	-24.0	-0.1	-0.6	-1.1
Rail	254.9	249.5	267.4	279.9	288.9	-0.7	-0.8	0.2	-0.3	-0.3	0.1
Inland navigation	250.1	266.8	284.9	312.3	333.7	0.2	1.2	2.6	0.1	0.4	0.8
Freight activity per unit of GDP (tkm/000 Euro'00)	203	213	206	193	184	-0.2	-0.8	-1.4	-0.1	-0.4	-0.8
Energy demand in transport (ktoe)	**252606**	**310102**	**341536**	**333815**	**322581**	-7688	-34017	-37609	-2.2	-9.2	-10.4
Public road transport	6250	5860	5925	5048	4259	-32	-309	-295	-0.5	-5.8	-6.5
Private cars and motorcycles	129911	146708	154545	147758	135991	-637	-4411	-4744	-0.4	-2.9	-3.4
Trucks	75351	100615	122725	127894	127009	-460	-12597	-18704	-0.4	-9.0	-12.8
Rail	6970	7579	6934	5109	4797	-179	-436	-336	-2.5	-7.9	-6.5
Aviation	27742	44025	45667	42016	44482	-6369	-16111	-13285	-12.2	-27.7	-23.0
Inland navigation	6383	5314	5740	5991	6044	-11	-154	-246	-0.2	-2.5	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	41.2	40.7	36.4	30.1	26.3	-1.2	-3.1	-2.5	-3.3	-9.4	-8.6
Freight transport (toe/Mtkm)	58.0	58.5	60.3	54.0	48.3	-0.2	-4.9	-6.5	-0.3	-8.4	-11.8

Source: PRIMES

NMS: Combined high renewables and efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**169598**	**136955**	**136970**	**123625**	**121769**	**10191**	**-2396**	**-11600**	**8.0**	**-1.9**	**-8.7**
Solids	140913	103966	84505	44241	28258	-1764	-26845	-33322	-2.0	-37.8	-54.1
Oil	2614	3079	2350	2081	1807	-11	-49	-44	-0.5	-2.3	-2.4
Natural gas	6749	6084	5735	4962	4536	-24	-353	-253	-0.4	-6.6	-5.3
Nuclear	15481	14818	17254	17519	12651	0	-3958	-20570	0.0	-18.4	-61.9
Renewable energy sources	3841	9008	27127	54823	74516	11990	28809	42590	79.2	110.7	133.4
Hydro	1116	1355	1723	1859	1950	261	199	83	17.9	12.0	4.5
Biomass & Waste	2725	7609	22227	47268	64915	9138	24300	38442	69.8	105.8	145.2
Wind	0	1	1079	2321	3742	674	1258	707	166.2	118.4	23.3
Solar and others	0	35	244	366	552	79	64	24	47.8	21.3	4.6
Geothermal	0	8	1853	3009	3357	1838	2988	3333	11870.6	14234.7	13478.9
Net Imports	**68016**	**59470**	**82723**	**100007**	**103962**	**-17127**	**-36783**	**-50762**	**-17.2**	**-26.9**	**-32.8**
Solids	-14214	-15836	-8217	2902	2917	-5423	-2015	-10050	194.2	-41.0	-77.5
Oil	51224	45604	53071	56080	58519	-3868	-10222	-14513	-6.8	-15.4	-19.9
- Crude oil and Feedstocks	43747	41220	44182	46971	49137	-3344	-8572	-12212	-7.0	-15.4	-19.9
- Oil products	7477	4384	8889	9109	9381	-524	-1650	-2301	-5.6	-15.3	-19.7
Natural gas	31158	31202	39582	43118	45684	-7709	-24106	-25802	-16.3	-35.9	-36.1
Electricity	-152	-1500	-1714	-2093	-3158	-127	-440	-398	8.0	26.6	14.4
Gross Inland Consumption	**236229**	**196904**	**218552**	**222359**	**224375**	**-6936**	**-39180**	**-62363**	**-3.1**	**-15.0**	**-21.7**
Solids	128332	90799	76288	47143	31174	-7187	-28860	-43372	-8.6	-38.0	-58.2
Oil	51587	46785	54279	56888	58970	-3879	-10271	-14558	-6.7	-15.3	-19.8
Natural gas	37140	36994	45317	48080	50221	-7733	-24458	-26054	-14.6	-33.7	-34.2
Nuclear	15481	14818	17254	17519	12651	0	-3958	-20570	0.0	-18.4	-61.9
Electricity	-152	-1500	-1714	-2093	-3158	-127	-440	-398	8.0	26.6	14.4
Renewable energy forms	3841	9008	27127	54823	74516	11990	28809	42590	79.2	110.7	133.4
as % in Gross Inland Consumption											
Solids	54.3	46.1	34.9	21.2	13.9	-2.1	-7.9	-12.1	-5.7	-27.0	-46.6
Oil	21.8	23.8	24.8	25.6	26.3	-1.0	-0.1	0.6	-3.7	-0.4	2.5
Natural gas	15.7	18.8	20.7	21.6	22.4	-2.8	-6.1	-4.2	-11.9	-22.0	-15.9
Nuclear	6.6	7.5	7.9	7.9	5.6	0.2	-0.3	-5.9	3.2	-4.1	-51.3
Renewable energy forms	1.6	4.6	12.4	24.7	33.2	5.7	14.7	22.1	84.9	147.9	198.3
Electricity Generation in GWh_e	**316734**	**324333**	**377250**	**408990**	**437993**	**-23186**	**-112043**	**-193161**	**-5.8**	**-21.5**	**-30.6**
Nuclear	59996	57434	66876	67901	49036	0	-15345	-79737	0.0	-18.4	-61.9
Hydro & wind	12978	15771	32600	48774	66851	10872	16947	9194	50.0	53.2	15.9
Thermal (incl. biomass)	243760	251128	277773	292315	322106	-34059	-113645	-122618	-10.9	-28.0	-27.6
Fuel Inputs for Thermal Power Generation [1]	**73176**	**66652**	**71530**	**66722**	**64127**	**-4730**	**-18825**	**-20349**	**-6.2**	**-22.0**	**-24.1**
Solids	62206	56391	51949	28628	16666	-6645	-27068	-39459	-11.3	-48.6	-70.3
Oil (including refinery gas)	5236	3281	2764	1982	1683	-170	-371	-638	-5.8	-15.8	-27.5
Gas	5360	6292	6966	5660	2883	-4926	-13218	-12530	-41.4	-70.0	-81.3
Biomass & Waste	374	687	8021	27472	39570	5180	18853	28954	182.4	218.7	272.7
Geothermal heat	0	0	1831	2980	3324	1831	2980	3324			
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**93232**	**70786**	**70014**	**72809**	**75742**	**-2934**	**-8434**	**-11502**	**-4.0**	**-10.4**	**-13.2**
Refineries	47239	44972	47446	50115	52134	-3390	-8723	-12357	-6.7	-14.8	-19.2
Biofuels and hydrogen production	0	33	2230	6056	8550	963	3245	4695	76.0	115.5	121.8
District heating	17949	8544	8117	5636	5288	-397	-2721	-3799	-4.7	-32.6	-41.8
Others	28043	17236	12221	11002	9770	-111	-236	-41	-0.9	-2.1	-0.4
Energy Branch Consumption	**9477**	**12681**	**11996**	**11705**	**11819**	**-657**	**-1940**	**-2108**	**-5.2**	**-14.2**	**-15.1**
Non-Energy Uses	**10089**	**10135**	**10750**	**13363**	**15315**	**-35**	**-40**	**-67**	**-0.3**	**-0.3**	**-0.4**
Final Energy Demand	**155460**	**124696**	**146874**	**157128**	**165220**	**-4397**	**-26271**	**-41308**	**-2.9**	**-14.3**	**-20.0**
by sector											
Industry[1]	68606	45281	49682	57189	63831	30	-2156	-1602	0.1	-3.6	-2.4
- energy intensive industries	34503	28649	29269	32033	33739	23	-1069	-940	0.1	-3.2	-2.7
- other industrial sectors	34103	16632	20413	25156	30092	6	-1087	-662	0.0	-4.1	-2.2
Residential	40986	34898	41510	42242	42007	-1335	-9502	-16164	-3.1	-18.4	-27.8
Tertiary	25276	21599	24206	23691	23492	-2660	-10947	-17335	-9.9	-31.6	-42.5
Transport	20592	22917	31477	34006	35890	-432	-3667	-6207	-1.4	-9.7	-14.7
by fuel [1]											
Solids	44176	21303	16635	13485	11155	58	-620	-1257	0.4	-4.4	-10.1
Oil	34795	33764	42228	44231	45477	-1977	-8409	-12505	-4.5	-16.0	-21.6
Gas	27229	25471	33075	37271	40738	-1434	-6962	-9559	-4.2	-15.7	-19.0
Electricity	20539	19641	24397	27674	29647	-1750	-8637	-15300	-6.7	-23.8	-34.0
Heat (from CHP and District Heating)	26534	18005	19093	18591	18276	-1193	-4344	-8059	-5.9	-18.9	-30.6
Other	2188	6512	11446	15876	19926	1898	2701	5372	19.9	20.5	36.9
CO2 Emissions (Mt of CO2)	**707.7**	**547.1**	**533.4**	**425.5**	**369.4**	**-57.6**	**-202.0**	**-274.6**	**-9.8**	**-32.2**	**-42.6**
Power generation/District heating	341.5	280.2	252.9	142.2	82.4	-45.3	-154.5	-209.0	-15.2	-52.1	-71.7
Energy Branch	14.3	17.9	8.0	7.5	9.0	-3.3	-3.7	-1.2	-29.0	-33.3	-11.7
Industry	153.7	96.1	100.5	109.2	113.3	-0.7	-5.4	-5.3	-0.7	-4.7	-4.5
Residential	86.4	50.6	53.3	49.0	45.5	-2.1	-11.1	-16.0	-3.7	-18.4	-26.0
Tertiary	53.5	37.2	33.3	33.3	35.3	-2.9	-9.3	-14.0	-8.0	-21.8	-28.4
Transport	58.2	65.1	85.5	84.4	84.0	-3.4	-18.1	-29.1	-3.8	-17.7	-25.7
CO2 Emissions Index (1990=100)	**100.0**	**77.3**	**75.4**	**60.1**	**52.2**	-8.1	-28.5	-38.8	-9.8	-32.2	-42.6

Source: PRIMES

NMS: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Main Energy System Indicators											
Population (Million)	75.039	74.853	73.401	71.813	70.628	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	312.8	374.8	555.3	820.6	1102.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	755.2	525.3	393.6	271.0	203.5	-12.5	-47.7	-56.6	-3.1	-15.0	-21.7
Gross Inl. Cons./Capita (toe/inhabitant)	3.15	2.63	2.98	3.10	3.18	-0.09	-0.55	-0.88	-3.1	-15.0	-21.7
Electricity Generated/Capita (kWh/inhabitant)	4221	4333	5140	5695	6201	-316	-1560	-2735	-5.8	-21.5	-30.6
Carbon intensity (t of CO_2/toe of GIC)	3.00	2.78	2.44	1.91	1.65	-0.18	-0.49	-0.60	-6.9	-20.2	-26.7
CO_2 Emissions/Capita (t of CO_2/inhabitant)	9.43	7.31	7.27	5.93	5.23	-0.79	-2.81	-3.89	-9.8	-32.2	-42.6
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	2262.2	1459.6	960.5	518.5	335.0	-103.8	-246.2	-249.0	-9.8	-32.2	-42.6
Import Dependency %	28.7	30.1	37.7	44.7	46.1	-6.4	-7.3	-7.7	-14.5	-14.1	-14.2
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	52.9	35.2	27.2	23.4	0.0	-1.0	-0.6	0.1	-3.6	-2.4
Residential (Energy on Private Income)	100.0	70.0	55.3	37.7	27.7	-1.8	-8.5	-10.7	-3.1	-18.4	-27.8
Tertiary (Energy on Value added)	100.0	65.9	49.7	32.3	23.1	-5.5	-14.9	-17.0	-9.9	-31.6	-42.5
Transport (Energy on GDP)	100.0	92.9	86.1	63.0	49.4	-1.2	-6.8	-8.6	-1.4	-9.7	-14.7
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.50	0.46	0.36	0.19	0.10	-0.05	-0.14	-0.17	-11.7	-41.6	-62.0
Final energy demand (t of CO_2/toe)	2.26	2.00	1.86	1.76	1.68	-0.01	0.01	0.02	-0.3	0.7	1.5
Industry	2.24	2.12	2.02	1.91	1.77	-0.02	-0.02	-0.04	-0.8	-1.1	-2.1
Residential	2.11	1.45	1.28	1.16	1.08	-0.01	0.00	0.03	-0.7	-0.1	2.5
Tertiary	2.12	1.72	1.37	1.40	1.50	0.03	0.18	0.30	2.1	14.3	24.5
Transport	2.83	2.84	2.72	2.48	2.34	-0.07	-0.24	-0.35	-2.5	-8.8	-12.9
Electricity and steam generation											
Generation Capacity in MW_e		**73667**	**87368**	**99076**	**125192**	**1030**	**-15414**	**-41547**	**1.2**	**-13.5**	**-24.9**
Nuclear		9324	8786	8786	6522	0	-1952	-10026	0.0	-18.2	-60.6
Hydro (pumping excluded)		6374	7385	7749	8012	565	399	207	8.3	5.4	2.6
Wind		16	6007	12214	19454	3748	5922	3333	165.9	94.1	20.7
Solar		0	13	138	537	0	0	0	0.0	0.0	0.0
Thermal		57953	65176	70189	90666	-3283	-19783	-35060	-4.8	-22.0	-27.9
of which cogeneration units		24415	26589	29744	44569	417	-3668	-9416	1.6	-11.0	-17.4
Solids fired		43996	39035	23242	17892	-981	-16414	-39158	-2.5	-41.4	-68.6
Gas fired		6071	10623	11935	17935	-6863	-19650	-26819	-39.2	-62.2	-59.9
Oil fired		6832	7037	4645	3490	-32	-1556	-2060	-0.5	-25.1	-37.1
Biomass-waste fired		1055	8076	29708	50613	4188	17179	32241	107.7	137.1	175.5
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		0	405	659	735	405	659	735			
Indicators											
Efficiency for thermal electricity production (%)		32.4	33.4	37.7	43.2	-1.8	-3.1	-2.1	-5.0	-7.7	-4.6
Load factor for gross electric capacities (%)		50.3	49.3	47.1	39.9	-3.7	-4.8	-3.3	-6.9	-9.3	-7.6
CHP indicator (% of electricity from CHP)		23.5	29.2	33.6	45.2	2.5	2.6	5.3	9.4	8.4	13.2
Non fossil fuels in electricity generation (%)		23.3	36.5	66.4	77.4	11.7	36.1	39.6	47.3	119.0	104.7
- nuclear		17.7	17.7	16.6	11.2	1.0	0.6	-9.2	6.1	3.9	-45.1
- renewable energy forms		5.6	18.8	49.8	66.2	10.7	35.5	48.8	132.4	247.1	279.9
Transport sector											
Passenger transport activity (Gpkm)	**510.7**	**468.6**	**616.9**	**753.8**	**894.7**	-0.4	-2.3	-6.6	-0.1	-0.3	-0.7
Public road transport	135.1	78.3	72.7	67.2	63.3	0.2	0.6	1.1	0.2	0.9	1.7
Private cars and motorcycles	263.6	325.1	470.5	604.0	740.3	-0.3	-2.4	-6.6	-0.1	-0.4	-0.9
Rail	102.1	51.4	49.9	48.6	47.9	-0.3	-0.4	-0.6	-0.6	-0.7	-1.3
Aviation	9.0	13.3	23.2	33.4	42.4	0.0	-0.2	-0.5	-0.1	-0.5	-1.2
Inland navigation	0.8	0.6	0.7	0.7	0.8	0.0	0.0	0.0	0.0	-0.2	-0.5
Travel per person (km per capita)	6805	6261	8405	10497	12668	-5.7	-32.3	-94.1	-0.1	-0.3	-0.7
Freight transport activity (Gtkm)	**334.6**	**305.9**	**438.1**	**553.3**	**647.3**	-1.0	-4.1	-8.4	-0.2	-0.7	-1.3
Trucks	119.9	177.1	300.4	408.0	492.8	-0.6	-4.1	-8.0	-0.2	-1.0	-1.6
Rail	206.8	124.7	133.5	140.7	149.8	-0.4	0.0	-0.4	-0.3	0.0	-0.3
Inland navigation	7.9	4.2	4.3	4.6	4.6	0.0	0.0	0.1	0.3	0.7	1.2
Freight activity per unit of GDP (tkm/000 Euro'00)	1070	816	789	674	587	-1.8	-4.9	-7.6	-0.2	-0.7	-1.3
Energy demand in transport (ktoe)	**20592**	**22917**	**31477**	**34006**	**35890**	-432	-3667	-6207	-1.4	-9.7	-14.7
Public road transport	1591	1159	1059	856	665	-5	-61	-102	-0.5	-6.6	-13.2
Private cars and motorcycles	8290	11641	14898	16012	16473	-96	-720	-2644	-0.6	-4.3	-13.8
Trucks	7093	7453	12406	14487	15980	-57	-1853	-2692	-0.5	-11.3	-14.4
Rail	2096	1317	1160	854	738	-34	-120	-147	-2.8	-12.3	-16.6
Aviation	1190	1294	1898	1738	1972	-240	-912	-620	-11.2	-34.4	-23.9
Inland navigation	331	54	57	60	61	0	-1	-2	-0.1	-2.0	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	23.9	31.4	29.7	25.1	21.6	-0.6	-2.2	-3.6	-1.8	-8.2	-14.3
Freight transport (toe/Mtkm)	25.0	26.7	30.0	27.3	25.5	-0.1	-3.3	-4.0	-0.3	-10.7	-13.4

Source: PRIMES

EU27: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (A)										
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**928078**	**937145**	**922253**	**758172**	**688143**	**44065**	**7103**	**-44503**	**5.0**	**0.9**	**-6.1**
Solids	364706	214324	148949	89492	66156	-16926	-53497	-65368	-10.2	-37.4	-49.7
Oil	128402	170011	122570	57092	48614	-855	-2080	-1040	-0.7	-3.5	-2.1
Natural gas	162645	207644	179441	108524	87843	-5464	-1002	-1907	-3.0	-0.9	-2.1
Nuclear	200702	243761	253537	167704	79608	0	-67988	-141700	0.0	-28.8	-64.0
Renewable energy sources	71623	101405	217756	335361	405922	67310	131670	165512	44.7	64.6	68.8
Hydro	25013	30483	33761	35898	36634	2044	1522	223	6.4	4.4	0.6
Biomass & Waste	43297	65264	145155	233753	283696	48002	98931	128330	49.4	73.4	82.6
Wind	67	1913	22272	39305	51504	6437	12904	13373	40.7	48.9	35.1
Solar and others	145	417	2139	4667	9011	625	1794	4390	41.3	62.4	95.0
Geothermal	3101	3329	14427	21738	25076	10201	16520	19195	241.4	316.6	326.4
Net Imports	**749474**	**817569**	**951997**	**1002269**	**967259**	**-96548**	**-269545**	**-348069**	**-9.2**	**-21.2**	**-26.5**
Solids	81418	98469	113174	83509	76737	-24803	-54030	-107936	-18.0	-39.3	-58.4
Oil	529724	525771	581042	590689	558292	-31186	-95754	-114085	-5.1	-13.9	-17.0
- Crude oil and Feedstocks	503451	507009	546649	567573	542360	-30775	-90015	-108811	-5.3	-13.7	-16.7
- Oil products	26273	18762	34393	23115	15932	-411	-5738	-5274	-1.2	-19.9	-24.9
Natural gas	135011	191643	256303	327073	331041	-40419	-119174	-125496	-13.6	-26.7	-27.5
Electricity	3321	1687	1477	998	1189	-139	-588	-553	-8.6	-37.1	-31.7
Gross Inland Consumption	**1645474**	**1709133**	**1825969**	**1707403**	**1599771**	**-52483**	**-262442**	**-392572**	**-2.8**	**-13.3**	**-19.7**
Solids	450795	320708	262124	173002	142893	-41729	-107527	-173303	-13.7	-38.3	-54.8
Oil	624250	648970	655332	594742	551275	-32041	-97834	-115125	-4.7	-14.1	-17.3
Natural gas	294782	392603	435744	435597	418885	-45883	-120176	-127402	-9.5	-21.6	-23.3
Nuclear	200702	243761	253537	167704	79608	0	-67988	-141700	0.0	-28.8	-64.0
Electricity	3321	1687	1477	998	1189	-139	-588	-553	-8.6	-37.1	-31.7
Renewable energy forms	71623	101405	217756	335361	405922	67310	131670	165512	44.7	64.6	68.8
as % in Gross Inland Consumption											
Solids	27.4	18.8	14.4	10.1	8.9	-1.8	-4.1	-6.9	-11.3	-28.9	-43.7
Oil	37.9	38.0	35.9	34.8	34.5	-0.7	-0.3	1.0	-1.9	-0.9	3.0
Natural gas	17.9	23.0	23.9	25.5	26.2	-1.8	-2.7	-1.2	-6.9	-9.6	-4.5
Nuclear	12.2	14.3	13.9	9.8	5.0	0.4	-2.1	-6.1	2.9	-17.9	-55.2
Renewable energy forms	4.4	5.9	11.9	19.6	25.4	3.9	9.3	13.3	48.9	89.9	110.3
Electricity Generation in GWh_e	**2561205**	**2993398**	**3428825**	**3390746**	**3366943**	**-173341**	**-772963**	**-1197474**	**-4.8**	**-18.6**	**-26.2**
Nuclear	794718	944823	982718	650020	308556	0	-263526	-549231	0.0	-28.8	-64.0
Hydro & wind	291642	376697	653122	889177	1077019	98621	178174	201590	17.8	25.1	23.0
Thermal (incl. biomass)	1474844	1671878	1792985	1851549	1981367	-271962	-687611	-849833	-13.2	-27.1	-30.0
Fuel Inputs for Thermal Power Generation [1]	**384763**	**402753**	**408959**	**384934**	**372115**	**-43469**	**-103079**	**-143083**	**-9.6**	**-21.1**	**-27.8**
Solids	261342	225135	189598	112173	90273	-38495	-103375	-168964	-16.9	-48.0	-65.2
Oil (including refinery gas)	56108	43691	33483	22644	22830	-297	-1595	2695	-0.9	-6.6	13.4
Gas	54301	109769	124586	127156	100008	-32710	-62069	-60294	-20.8	-32.8	-37.6
Biomass & Waste	10237	21219	47413	101821	134502	17837	47426	64239	60.3	87.2	91.4
Geothermal heat	2774	2939	13879	21140	24501	10195	16533	19241	276.7	358.8	365.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**840016**	**818581**	**814967**	**787868**	**760274**	**-24023**	**-67091**	**-71864**	**-2.9**	**-7.8**	**-8.6**
Refineries	673728	727122	718199	665420	625277	-33036	-95731	-113951	-4.4	-12.6	-15.4
Biofuels and hydrogen production	2	637	27052	63231	83240	10149	31907	45869	60.0	101.9	122.7
District heating	38458	19291	16878	12321	12403	1442	-1595	-2442	9.3	-11.5	-16.4
Others	127829	71530	52839	46895	39354	-2578	-1672	-1340	-4.7	-3.4	-3.3
Energy Branch Consumption	**78427**	**85834**	**84482**	**76375**	**71639**	**-4104**	**-12980**	**-15427**	**-4.6**	**-14.5**	**-17.7**
Non-Energy Uses	**98844**	**109187**	**110056**	**113744**	**115127**	**-330**	**-420**	**-461**	**-0.3**	**-0.4**	**-0.4**
Final Energy Demand	**1071205**	**1126314**	**1249471**	**1235618**	**1218131**	**-31689**	**-161570**	**-225133**	**-2.5**	**-11.6**	**-15.6**
by sector											
Industry[1]	372041	342654	374380	396581	413429	309	-9940	-8507	0.1	-2.4	-2.0
- energy intensive industries	239834	220752	233917	239541	239992	715	-5230	-5339	0.3	-2.1	-2.2
- other industrial sectors	132206	121902	140462	157039	173436	-406	-4710	-3168	-0.3	-2.9	-1.8
Residential	267394	283857	314056	291035	273329	-9825	-62415	-94330	-3.0	-17.7	-25.7
Tertiary	151680	161545	177989	166961	155671	-13911	-49784	-76031	-7.2	-23.0	-32.8
Transport	280091	338258	383046	381042	375702	-8262	-39431	-46265	-2.1	-9.4	-11.0
by fuel [1]											
Solids	128087	58191	46406	39620	35350	-914	-1991	-1140	-1.9	-4.8	-3.1
Oil	441141	476894	506688	461467	425869	-24781	-87816	-109257	-4.7	-16.0	-20.4
Gas	219636	259889	279428	280702	285706	-11294	-45698	-57173	-3.9	-14.0	-16.7
Electricity	183815	216343	254051	256056	257706	-12535	-57426	-90187	-4.7	-18.3	-25.9
Heat (from CHP and District Heating)	67635	73194	78587	83998	85233	-5336	-8531	-15999	-6.4	-9.2	-15.8
Other	30892	41802	84312	113776	128267	23171	39891	48624	37.9	54.0	61.1
CO2 Emissions (Mt of CO2)	**4009.9**	**3800.2**	**3674.9**	**3134.5**	**2854.0**	**-367.9**	**-997.1**	**-1326.4**	**-9.1**	**-24.1**	**-31.7**
Power generation/District heating	1483.5	1359.8	1189.1	837.7	682.1	-245.0	-583.9	-832.4	-17.1	-41.1	-55.0
Energy Branch	151.1	154.0	114.9	85.8	74.8	-18.9	-36.0	-29.1	-14.1	-29.6	-28.0
Industry	761.0	594.1	587.6	581.6	587.5	-24.0	-57.3	-34.0	-3.9	-9.0	-5.5
Residential	516.6	459.7	476.0	424.8	382.6	-17.8	-84.9	-120.9	-3.6	-16.7	-24.0
Tertiary	285.7	247.7	250.3	236.8	225.1	-15.3	-44.3	-63.7	-5.8	-15.8	-22.0
Transport	812.0	984.9	1057.0	967.8	901.9	-46.9	-190.7	-246.3	-4.2	-16.5	-21.5
CO2 Emissions Index (1990=100)	**100.0**	**94.8**	**91.6**	**78.2**	**71.2**	-9.2	-24.9	-33.1	-9.1	-24.1	-31.7

Source: PRIMES

EU27: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	472.712	483.520	492.838	496.408	494.784	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7358.9	9001.0	11044.1	13825.4	16315.6	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	223.6	189.9	165.3	123.5	98.1	-4.8	-19.0	-24.1	-2.8	-13.3	-19.7
Gross Inl. Cons./Capita (toe/inhabitant)	3.48	3.53	3.71	3.44	3.23	-0.11	-0.53	-0.79	-2.8	-13.3	-19.7
Electricity Generated/Capita (kWh/inhabitant)	5418	6191	6957	6831	6805	-352	-1557	-2420	-4.8	-18.6	-26.2
Carbon intensity (t of CO_2/toe of GIC)	2.44	2.22	2.01	1.84	1.78	-0.14	-0.26	-0.31	-6.5	-12.5	-15.0
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.48	7.86	7.46	6.31	5.77	-0.75	-2.01	-2.68	-9.1	-24.1	-31.7
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	544.9	422.2	332.7	226.7	174.9	-33.3	-72.1	-81.3	-9.1	-24.1	-31.7
Import Dependency %	44.6	46.7	50.8	56.9	58.4	-3.6	-5.9	-5.8	-6.7	-9.4	-9.0
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	80.2	74.5	63.1	56.1	0.1	-1.6	-1.2	0.1	-2.4	-2.0
Residential (Energy on Private Income)	100.0	87.2	78.9	58.9	47.1	-2.5	-12.6	-16.3	-3.0	-17.7	-25.7
Tertiary (Energy on Value added)	100.0	83.5	72.6	53.7	42.1	-5.7	-16.0	-20.6	-7.2	-23.0	-32.8
Transport (Energy on GDP)	100.0	98.7	91.1	72.4	60.5	-2.0	-7.5	-7.5	-2.1	-9.4	-11.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.23	0.16	0.13	-0.04	-0.07	-0.10	-14.4	-31.2	-43.2
Final energy demand (t of CO_2/toe)	2.22	2.03	1.90	1.79	1.72	-0.03	-0.06	-0.05	-1.8	-3.4	-3.0
Industry	2.05	1.73	1.57	1.47	1.42	-0.07	-0.11	-0.05	-4.0	-6.7	-3.5
Residential	1.93	1.62	1.52	1.46	1.40	-0.01	0.02	0.03	-0.6	1.2	2.2
Tertiary	1.88	1.53	1.41	1.42	1.45	0.02	0.12	0.20	1.6	9.4	16.0
Transport	2.90	2.91	2.76	2.54	2.40	-0.06	-0.22	-0.32	-2.2	-7.8	-11.8
Electricity and steam generation											
Generation Capacity in MW_e		**697174**	**861116**	**935645**	**1005065**	**11793**	**-47829**	**-151253**	**1.4**	**-4.9**	**-13.1**
Nuclear		145542	139130	109239	43440	0	-11530	-62997	0.0	-9.5	-59.2
Hydro (pumping excluded)		105185	116083	120378	123023	3707	2497	854	3.3	2.1	0.7
Wind		12786	107693	193855	256359	28887	64899	71855	36.7	50.3	38.9
Solar		176	1661	11672	38805	0	6807	28370	0.0	139.9	271.9
Thermal		433485	496549	500501	543438	-20801	-110502	-189335	-4.0	-18.1	-25.8
of which cogeneration units		120284	160123	209918	259243	-3518	-15798	-14932	-2.2	-7.0	-5.4
Solids fired		203503	165823	106367	105109	-4619	-65668	-126251	-2.7	-38.2	-54.6
Gas fired		135927	226506	240045	242402	-27864	-89652	-136896	-11.0	-27.2	-36.1
Oil fired		78309	65601	49473	39982	-4285	321	4652	-6.1	0.7	13.2
Biomass-waste fired		14723	34929	99165	149723	13633	40563	64582	64.0	69.2	75.9
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3690	5451	6221	2334	3934	4578	172.0	259.3	278.6
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.7	41.4	45.8	-1.5	-3.4	-1.5	-3.9	-7.6	-3.1
Load factor for gross electric capacities (%)		49.0	45.5	41.4	38.2	-3.0	-7.0	-6.8	-6.1	-14.4	-15.1
CHP indicator (% of electricity from CHP)		14.9	19.8	28.8	36.7	1.2	6.0	10.9	6.6	26.4	42.2
Non fossil fuels in electricity generation (%)		46.4	53.6	61.5	63.6	8.2	16.3	17.6	18.0	36.1	38.4
- nuclear		31.6	28.7	19.2	9.2	1.4	-2.8	-9.6	5.1	-12.6	-51.2
- renewable energy forms		14.9	24.9	42.3	54.4	6.8	19.1	27.3	37.4	82.0	100.4
Transport sector											
Passenger transport activity (Gpkm)	**4769.3**	**5568.5**	**6594.8**	**7609.5**	**8392.0**	-1.2	-12.9	-32.9	0.0	-0.2	-0.4
Public road transport	554.1	502.3	518.0	508.1	500.8	1.0	3.7	6.7	0.2	0.7	1.4
Private cars and motorcycles	3567.1	4316.4	5124.8	5940.2	6556.1	-1.6	-13.6	-31.7	0.0	-0.2	-0.5
Rail	450.2	417.8	457.6	493.8	525.9	-0.2	0.1	0.0	0.0	0.0	0.0
Aviation	168.5	298.4	454.7	622.0	759.8	-0.3	-3.0	-7.7	-0.1	-0.5	-1.0
Inland navigation	29.4	33.6	39.8	45.4	49.4	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	10089	11517	13381	15329	16961	-2.4	-25.9	-66.5	0.0	-0.2	-0.4
Freight transport activity (Gtkm)	**1861.5**	**2177.1**	**2683.0**	**3185.6**	**3610.5**	-1.8	-16.3	-35.2	-0.1	-0.5	-1.0
Trucks	1075.1	1507.0	1956.5	2407.1	2786.6	-2.5	-18.2	-37.7	-0.1	-0.8	-1.3
Rail	524.7	396.1	426.8	447.1	465.7	0.6	0.7	-0.6	0.1	0.2	-0.1
Inland navigation	261.8	274.0	299.7	331.4	358.3	0.1	1.3	3.1	0.0	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	253	242	243	230	221	-0.2	-1.2	-2.2	-0.1	-0.5	-1.0
Energy demand in transport (ktoe)	**280091**	**338258**	**383046**	**381042**	**375702**	-8262	-39431	-46265	-2.1	-9.4	-11.0
Public road transport	8685	7514	7434	6318	5289	-38	-387	-455	-0.5	-5.8	-7.9
Private cars and motorcycles	139578	160719	173172	168759	158503	-762	-5329	-7800	-0.4	-3.1	-4.7
Trucks	85770	109568	139873	148870	151790	-575	-15591	-22891	-0.4	-9.5	-13.1
Rail	9564	9423	8411	6222	5784	-202	-569	-519	-2.3	-8.4	-8.2
Aviation	29449	45553	47959	44314	47609	-6668	-17379	-14284	-12.2	-28.2	-23.1
Inland navigation	7044	5481	6197	6560	6728	-17	-177	-316	-0.3	-2.6	-4.5
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.8	35.7	29.6	25.8	-1.1	-3.0	-2.6	-3.1	-9.3	-9.2
Freight transport (toe/Mtkm)	50.8	53.6	55.0	49.0	44.0	-0.2	-4.7	-6.0	-0.4	-8.8	-12.0

Source: PRIMES

EU28: Combined high renewables and efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**961237**	**963855**	**953703**	**799371**	**738784**	**49403**	**13628**	**-39936**	**5.5**	**1.7**	**-5.1**
Solids	377116	227617	158175	100984	78687	-18235	-55658	-67725	-10.3	-35.5	-46.3
Oil	132112	172757	125814	60474	52353	-855	-2080	-1040	-0.7	-3.3	-1.9
Natural gas	162820	208170	180389	109879	89264	-5591	-1002	-1907	-3.0	-0.9	-2.1
Nuclear	200702	243761	253537	167704	81711	0	-67988	-143065	0.0	-28.8	-63.6
Renewable energy sources	88487	111549	235789	360331	436770	74084	140357	173801	45.8	63.8	66.1
Hydro	27003	33138	37327	39681	40784	2462	1776	223	7.1	4.7	0.6
Biomass & Waste	57710	71804	151897	242331	293795	48730	100071	129584	47.2	70.3	78.9
Wind	67	1916	22750	40452	53212	6760	13311	13782	42.3	49.0	35.0
Solar and others	173	679	2900	7158	13623	592	1109	2383	25.7	18.3	21.2
Geothermal	3534	4012	20914	30709	35356	15539	24091	27830	289.1	364.0	369.8
Net Imports	**776740**	**868442**	**1018082**	**1091992**	**1087886**	**-101052**	**-287224**	**-380915**	**-9.0**	**-20.8**	**-25.9**
Solids	85626	107717	125149	93663	89043	-25510	-59709	-116749	-16.9	-38.9	-56.7
Oil	550163	555056	613221	636926	618553	-31993	-101335	-125746	-5.0	-13.7	-16.9
- Crude oil and Feedstocks	523502	528467	576551	610622	598508	-31530	-95238	-119723	-5.2	-13.5	-16.7
- Oil products	26661	26589	36670	26305	20045	-463	-6097	-6024	-1.2	-18.8	-23.1
Natural gas	137693	203694	278551	360637	379414	-43410	-125592	-137865	-13.5	-25.8	-26.7
Electricity	3259	1975	1161	765	877	-139	-588	-554	-10.7	-43.5	-38.7
Gross Inland Consumption	**1704962**	**1786487**	**1923004**	**1837684**	**1770261**	**-51650**	**-273596**	**-420851**	**-2.6**	**-13.0**	**-19.2**
Solids	467717	343986	283324	194647	167730	-43745	-115367	-184474	-13.4	-37.2	-52.4
Oil	647159	679975	690254	643722	614496	-32848	-103415	-126786	-4.5	-13.8	-17.1
Natural gas	297637	405241	458940	470516	468678	-49001	-126594	-139772	-9.6	-21.2	-23.0
Nuclear	200702	243761	253537	167704	81711	0	-67988	-143065	0.0	-28.8	-63.6
Electricity	3259	1975	1161	765	877	-139	-588	-554	-10.7	-43.5	-38.7
Renewable energy forms	88487	111549	235789	360331	436770	74084	140357	173801	45.8	63.8	66.1
as % in Gross Inland Consumption											
Solids	27.4	19.3	14.7	10.6	9.5	-1.8	-4.1	-6.6	-11.0	-27.9	-41.1
Oil	38.0	38.1	35.9	35.0	34.7	-0.7	-0.4	0.9	-2.0	-1.0	2.6
Natural gas	17.5	22.7	23.9	25.6	26.5	-1.9	-2.7	-1.3	-7.2	-9.5	-4.7
Nuclear	11.8	13.6	13.2	9.1	4.6	0.3	-2.0	-5.6	2.7	-18.3	-55.0
Renewable energy forms	5.2	6.2	12.3	19.6	24.7	4.1	9.2	12.7	49.7	88.2	105.6
Electricity Generation in GWh_e	**2618738**	**3118298**	**3593155**	**3608914**	**3681182**	**-181947**	**-813609**	**-1282716**	**-4.8**	**-18.4**	**-25.8**
Nuclear	794718	944823	982718	650020	316709	0	-263526	-554524	0.0	-28.8	-63.6
Hydro & wind	314786	407604	700141	946545	1145322	107239	185864	206340	18.1	24.4	22.0
Thermal (incl. biomass)	1509233	1765871	1910297	2012349	2219151	-289186	-735946	-934531	-13.1	-26.8	-29.6
Fuel Inputs for Thermal Power Generation [1]	**393649**	**424378**	**437409**	**422125**	**418792**	**-42750**	**-105406**	**-150109**	**-8.9**	**-20.0**	**-26.4**
Solids	266482	235098	197829	123865	107743	-40393	-110760	-179263	-17.0	-47.2	-62.5
Oil (including refinery gas)	57294	46624	35539	23711	23676	-183	-1625	2632	-0.5	-6.4	12.5
Gas	56793	118348	136399	141655	116743	-35863	-65544	-66654	-20.8	-31.6	-36.3
Biomass & Waste	10237	21304	48227	103848	136912	18153	48277	65007	60.4	86.9	90.4
Geothermal heat	2842	3004	19414	29046	33718	15536	24245	28170	400.6	505.0	507.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**867592**	**846345**	**851476**	**837985**	**824940**	**-24775**	**-71915**	**-81701**	**-2.8**	**-7.9**	**-9.0**
Refineries	696742	750941	751345	711851	685164	-33791	-100954	-124863	-4.3	-12.4	-15.4
Biofuels and hydrogen production	2	637	27164	63856	85321	10172	32258	47025	59.9	102.1	122.8
District heating	38458	19291	16913	12422	12574	1440	-1620	-2489	9.3	-11.5	-16.5
Others	132391	75474	56054	49856	41882	-2596	-1599	-1374	-4.4	-3.1	-3.2
Energy Branch Consumption	**80396**	**88538**	**87354**	**79861**	**75798**	**-4211**	**-13452**	**-16293**	**-4.6**	**-14.4**	**-17.7**
Non-Energy Uses	**101612**	**112692**	**113441**	**117704**	**119641**	**-335**	**-446**	**-487**	**-0.3**	**-0.4**	**-0.4**
Final Energy Demand	**1109885**	**1180941**	**1321824**	**1337957**	**1357192**	**-33236**	**-173325**	**-251329**	**-2.5**	**-11.5**	**-15.6**
by sector											
Industry[1]	384219	363322	401469	436047	473487	222	-11265	-10343	0.1	-2.5	-2.1
- energy intensive industries	245670	228215	242215	249763	253205	703	-5442	-5524	0.3	-2.1	-2.1
- other industrial sectors	138549	135107	159254	186284	220281	-481	-5823	-4818	-0.3	-3.0	-2.1
Residential	281949	300854	333416	316209	304115	-9902	-65600	-103586	-2.9	-17.2	-25.4
Tertiary	154275	166339	185878	177245	167530	-14729	-53327	-81981	-7.3	-23.1	-32.9
Transport	289441	350426	401061	408455	412060	-8827	-43133	-55420	-2.2	-9.6	-11.9
by fuel [1]											
Solids	136126	68674	57744	48102	41527	-1022	-2464	-1957	-1.7	-4.9	-4.5
Oil	458929	499706	536048	505543	484046	-25569	-93304	-120807	-4.6	-15.6	-20.0
Gas	220792	264489	291186	301678	318868	-11528	-48630	-63152	-3.8	-13.9	-16.5
Electricity	187680	224587	265740	272524	281494	-13128	-60523	-96745	-4.7	-18.2	-25.6
Heat (from CHP and District Heating)	67875	74443	79178	86324	89997	-5529	-7706	-15252	-6.5	-8.2	-14.5
Other	38483	49041	91928	123786	141260	23540	39302	46583	34.4	46.5	49.2
CO2 Emissions (Mt of CO2)	**4136.3**	**3998.9**	**3906.1**	**3434.8**	**3242.1**	**-385.8**	**-1059.9**	**-1433.8**	**-9.0**	**-23.6**	**-30.7**
Power generation/District heating	1515.0	1431.1	1257.7	924.0	796.1	-259.7	-621.7	-888.7	-17.1	-40.2	-52.8
Energy Branch	155.8	159.9	117.0	86.4	75.3	-18.6	-35.9	-29.1	-13.7	-29.4	-27.9
Industry	796.2	650.1	660.0	672.0	710.3	-24.2	-63.5	-41.7	-3.5	-8.6	-5.5
Residential	538.0	481.6	500.9	458.5	424.8	-18.4	-89.6	-132.3	-3.5	-16.3	-23.8
Tertiary	291.5	255.8	261.3	248.4	234.2	-16.3	-46.8	-66.2	-5.9	-15.8	-22.0
Transport	839.9	1020.5	1109.3	1045.5	1001.4	-48.6	-202.4	-275.8	-4.2	-16.2	-21.6
CO2 Emissions Index (1990=100)	**100.0**	**96.7**	**94.4**	**83.0**	**78.4**	-9.3	-25.6	-34.7	-9.0	-23.6	-30.7

Source: PRIMES

EU28: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	528.913	550.981	569.992	582.152	587.546	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7511.4	9217.8	11370.5	14408.7	17374.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	227.0	193.8	169.1	127.5	101.9	-4.5	-19.0	-24.2	-2.6	-13.0	-19.2
Gross Inl. Cons./Capita (toe/inhabitant)	3.22	3.24	3.37	3.16	3.01	-0.09	-0.47	-0.72	-2.6	-13.0	-19.2
Electricity Generated/Capita (kWh/inhabitant)	4951	5660	6304	6199	6265	-319	-1398	-2183	-4.8	-18.4	-25.8
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.24	2.03	1.87	1.83	-0.14	-0.26	-0.30	-6.5	-12.2	-14.2
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.82	7.26	6.85	5.90	5.52	-0.68	-1.82	-2.44	-9.0	-23.6	-30.7
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	550.7	433.8	343.5	238.4	186.6	-33.9	-73.6	-82.5	-9.0	-23.6	-30.7
Import Dependency %	44.6	47.5	51.6	57.7	59.6	-3.7	-6.0	-5.8	-6.6	-9.4	-8.9
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.8	76.0	64.9	58.1	0.0	-1.7	-1.3	0.1	-2.5	-2.1
Residential (Energy on Private Income)	100.0	87.3	78.8	59.5	47.5	-2.3	-12.3	-16.2	-2.9	-17.2	-25.4
Tertiary (Energy on Value added)	100.0	84.3	73.9	54.9	42.8	-5.9	-16.5	-21.0	-7.3	-23.1	-32.9
Transport (Energy on GDP)	100.0	98.7	91.5	73.6	61.5	-2.0	-7.8	-8.3	-2.2	-9.6	-11.9
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.23	0.17	0.14	-0.04	-0.07	-0.10	-14.5	-30.3	-40.6
Final energy demand (t of CO_2/toe)	2.22	2.04	1.92	1.81	1.75	-0.03	-0.06	-0.05	-1.7	-3.1	-2.7
Industry	2.07	1.79	1.64	1.54	1.50	-0.06	-0.10	-0.05	-3.6	-6.3	-3.5
Residential	1.91	1.60	1.50	1.45	1.40	-0.01	0.01	0.03	-0.7	1.0	2.2
Tertiary	1.89	1.54	1.41	1.40	1.40	0.02	0.12	0.19	1.6	9.5	16.1
Transport	2.90	2.91	2.77	2.56	2.43	-0.06	-0.20	-0.30	-2.1	-7.4	-11.1
Electricity and steam generation											
Generation Capacity in MW_e		**725459**	**903296**	**988811**	**1085954**	**14473**	**-49274**	**-159172**	**1.6**	**-4.7**	**-12.8**
Nuclear		145542	139130	109239	44476	0	-11530	-63674	0.0	-9.5	-58.9
Hydro (pumping excluded)		116592	128195	132999	136672	4262	2834	854	3.4	2.2	0.6
Wind		12806	109569	200450	268428	30149	68169	76173	38.0	51.5	39.6
Solar		176	1661	11703	38953	0	6807	28370	0.0	139.0	268.1
Thermal		450343	524741	534421	597425	-19938	-115555	-200894	-3.7	-17.8	-25.2
of which cogeneration units		122684	164400	222571	282036	-4163	-13169	-9826	-2.5	-5.6	-3.4
Solids fired		210547	175915	115408	121647	-4619	-69282	-135856	-2.6	-37.5	-52.8
Gas fired		143140	239643	259383	270265	-27965	-93415	-144152	-10.5	-26.5	-34.8
Oil fired		80801	68886	51422	41807	-4569	177	4510	-6.2	0.3	12.1
Biomass-waste fired		14814	35371	100995	155430	13714	41337	68063	63.3	69.3	77.9
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	4926	7212	8276	3502	5628	6541	246.0	355.1	376.8
Indicators											
Efficiency for thermal electricity production (%)		35.8	37.6	41.0	45.6	-1.8	-3.8	-2.1	-4.7	-8.5	-4.4
Load factor for gross electric capacities (%)		49.1	45.4	41.7	38.7	-3.1	-7.0	-6.8	-6.3	-14.3	-15.0
CHP indicator (% of electricity from CHP)		14.8	19.4	28.9	36.9	1.1	6.5	11.6	6.2	28.8	46.0
Non fossil fuels in electricity generation (%)		45.6	52.7	59.9	60.8	8.3	16.1	16.9	18.7	36.8	38.4
- nuclear		30.3	27.3	18.0	8.6	1.3	-2.6	-8.9	5.1	-12.8	-51.0
- renewable energy forms		15.3	25.4	41.9	52.2	7.0	18.8	25.8	38.0	81.1	97.8
Transport sector											
Passenger transport activity (Gpkm)	**4881.2**	**5752.9**	**6896.0**	**8248.3**	**9444.1**	-1.2	-16.6	-50.3	0.0	-0.2	-0.5
Public road transport	618.4	589.7	619.8	631.2	615.7	1.2	5.6	9.4	0.2	0.9	1.5
Private cars and motorcycles	3601.6	4397.4	5298.7	6392.7	7372.3	-2.0	-20.2	-55.3	0.0	-0.3	-0.7
Rail	456.6	423.6	466.2	516.0	571.0	-0.1	1.7	5.7	0.0	0.3	1.0
Aviation	170.7	304.7	466.2	653.1	822.4	-0.4	-3.5	-9.8	-0.1	-0.5	-1.2
Inland navigation	33.9	37.4	45.0	55.2	62.7	0.0	-0.2	-0.4	0.0	-0.3	-0.6
Travel per person (km per capita)	9229	10441	12098	14169	16074	-2.1	-28.5	-85.7	0.0	-0.2	-0.5
Freight transport activity (Gtkm)	**1958.3**	**2352.3**	**2945.1**	**3590.4**	**4182.6**	-2.3	-21.6	-48.9	-0.1	-0.6	-1.2
Trucks	1159.5	1668.6	2201.3	2785.1	3320.1	-3.0	-24.0	-53.5	-0.1	-0.9	-1.6
Rail	532.6	405.9	438.6	466.0	493.9	0.6	1.1	1.3	0.1	0.2	0.3
Inland navigation	266.3	277.8	305.1	339.3	368.6	0.2	1.3	3.3	0.1	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	261	255	259	249	241	-0.2	-1.5	-2.8	-0.1	-0.6	-1.2
Energy demand in transport (ktoe)	**289441**	**350426**	**401061**	**408455**	**412060**	-8827	-43133	-55420	-2.2	-9.6	-11.9
Public road transport	9634	8758	8867	7856	6466	-43	-472	-653	-0.5	-5.7	-9.2
Private cars and motorcycles	140266	162549	176698	176693	170643	-786	-5642	-10335	-0.4	-3.1	-5.7
Trucks	92511	116941	150966	163459	169033	-652	-17545	-27687	-0.4	-9.7	-14.1
Rail	9807	9691	8663	6480	6242	-219	-604	-499	-2.5	-8.5	-7.4
Aviation	29928	46814	49402	46984	52419	-7110	-18672	-15882	-12.6	-28.4	-23.3
Inland navigation	7295	5673	6465	6983	7258	-18	-198	-365	-0.3	-2.8	-4.8
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.5	39.3	35.1	28.8	24.9	-1.2	-3.0	-2.7	-3.2	-9.4	-9.9
Freight transport (toe/Mtkm)	51.8	52.8	53.9	47.6	42.2	-0.2	-4.7	-6.2	-0.4	-9.0	-12.8

Source: PRIMES

Europe-30: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (A)										
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**1091087**	**1200143**	**1185693**	**1041368**	**947313**	**27363**	**-18524**	**-62106**	**2.4**	**-1.7**	**-6.2**
Solids	377317	228042	158709	101248	78829	-18235	-55721	-67886	-10.3	-35.5	-46.3
Oil	216359	337714	257162	183366	134189	-1044	-3507	-1040	-0.4	-1.9	-0.8
Natural gas	186970	253987	252915	199649	188803	-28059	-31386	-20293	-10.0	-13.6	-9.7
Nuclear	206883	250675	260480	173542	83986	-59	-69292	-147776	0.0	-28.5	-63.8
Renewable energy sources	103557	129725	256428	383563	461506	74760	141381	174890	41.2	58.4	61.0
Hydro	40003	48250	52614	56012	57480	2671	1725	10	5.3	3.2	0.0
Biomass & Waste	59720	74749	157045	248935	301506	49466	101569	131597	46.0	68.9	77.5
Wind	67	1919	22832	40608	53380	6486	12879	13060	39.7	46.4	32.4
Solar and others	173	703	2935	7214	13705	599	1128	2407	25.6	18.5	21.3
Geothermal	3595	4103	21002	30792	35433	15538	24080	27817	284.4	358.7	365.2
Net Imports	**695727**	**684878**	**842862**	**905695**	**931628**	**-80872**	**-260933**	**-367770**	**-8.8**	**-22.4**	**-28.3**
Solids	86632	108508	125792	94053	89278	-25681	-59856	-116937	-17.0	-38.9	-56.7
Oil	490237	412700	503278	533240	554798	-33386	-103436	-129459	-6.2	-16.2	-18.9
- Crude oil and Feedstocks	458354	384418	464342	505159	533579	-33040	-97001	-123082	-6.6	-16.1	-18.7
- Oil products	31883	28282	38936	28081	21218	-346	-6434	-6377	-0.9	-18.6	-23.1
Natural gas	117149	163941	214036	278961	288059	-21666	-97052	-120819	-9.2	-25.8	-29.5
Electricity	1710	-272	-244	-560	-506	-139	-589	-554	133.2	-2068.9	-1146.3
Gross Inland Consumption	**1751588**	**1839144**	**1978716**	**1892091**	**1821019**	**-53509**	**-279457**	**-429875**	**-2.6**	**-12.9**	**-19.1**
Solids	468937	345317	284501	195302	168106	-43916	-115577	-184823	-13.4	-37.2	-52.4
Oil	669257	702393	710600	661635	631064	-34430	-106942	-130500	-4.6	-13.9	-17.1
Natural gas	301245	411306	466952	478610	476863	-49725	-128438	-141112	-9.6	-21.2	-22.8
Nuclear	206883	250675	260480	173542	83986	-59	-69292	-147776	0.0	-28.5	-63.8
Electricity	1710	-272	-244	-560	-506	-139	-589	-554	133.2	-2068.9	-1146.3
Renewable energy forms	103557	129725	256428	383563	461506	74760	141381	174890	41.2	58.4	61.0
as % in Gross Inland Consumption											
Solids	26.8	18.8	14.4	10.3	9.2	-1.8	-4.0	-6.4	-11.0	-27.9	-41.1
Oil	38.2	38.2	35.9	35.0	34.7	-0.7	-0.4	0.8	-2.0	-1.2	2.4
Natural gas	17.2	22.4	23.6	25.3	26.2	-1.8	-2.7	-1.3	-7.2	-9.5	-4.6
Nuclear	11.8	13.6	13.2	9.2	4.6	0.3	-2.0	-5.7	2.7	-18.0	-55.2
Renewable energy forms	5.9	7.1	13.0	20.3	25.3	4.0	9.1	12.6	45.0	81.8	99.0
Electricity Generation in GWh_e	**2794856**	**3323905**	**3804258**	**3829115**	**3900939**	**-187331**	**-833225**	**-1316699**	**-4.7**	**-17.9**	**-25.2**
Nuclear	818651	971593	1009601	672627	325520	-229	-268575	-572766	0.0	-28.5	-63.8
Hydro & wind	465941	583374	878866	1138323	1341569	106472	180250	195463	13.8	18.8	17.1
Thermal (incl. biomass)	1510263	1768938	1915791	2018165	2233850	-293574	-744900	-939396	-13.3	-27.0	-29.6
Fuel Inputs for Thermal Power Generation [1]	**394358**	**425676**	**439375**	**423993**	**421823**	**-43211**	**-106886**	**-151413**	**-9.0**	**-20.1**	**-26.4**
Solids	266510	235114	197946	123865	107743	-40472	-110782	-179263	-17.0	-47.2	-62.5
Oil (including refinery gas)	57394	46636	35715	23793	23727	-167	-1611	2617	-0.5	-6.3	12.4
Gas	56913	118562	136406	141655	116884	-36725	-66479	-67168	-21.2	-31.9	-36.5
Biomass & Waste	10698	22359	49894	105634	139751	18617	47740	64230	59.5	82.5	85.0
Geothermal heat	2842	3004	19414	29046	33718	15536	24245	28170	400.6	505.0	507.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**884427**	**866713**	**870593**	**857016**	**844090**	**-26358**	**-74091**	**-83741**	**-2.9**	**-8.0**	**-9.0**
Refineries	713481	771184	769715	728699	701554	-35477	-104111	-128214	-4.4	-12.5	-15.5
Biofuels and hydrogen production	2	637	27598	65650	87662	10269	33250	48349	59.3	102.6	123.0
District heating	38512	19379	17201	12795	12986	1446	-1624	-2493	9.2	-11.3	-16.1
Others	132432	75512	56079	49871	41888	-2596	-1607	-1382	-4.4	-3.1	-3.2
Energy Branch Consumption	**83789**	**92950**	**91602**	**83719**	**79137**	**-4612**	**-14081**	**-16686**	**-4.8**	**-14.4**	**-17.4**
Non-Energy Uses	**103762**	**115166**	**115648**	**119840**	**121819**	**-339**	**-451**	**-493**	**-0.3**	**-0.4**	**-0.4**
Final Energy Demand	**1145388**	**1220510**	**1364580**	**1380751**	**1399197**	**-34440**	**-177417**	**-256575**	**-2.5**	**-11.4**	**-15.5**
by sector											
Industry[1]	394004	375356	413986	449607	487527	180	-11426	-10502	0.0	-2.5	-2.1
- energy intensive industries	252212	236839	251130	259291	262798	693	-5503	-5629	0.3	-2.1	-2.1
- other industrial sectors	141792	138517	162856	190316	224729	-513	-5923	-4873	-0.3	-3.0	-2.1
Residential	290806	310280	343558	326163	313596	-10018	-66484	-104962	-2.8	-16.9	-25.1
Tertiary	160718	172911	193491	184523	174480	-15295	-54972	-84266	-7.3	-23.0	-32.6
Transport	299860	361964	413545	420458	423594	-9308	-44535	-56846	-2.2	-9.6	-11.8
by fuel [1]											
Solids	137278	69933	58705	48716	41896	-1104	-2614	-2244	-1.8	-5.1	-5.1
Oil	477192	518412	554399	521845	498957	-26530	-96463	-124172	-4.6	-15.6	-19.9
Gas	222317	266915	295090	305876	323383	-11604	-49302	-63874	-3.8	-13.9	-16.5
Electricity	200044	238509	280871	288683	297722	-13555	-62079	-99460	-4.6	-17.7	-25.0
Heat (from CHP and District Heating)	68198	75229	80269	87505	91656	-5415	-7991	-15750	-6.3	-8.4	-14.7
Other	40359	51512	95246	128124	145583	23767	41030	48924	33.2	47.1	50.6
CO2 Emissions (Mt of CO2)	**4207.7**	**4076.8**	**3983.8**	**3504.1**	**3306.1**	**-392.7**	**-1075.4**	**-1449.3**	**-9.0**	**-23.5**	**-30.5**
Power generation/District heating	1515.7	1431.7	1259.1	924.6	796.9	-262.1	-624.3	-890.6	-17.2	-40.3	-52.8
Energy Branch	163.4	170.4	125.4	94.0	81.9	-19.8	-37.4	-29.9	-13.6	-28.4	-26.7
Industry	807.4	663.2	671.1	683.4	722.0	-25.0	-65.7	-44.1	-3.6	-8.8	-5.8
Residential	551.3	493.5	513.0	469.0	433.9	-18.6	-90.7	-133.3	-3.5	-16.2	-23.5
Tertiary	300.2	264.5	271.1	257.1	242.3	-17.0	-48.6	-68.2	-5.9	-15.9	-22.0
Transport	869.6	1053.4	1144.1	1075.9	1029.1	-50.2	-208.7	-283.1	-4.2	-16.2	-21.6
CO2 Emissions Index (1990=100)	**100.0**	**96.9**	**94.7**	**83.3**	**78.6**	-9.3	-25.6	-34.4	-9.0	-23.5	-30.5

Source: PRIMES

Europe-30: Combined high renewables and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	539.950	562.681	582.130	594.587	600.252	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7877.3	9665.6	11898.8	15057.8	18137.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	222.4	190.3	166.3	125.7	100.4	-4.5	-18.6	-23.7	-2.6	-12.9	-19.1
Gross Inl. Cons./Capita (toe/inhabitant)	3.24	3.27	3.40	3.18	3.03	-0.09	-0.47	-0.72	-2.6	-12.9	-19.1
Electricity Generated/Capita (kWh/inhabitant)	5176	5907	6535	6440	6499	-322	-1401	-2194	-4.7	-17.9	-25.2
Carbon intensity (t of CO_2/toe of GIC)	2.40	2.22	2.01	1.85	1.82	-0.14	-0.26	-0.30	-6.5	-12.2	-14.1
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.79	7.25	6.84	5.89	5.51	-0.67	-1.81	-2.41	-9.0	-23.5	-30.5
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	534.2	421.8	334.8	232.7	182.3	-33.0	-71.4	-79.9	-9.0	-23.5	-30.5
Import Dependency %	38.9	36.4	41.5	46.5	49.6	-2.8	-5.9	-6.7	-6.3	-11.2	-11.9
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.7	75.8	64.8	58.0	0.0	-1.6	-1.3	0.0	-2.5	-2.1
Residential (Energy on Private Income)	100.0	87.4	78.8	59.6	47.7	-2.3	-12.1	-16.0	-2.8	-16.9	-25.1
Tertiary (Energy on Value added)	100.0	84.5	74.3	55.3	43.2	-5.9	-16.5	-20.8	-7.3	-23.0	-32.6
Transport (Energy on GDP)	100.0	98.4	91.3	73.4	61.4	-2.1	-7.8	-8.2	-2.2	-9.6	-11.8
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.40	0.29	0.22	0.16	0.13	-0.04	-0.07	-0.09	-14.6	-30.6	-40.9
Final energy demand (t of CO_2/toe)	2.21	2.03	1.90	1.80	1.73	-0.03	-0.06	-0.05	-1.7	-3.3	-2.8
Industry	2.05	1.77	1.62	1.52	1.48	-0.06	-0.10	-0.06	-3.6	-6.4	-3.7
Residential	1.90	1.59	1.49	1.44	1.38	-0.01	0.01	0.03	-0.7	0.9	2.1
Tertiary	1.87	1.53	1.40	1.39	1.39	0.02	0.12	0.19	1.5	9.1	15.7
Transport	2.90	2.91	2.77	2.56	2.43	-0.06	-0.20	-0.30	-2.0	-7.4	-11.1
Electricity and steam generation											
Generation Capacity in MW_e		**769539**	**951309**	**1039360**	**1136749**	**13500**	**-51879**	**-164810**	**1.4**	**-4.8**	**-12.7**
Nuclear		148992	142580	112689	45576	0	-11530	-65999	0.0	-9.3	-59.2
Hydro (pumping excluded)		155831	169754	176369	180625	4538	3055	1286	2.7	1.8	0.7
Wind		12886	110000	201504	269907	29039	66487	73683	35.9	49.2	37.6
Solar		195	1705	11813	39184	0	6807	28370	0.0	136.0	262.3
Thermal		451636	527270	536985	601456	-20077	-116697	-202151	-3.7	-17.9	-25.2
of which cogeneration units		123656	165788	224123	285234	-4002	-13416	-10014	-2.4	-5.6	-3.4
Solids fired		210703	176070	115486	121647	-4557	-69220	-135856	-2.5	-37.5	-52.8
Gas fired		143723	241117	260777	271501	-28320	-94129	-144832	-10.5	-26.5	-34.8
Oil fired		80968	69063	51523	41863	-4535	211	4506	-6.2	0.4	12.1
Biomass-waste fired		15202	36093	101986	158169	13832	40813	67491	62.1	66.7	74.4
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	4926	7212	8276	3502	5628	6541	246.0	355.1	376.8
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.5	40.9	45.5	-1.9	-3.8	-2.1	-4.8	-8.5	-4.3
Load factor for gross electric capacities (%)		49.3	45.7	42.1	39.2	-2.9	-6.7	-6.6	-6.0	-13.8	-14.4
CHP indicator (% of electricity from CHP)		14.0	18.4	27.4	35.2	1.0	5.9	10.9	6.0	27.8	44.8
Non fossil fuels in electricity generation (%)		48.9	55.3	62.2	63.0	8.1	15.7	16.4	17.1	33.7	35.3
- nuclear		29.2	26.5	17.6	8.3	1.2	-2.6	-8.9	4.9	-13.0	-51.5
- renewable energy forms		19.6	28.8	44.6	54.7	6.8	18.3	25.3	31.1	69.4	86.2
Transport sector											
Passenger transport activity (Gpkm)	**5032.5**	**5925.5**	**7097.1**	**8471.2**	**9678.9**	-1.2	-16.9	-50.9	0.0	-0.2	-0.5
Public road transport	625.6	596.9	628.1	640.0	624.8	1.3	5.6	9.5	0.2	0.9	1.5
Private cars and motorcycles	3720.2	4530.1	5452.1	6562.2	7550.4	-2.0	-20.5	-55.8	0.0	-0.3	-0.7
Rail	473.5	443.8	489.1	540.5	596.4	-0.1	1.6	5.8	0.0	0.3	1.0
Aviation	178.7	316.3	481.6	671.9	843.1	-0.4	-3.5	-9.9	-0.1	-0.5	-1.2
Inland navigation	34.5	38.4	46.2	56.5	64.2	0.0	-0.2	-0.4	0.0	-0.3	-0.6
Travel per person (km per capita)	9320	10531	12192	14247	16125	-2.1	-28.4	-84.7	0.0	-0.2	-0.5
Freight transport activity (Gtkm)	**2026.8**	**2447.9**	**3057.6**	**3721.3**	**4326.6**	-2.3	-22.3	-50.3	-0.1	-0.6	-1.1
Trucks	1179.2	1705.6	2252.7	2854.2	3405.0	-3.1	-24.7	-55.1	-0.1	-0.9	-1.6
Rail	544.1	419.3	454.4	482.4	510.5	0.6	1.1	1.3	0.1	0.2	0.3
Inland navigation	303.5	323.0	350.5	384.8	411.1	0.1	1.4	3.5	0.0	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	257	253	257	247	239	-0.2	-1.5	-2.8	-0.1	-0.6	-1.1
Energy demand in transport (ktoe)	**299860**	**361964**	**413545**	**420458**	**423594**	-9308	-44535	-56846	-2.2	-9.6	-11.8
Public road transport	9802	8917	9044	8019	6608	-44	-481	-663	-0.5	-5.7	-9.1
Private cars and motorcycles	145794	168062	182467	181963	175422	-813	-5806	-10488	-0.4	-3.1	-5.6
Trucks	94266	119351	154314	167292	173058	-672	-18031	-28397	-0.4	-9.7	-14.1
Rail	10142	10079	9052	6776	6511	-228	-632	-518	-2.5	-8.5	-7.4
Aviation	31627	49160	51471	48713	54088	-7532	-19373	-16391	-12.8	-28.5	-23.3
Inland navigation	8229	6394	7198	7696	7906	-19	-213	-388	-0.3	-2.7	-4.7
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.6	35.3	28.9	25.0	-1.2	-3.0	-2.7	-3.3	-9.4	-9.8
Freight transport (toe/Mtkm)	51.4	52.0	53.3	47.2	41.9	-0.2	-4.6	-6.1	-0.4	-9.0	-12.8

Source: PRIMES

(1) EUROSTAT Energy Balances do not take into account non-marketed steam, i.e. steam generated - either in boilers or in CHP plants - and used on site by industrial consumers. Using statistical information provided by EUROSTAT on CHP, the non-marketed steam generated in CHP units as well as the corresponding fuel input have been estimated for this study. In the PRIMES model, steam has been attributed to the demand side and the fuel input to the supply side. This approach ensures a better comparability of historical figures with the projections. However, slight differences exist for certain figures related to steam generation - both in terms of final energy demand and transformation input - in this report compared to EUROSTAT energy balances.

Disclaimer: Energy and transport statistics reported in this publication and used for the modelling are taken mainly from EUROSTAT and from the publication "EU Energy and Transport in Figures" of the Directorate General for Energy and Transport. Energy and transport statistical concepts have developed differently in the past according to their individual purposes. Energy demand in transport reflects usually sales of fuels at the point of refuelling, which can differ from the region of consumption. This is particularly relevant for airplanes and trucks. Transport statistics deal with the transport activity within a country but may not always fully include transit shipments. These differences should be borne in mind when comparing energy and transport figures. This applies in particular to transport activity ratios, such as energy efficiency in freight transport, which is measured in tonnes of oil equivalent per million tonne-km.

Abbreviations

GIC: Gross Inland Consumption
CHP: combined heat and power

Geographical regions
EU15: EU15 Member States
EU25: EU15 Member States + New Member States
NMS: New Member States (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia)
EU27: EU25 Member States + Bulgaria + Romania
EU28: EU27 + Turkey
Europe 30: EU28 + Norway + Switzerland

Units
toe: tonne of oil equivalent, or 10^{7} kilocalories, or 41.86 GJ (Gigajoule)
Mtoe: million toe

GW: Gigawatt or 10^{9} watt
kWh: kilowatt-hour or 10^{3} watt-hour
MWh: megawatt-hour or 10^{6} watt-hour
TWh: Terawatt-hour or 10^{12} watt-hour

t: metric tonnes, or 1000 kilogrammes
Mt: Million metric tonnes

km: kilometre
pkm: passenger-kilometre (one passenger transported a distance of one kilometre)
tkm: tonne-kilometre (one tonne transported a distance of one kilometre)
Gpkm: Giga passenger-kilometre, or 10^{9} passenger-kilometre
Gtkm: Giga tonne-kilometre, or 10^{9} tonne-kilometre

APPENDIX 5: "Combined 12% renewables share in 2010 and efficiency" case results

Summary results by groups of countries (comparison to Baseline)

EU25: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**877543**	**898598**	**878214**	**701347**	**614564**	**41797**	**-5174**	**-70539**	**5.0**	**-0.7**	**-10.3**
Solids	351650	204139	138557	85220	61908	-15970	-45862	-58289	-10.3	-35.0	-48.5
Oil	120396	163631	116356	51384	42921	-823	-1575	-528	-0.7	-3.0	-1.2
Natural gas	139723	196665	167751	97498	78791	-4428	-852	-1015	-2.6	-0.9	-1.3
Nuclear	196920	237664	248776	175939	86147	0	-52699	-124661	0.0	-23.0	-59.1
Renewable energy sources	68855	96499	206774	291306	344797	63018	95813	113955	43.8	49.0	49.4
Hydro	23391	28982	31545	33517	34005	1667	1314	124	5.6	4.1	0.4
Biomass & Waste	42151	61865	138261	199626	234662	45854	70434	85782	49.6	54.5	57.6
Wind	67	1913	21707	35659	47511	5921	9418	9569	37.5	35.9	25.2
Solar and others	145	417	2122	3525	5423	632	778	1029	42.4	28.3	23.4
Geothermal	3101	3322	13138	18979	23196	8944	13868	17450	213.3	271.4	303.7
Net Imports	**711300**	**801061**	**932898**	**994077**	**964342**	**-91377**	**-237614**	**-301225**	**-8.9**	**-19.3**	**-23.8**
Solids	75449	94307	108696	78835	73034	-23591	-49560	-99885	-17.8	-38.6	-57.8
Oil	510017	518147	569458	589332	562527	-30240	-80534	-89923	-5.0	-12.0	-13.8
- Crude oil and Feedstocks	479112	496826	531554	561467	540677	-29803	-75208	-85573	-5.3	-11.8	-13.7
- Oil products	30905	21321	37904	27865	21850	-437	-5326	-4349	-1.1	-16.0	-16.6
Natural gas	123653	186463	252639	324268	326966	-37414	-107042	-111031	-12.9	-24.8	-25.3
Electricity	2181	2144	2105	1643	1815	-131	-479	-387	-5.9	-22.6	-17.6
Gross Inland Consumption	**1556194**	**1653841**	**1762952**	**1642548**	**1523473**	**-49580**	**-242788**	**-371764**	**-2.7**	**-12.9**	**-19.6**
Solids	431944	306538	247253	164055	134942	-39562	-95421	-158174	-13.8	-36.8	-54.0
Oil	595746	634711	637655	587840	550016	-31063	-82108	-90450	-4.6	-12.3	-14.1
Natural gas	260548	376284	420389	421765	405756	-41842	-107894	-112046	-9.1	-20.4	-21.6
Nuclear	196920	237664	248776	175939	86147	0	-52699	-124661	0.0	-23.0	-59.1
Electricity	2181	2144	2105	1643	1815	-131	-479	-387	-5.9	-22.6	-17.6
Renewable energy forms	68855	96499	206774	291306	344797	63018	95813	113955	43.8	49.0	49.4
as % in Gross Inland Consumption											
Solids	27.8	18.5	14.0	10.0	8.9	-1.8	-3.8	-6.6	-11.4	-27.4	-42.7
Oil	38.3	38.4	36.2	35.8	36.1	-0.7	0.3	2.3	-2.0	0.7	6.8
Natural gas	16.7	22.8	23.8	25.7	26.6	-1.7	-2.4	-0.7	-6.5	-8.6	-2.5
Nuclear	12.7	14.4	14.1	10.7	5.7	0.4	-1.4	-5.5	2.8	-11.7	-49.2
Renewable energy forms	4.4	5.8	11.7	17.7	22.6	3.8	7.4	10.5	47.9	71.0	85.8
Electricity Generation in GWh_e	**2455674**	**2900835**	**3318725**	**3269439**	**3241593**	**-164461**	**-736336**	**-1125006**	**-4.7**	**-18.4**	**-25.8**
Nuclear	780056	921193	964265	681942	333901	0	-204265	-483191	0.0	-23.0	-59.1
Hydro & wind	272788	359249	620782	811980	968297	88238	128129	124574	16.6	18.7	14.8
Thermal (incl. biomass)	1402830	1620392	1733678	1775517	1939395	-252698	-660201	-766389	-12.7	-27.1	-28.3
Fuel Inputs for Thermal Power Generation [1]	**355362**	**385987**	**391799**	**365632**	**361270**	**-40442**	**-97139**	**-128768**	**-9.4**	**-21.0**	**-26.3**
Solids	246377	214488	178223	106106	87017	-36727	-92396	-153294	-17.1	-46.5	-63.8
Oil (including refinery gas)	48954	41870	31880	21638	22503	246	-1673	2708	0.8	-7.2	13.7
Gas	47057	105480	121925	126764	106109	-30901	-55967	-49139	-20.2	-30.6	-31.7
Biomass & Waste	10201	21211	47139	92597	122841	17992	38978	53417	61.7	72.7	76.9
Geothermal heat	2774	2939	12632	18527	22800	8948	13920	17539	242.8	302.1	333.4
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**797634**	**796450**	**790375**	**757863**	**723538**	**-22521**	**-66232**	**-73527**	**-2.8**	**-8.0**	**-9.2**
Refineries	642275	710448	697019	654465	619191	-31903	-79560	-88912	-4.4	-10.8	-12.6
Biofuels and hydrogen production	2	637	26912	47096	56198	10120	16092	19823	60.3	51.9	54.5
District heating	31035	17261	16807	11793	10690	1557	-2024	-4044	10.2	-14.6	-27.4
Others	124322	68104	49637	44509	37459	-2295	-740	-394	-4.4	-1.6	-1.0
Energy Branch Consumption	**73032**	**80377**	**77779**	**70280**	**64868**	**-3719**	**-10886**	**-13266**	**-4.6**	**-13.4**	**-17.0**
Non-Energy Uses	**94476**	**105950**	**107538**	**110826**	**111775**	**-309**	**-374**	**-390**	**-0.3**	**-0.3**	**-0.3**
Final Energy Demand	**1021913**	**1095359**	**1208029**	**1184149**	**1156212**	**-29978**	**-154355**	**-214241**	**-2.4**	**-11.5**	**-15.6**
by sector											
Industry[1]	341087	330062	356461	373222	384467	40	-9180	-7098	0.0	-2.4	-1.8
- energy intensive industries	216809	211616	221303	223826	220864	543	-4566	-4068	0.2	-2.0	-1.8
- other industrial sectors	124278	118446	135158	149396	163603	-503	-4614	-3030	-0.4	-3.0	-1.8
Residential	261006	273302	303199	278669	260050	-8766	-60072	-91235	-2.8	-17.7	-26.0
Tertiary	146622	158975	175357	164456	153202	-13130	-47399	-72114	-7.0	-22.4	-32.0
Transport	273198	333020	373011	367801	358493	-8122	-37704	-43794	-2.1	-9.3	-10.9
by fuel [1]											
Solids	123937	56633	44503	37950	31925	-699	-1470	-2099	-1.5	-3.7	-6.2
Oil	428121	468312	493212	457819	427002	-24130	-72077	-84835	-4.7	-13.6	-16.6
Gas	200242	251885	269026	267478	268496	-10148	-42248	-52901	-3.6	-13.6	-16.5
Electricity	176468	211352	247364	247767	248916	-11946	-55150	-85127	-4.6	-18.2	-25.5
Heat (from CHP and District Heating)	63092	68712	76089	80372	82887	-4088	-7319	-12438	-5.1	-8.3	-13.0
Other	30053	38465	77834	92764	96986	21032	23909	23160	37.0	34.7	31.4
CO2 Emissions (Mt of CO2)	**3776.1**	**3674.1**	**3535.0**	**3055.0**	**2797.8**	**-346.9**	**-873.6**	**-1157.2**	**-8.9**	**-22.2**	**-29.3**
Power generation/District heating	1362.6	1294.9	1130.8	809.9	681.4	-231.0	-523.3	-742.6	-17.0	-39.3	-52.2
Energy Branch	141.5	144.9	106.5	83.7	71.2	-17.4	-30.2	-28.5	-14.1	-26.5	-28.6
Industry	698.9	567.7	557.9	549.1	537.2	-19.1	-46.1	-32.6	-3.3	-7.7	-5.7
Residential	506.1	452.1	465.0	412.6	371.0	-17.7	-82.2	-115.7	-3.7	-16.6	-23.8
Tertiary	274.2	244.6	246.5	232.9	221.2	-15.3	-42.9	-60.7	-5.8	-15.5	-21.5
Transport	792.7	969.9	1028.3	966.6	915.9	-46.4	-148.9	-177.0	-4.3	-13.3	-16.2
CO2 Emissions Index (1990=100)	**100.0**	**97.3**	**93.6**	**80.9**	**74.1**	-9.2	-23.1	-30.6	-8.9	-22.2	-29.3

Source: PRIMES

EU25: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	440.788	452.915	464.054	469.270	469.365	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7294.7	8947.0	10946.8	13656.3	16051.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	213.3	184.8	161.0	120.3	94.9	-4.5	-17.8	-23.2	-2.7	-12.9	-19.6
Gross Inl. Cons./Capita (toe/inhabitant)	3.53	3.65	3.80	3.50	3.25	-0.11	-0.52	-0.79	-2.7	-12.9	-19.6
Electricity Generated/Capita (kWh/inhabitant)	5571	6405	7152	6967	6906	-354	-1569	-2397	-4.7	-18.4	-25.8
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.22	2.01	1.86	1.84	-0.14	-0.22	-0.25	-6.4	-10.7	-12.0
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.57	8.11	7.62	6.51	5.96	-0.75	-1.86	-2.47	-8.9	-22.2	-29.3
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	517.7	410.7	322.9	223.7	174.3	-31.7	-64.0	-72.1	-8.9	-22.2	-29.3
Import Dependency %	44.7	47.2	51.5	58.6	61.1	-3.5	-4.9	-3.8	-6.4	-7.7	-5.9
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	83.8	77.3	65.1	57.5	0.0	-1.6	-1.1	0.0	-2.4	-1.8
Residential (Energy on Private Income)	100.0	85.8	78.1	58.1	46.3	-2.3	-12.5	-16.2	-2.8	-17.7	-26.0
Tertiary (Energy on Value added)	100.0	84.9	74.0	54.8	43.1	-5.5	-15.8	-20.3	-7.0	-22.4	-32.0
Transport (Energy on GDP)	100.0	99.4	91.0	71.9	59.6	-2.0	-7.4	-7.3	-2.1	-9.3	-10.9
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.41	0.30	0.23	0.16	0.14	-0.04	-0.07	-0.09	-14.4	-29.0	-39.9
Final energy demand (t of CO_2/toe)	2.22	2.04	1.90	1.83	1.77	-0.03	-0.03	-0.01	-1.7	-1.5	-0.3
Industry	2.05	1.72	1.57	1.47	1.40	-0.05	-0.09	-0.06	-3.3	-5.5	-4.0
Residential	1.94	1.65	1.53	1.48	1.43	-0.01	0.02	0.04	-0.9	1.4	3.0
Tertiary	1.87	1.54	1.41	1.42	1.44	0.02	0.11	0.19	1.2	8.8	15.4
Transport	2.90	2.91	2.76	2.63	2.55	-0.06	-0.12	-0.16	-2.2	-4.5	-6.0
Electricity and steam generation											
Generation Capacity in MW_e		**661750**	**820334**	**869160**	**927423**	**9827**	**-73421**	**-168869**	**1.2**	**-7.8**	**-15.4**
Nuclear		141082	136430	105839	41691	0	-11097	-59525	0.0	-9.5	-58.8
Hydro (pumping excluded)		97168	106856	110451	112533	2922	1834	332	2.8	1.7	0.3
Wind		12785	104728	173376	233662	26336	45753	50731	33.6	35.8	27.7
Solar		176	1658	7027	18101	0	2177	7737	0.0	44.9	74.7
Thermal		410539	470662	472466	521435	-19432	-112088	-168145	-4.0	-19.2	-24.4
of which cogeneration units		112958	148288	189667	244767	-2582	-19294	-3232	-1.7	-9.2	-1.3
Solids fired		188879	152362	92404	98805	-4175	-64402	-112430	-2.7	-41.1	-53.2
Gas fired		131875	219613	236128	241079	-25826	-85080	-119055	-10.5	-26.5	-33.1
Oil fired		74302	61643	47824	39688	-4406	-106	4723	-6.7	-0.2	13.5
Biomass-waste fired		14462	33631	91251	136045	12918	34158	54443	62.4	59.8	66.7
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3413	4859	5818	2057	3342	4175	151.6	220.3	254.1
Indicators											
Efficiency for thermal electricity production (%)		36.1	38.1	41.8	46.2	-1.5	-3.5	-1.3	-3.7	-7.7	-2.8
Load factor for gross electric capacities (%)		50.0	46.2	42.9	39.9	-2.9	-5.6	-5.6	-5.9	-11.5	-12.2
CHP indicator (% of electricity from CHP)		14.5	19.3	27.1	36.1	1.4	5.3	11.8	7.9	24.2	48.7
Non fossil fuels in electricity generation (%)		46.5	53.7	60.8	61.3	7.9	15.2	15.0	17.4	33.4	32.5
- nuclear		31.8	29.1	20.9	10.3	1.4	-1.3	-8.4	5.0	-5.7	-45.0
- renewable energy forms		14.7	24.6	39.9	51.0	6.6	16.5	23.4	36.3	70.3	85.0
Transport sector											
Passenger transport activity (Gpkm)	**4640.8**	**5466.3**	**6448.0**	**7390.0**	**8100.4**	-1.4	-12.1	-29.8	0.0	-0.2	-0.4
Public road transport	504.1	480.1	496.0	483.7	472.0	1.0	3.2	5.3	0.2	0.7	1.1
Private cars and motorcycles	3529.3	4253.1	5015.3	5768.3	6329.0	-1.2	-12.5	-29.5	0.0	-0.2	-0.5
Rail	411.9	402.7	445.7	478.8	507.6	-0.7	0.3	2.0	-0.2	0.1	0.4
Aviation	166.3	296.9	451.2	613.8	742.5	-0.4	-2.9	-7.3	-0.1	-0.5	-1.0
Inland navigation	29.2	33.6	39.7	45.4	49.3	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	10528	12069	13895	15748	17258	-3.0	-25.7	-63.4	0.0	-0.2	-0.4
Freight transport activity (Gtkm)	**1753.9**	**2131.5**	**2579.7**	**3034.2**	**3402.6**	-2.5	-14.5	-29.3	-0.1	-0.5	-0.9
Trucks	1034.1	1486.3	1889.4	2296.1	2624.9	-1.7	-15.6	-32.4	-0.1	-0.7	-1.2
Rail	461.7	374.2	401.0	421.4	439.4	-1.0	-0.1	0.5	-0.2	0.0	0.1
Inland navigation	258.1	271.0	289.2	316.8	338.3	0.2	1.2	2.7	0.1	0.4	0.8
Freight activity per unit of GDP (tkm/000 Euro'00)	240	238	236	222	212	-0.2	-1.1	-1.8	-0.1	-0.5	-0.9
Energy demand in transport (ktoe)	**273198**	**333020**	**373011**	**367801**	**358493**	-8122	-37704	-43794	-2.1	-9.3	-10.9
Public road transport	7841	7018	6983	5904	4924	-37	-370	-397	-0.5	-5.9	-7.5
Private cars and motorcycles	138202	158349	169440	163758	152452	-737	-5143	-7399	-0.4	-3.0	-4.6
Trucks	82444	108068	135129	142363	143010	-519	-14468	-21376	-0.4	-9.2	-13.0
Rail	9066	8897	8098	5976	5553	-209	-541	-466	-2.5	-8.3	-7.7
Aviation	28932	45320	47564	43750	46450	-6610	-17027	-13908	-12.2	-28.0	-23.0
Inland navigation	6714	5368	5796	6050	6104	-11	-155	-248	-0.2	-2.5	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	39.3	39.9	35.8	29.6	25.8	-1.2	-3.0	-2.6	-3.1	-9.3	-9.2
Freight transport (toe/Mtkm)	51.7	53.9	55.1	49.1	43.9	-0.2	-4.6	-6.0	-0.3	-8.6	-12.0

Source: PRIMES

EU15: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (A)										
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**707946**	**761643**	**741627**	**579540**	**497299**	**31990**	**-959**	**-54434**	**4.5**	**-0.2**	**-9.9**
Solids	210737	100172	54086	38998	29048	-14172	-20998	-29569	-20.8	-35.0	-50.4
Oil	117782	160552	114008	49288	41107	-809	-1540	-490	-0.7	-3.0	-1.2
Natural gas	132975	190581	162008	92431	74066	-4412	-604	-950	-2.7	-0.6	-1.3
Nuclear	181439	222846	231522	158352	73224	0	-48810	-104362	0.0	-23.6	-58.8
Renewable energy sources	65014	87491	180003	240472	279853	51384	70993	80937	40.0	41.9	40.7
Hydro	22275	27627	29822	31659	32055	1406	1116	41	4.9	3.7	0.1
Biomass & Waste	39426	54257	116323	155881	178707	37005	49658	56301	46.7	46.7	46.0
Wind	67	1912	20655	33595	44331	5274	8416	9424	34.3	33.4	27.0
Solar and others	145	381	1878	3170	4914	553	725	1048	41.7	29.7	27.1
Geothermal	3101	3315	11324	16167	19845	7146	11078	14124	171.0	217.7	246.9
Net Imports	**643284**	**741591**	**849580**	**891972**	**856373**	**-74845**	**-202928**	**-254470**	**-8.1**	**-18.5**	**-22.9**
Solids	89663	110142	116850	75780	69944	-18231	-47698	-90009	-13.5	-38.6	-56.3
Oil	458793	472543	516400	531915	501626	-26359	-71648	-77792	-4.9	-11.9	-13.4
- Crude oil and Feedstocks	435365	455606	487404	513341	489531	-26428	-67791	-75370	-5.1	-11.7	-13.3
- Oil products	23428	16937	28996	18574	12095	69	-3857	-2421	0.2	-17.2	-16.7
Natural gas	92495	155262	212516	280648	279916	-30246	-83437	-86594	-12.5	-22.9	-23.6
Electricity	2333	3644	3814	3629	4886	-9	-145	-75	-0.2	-3.8	-1.5
Gross Inland Consumption	**1319965**	**1456936**	**1544189**	**1419910**	**1299596**	**-42856**	**-203887**	**-308904**	**-2.7**	**-12.6**	**-19.2**
Solids	303612	215739	170936	114777	98993	-32403	-68696	-119578	-15.9	-37.4	-54.7
Oil	544159	587926	583391	529601	488657	-27169	-73188	-78282	-4.4	-12.1	-13.8
Natural gas	223408	339289	374523	373079	353982	-34658	-84042	-87545	-8.5	-18.4	-19.8
Nuclear	181439	222846	231522	158352	73224	0	-48810	-104362	0.0	-23.6	-58.8
Electricity	2333	3644	3814	3629	4886	-9	-145	-75	-0.2	-3.8	-1.5
Renewable energy forms	65014	87491	180003	240472	279853	51384	70993	80937	40.0	41.9	40.7
as % in Gross Inland Consumption											
Solids	23.0	14.8	11.1	8.1	7.6	-1.7	-3.2	-6.0	-13.6	-28.5	-43.9
Oil	41.2	40.4	37.8	37.3	37.6	-0.7	0.2	2.4	-1.8	0.5	6.7
Natural gas	16.9	23.3	24.3	26.3	27.2	-1.5	-1.9	-0.2	-5.9	-6.7	-0.8
Nuclear	13.7	15.3	15.0	11.2	5.6	0.4	-1.6	-5.4	2.8	-12.6	-49.0
Renewable energy forms	4.9	6.0	11.7	16.9	21.5	3.6	6.5	9.2	43.8	62.3	74.1
Electricity Generation in GWh_e	**2138940**	**2576502**	**2940705**	**2859496**	**2801348**	**-142044**	**-625246**	**-934097**	**-4.6**	**-17.9**	**-25.0**
Nuclear	720059	863760	897389	613775	283815	0	-189186	-404504	0.0	-23.6	-58.8
Hydro & wind	259810	343478	588489	766198	907984	77674	114175	121917	15.2	17.5	15.5
Thermal (incl. biomass)	1159070	1369264	1454827	1479523	1609549	-219718	-550234	-651510	-13.1	-27.1	-28.8
Fuel Inputs for Thermal Power Generation [1]	**282186**	**319336**	**319996**	**298030**	**295238**	**-35984**	**-79194**	**-110324**	**-10.1**	**-21.0**	**-27.2**
Solids	184170	158097	126309	75391	65558	-30046	-67414	-118628	-19.2	-47.2	-64.4
Oil (including refinery gas)	43718	38588	29152	19663	20824	453	-1296	3351	1.6	-6.2	19.2
Gas	41697	99188	114346	120769	101949	-26589	-43084	-37886	-18.9	-26.3	-27.1
Biomass & Waste	9827	20524	39347	66466	87431	13041	21465	28624	49.6	47.7	48.7
Geothermal heat	2774	2939	10841	15743	19476	7157	11135	14215	194.2	241.7	270.2
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**704402**	**725664**	**720320**	**685565**	**648858**	**-19629**	**-57287**	**-60963**	**-2.7**	**-7.7**	**-8.6**
Refineries	595036	665476	649606	603170	565023	-28480	-72016	-78589	-4.2	-10.7	-12.2
Biofuels and hydrogen production	2	604	24682	42668	50494	9157	14474	17974	59.0	51.3	55.3
District heating	13085	8717	8610	6226	5602	1874	765	-45	27.8	14.0	-0.8
Others	96279	50868	37421	33501	27740	-2180	-510	-302	-5.5	-1.5	-1.1
Energy Branch Consumption	**63555**	**67696**	**65780**	**58530**	**53118**	**-3064**	**-8991**	**-11090**	**-4.5**	**-13.3**	**-17.3**
Non-Energy Uses	**84387**	**95815**	**96788**	**97458**	**96447**	**-274**	**-338**	**-336**	**-0.3**	**-0.3**	**-0.3**
Final Energy Demand	**866453**	**970663**	**1061077**	**1027008**	**991068**	**-25658**	**-128097**	**-172858**	**-2.4**	**-11.1**	**-14.9**
by sector											
Industry[1]	272481	284781	306803	316038	320812	34	-7020	-5321	0.0	-2.2	-1.6
- energy intensive industries	182306	182967	192035	191797	187195	520	-3493	-3059	0.3	-1.8	-1.6
- other industrial sectors	90175	101814	114768	124240	133617	-486	-3527	-2262	-0.4	-2.8	-1.7
Residential	220020	238404	261642	236468	218066	-7479	-50530	-75048	-2.8	-17.6	-25.6
Tertiary	121346	137376	151097	140704	129582	-10524	-36513	-54907	-6.5	-20.6	-29.8
Transport	252606	310102	341535	333798	322608	-7689	-34034	-37583	-2.2	-9.3	-10.4
by fuel [1]											
Solids	79761	35330	27850	24430	20773	-774	-885	-839	-2.7	-3.5	-3.9
Oil	393325	434547	450978	412275	379163	-22159	-64981	-74692	-4.7	-13.6	-16.5
Gas	173014	226415	235978	230095	227395	-8688	-35397	-43705	-3.6	-13.3	-16.1
Electricity	155929	191711	222907	219951	219046	-10257	-46656	-70050	-4.4	-17.5	-24.2
Heat (from CHP and District Heating)	36558	50708	56867	61797	63975	-3024	-2959	-5015	-5.0	-4.6	-7.3
Other	27865	31953	66497	78461	80715	19244	22782	21443	40.7	40.9	36.2
CO2 Emissions (Mt of CO2)	**3068.4**	**3127.0**	**3000.3**	**2615.4**	**2398.6**	**-290.6**	**-685.6**	**-912.4**	**-8.8**	**-20.8**	**-27.6**
Power generation/District heating	1021.1	1014.7	876.7	657.9	575.8	-187.0	-378.6	-556.9	-17.6	-36.5	-49.2
Energy Branch	127.2	127.0	98.6	76.2	63.4	-14.1	-26.5	-26.0	-12.5	-25.8	-29.1
Industry	545.2	471.6	457.3	439.6	422.9	-18.5	-41.1	-28.3	-3.9	-8.5	-6.3
Residential	419.7	401.5	411.7	363.5	325.4	-15.5	-71.3	-99.8	-3.6	-16.4	-23.5
Tertiary	220.7	207.4	213.3	199.7	185.9	-12.4	-33.6	-46.8	-5.5	-14.4	-20.1
Transport	734.5	904.8	942.8	878.5	825.2	-43.0	-134.5	-154.6	-4.4	-13.3	-15.8
CO2 Emissions Index (1990=100)	**100.0**	**101.9**	**97.8**	**85.2**	**78.2**	-9.5	-22.3	-29.7	-8.8	-20.8	-27.6

Source: PRIMES

EU15: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	365.749	378.062	390.652	397.458	398.737	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	6981.9	8572.2	10391.5	12835.7	14948.8	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	189.1	170.0	148.6	110.6	86.9	-4.1	-15.9	-20.7	-2.7	-12.6	-19.2
Gross Inl. Cons./Capita (toe/inhabitant)	3.61	3.85	3.95	3.57	3.26	-0.11	-0.51	-0.77	-2.7	-12.6	-19.2
Electricity Generated/Capita (kWh/inhabitant)	5848	6815	7528	7194	7026	-364	-1573	-2343	-4.6	-17.9	-25.0
Carbon intensity (t of CO_2/toe of GIC)	2.32	2.15	1.94	1.84	1.85	-0.13	-0.19	-0.21	-6.3	-9.4	-10.3
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.39	8.27	7.68	6.58	6.02	-0.74	-1.73	-2.29	-8.8	-20.8	-27.6
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	439.5	364.8	288.7	203.8	160.5	-28.0	-53.4	-61.0	-8.8	-20.8	-27.6
Import Dependency %	47.5	49.5	53.4	60.6	63.3	-3.2	-4.7	-3.6	-5.6	-7.2	-5.3
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	90.9	85.3	71.8	63.1	0.0	-1.6	-1.0	0.0	-2.2	-1.6
Residential (Energy on Private Income)	100.0	88.8	80.8	59.7	47.5	-2.3	-12.8	-16.4	-2.8	-17.6	-25.6
Tertiary (Energy on Value added)	100.0	88.7	77.6	57.5	45.1	-5.4	-14.9	-19.1	-6.5	-20.6	-29.8
Transport (Energy on GDP)	100.0	100.0	90.8	71.9	59.6	-2.0	-7.3	-6.9	-2.2	-9.3	-10.4
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.39	0.27	0.20	0.16	0.14	-0.04	-0.06	-0.08	-15.2	-26.4	-36.9
Final energy demand (t of CO_2/toe)	2.22	2.05	1.91	1.83	1.78	-0.04	-0.04	-0.02	-1.9	-2.1	-1.1
Industry	2.00	1.66	1.49	1.39	1.32	-0.06	-0.10	-0.07	-3.9	-6.5	-4.7
Residential	1.91	1.68	1.57	1.54	1.49	-0.01	0.02	0.04	-0.9	1.5	2.9
Tertiary	1.82	1.51	1.41	1.42	1.43	0.02	0.10	0.17	1.1	7.8	13.8
Transport	2.91	2.92	2.76	2.63	2.56	-0.06	-0.12	-0.16	-2.2	-4.4	-6.0
Electricity and steam generation											
Generation Capacity in MW_e		**588083**	**733411**	**771232**	**802293**	**9241**	**-56858**	**-127261**	**1.3**	**-6.9**	**-13.7**
Nuclear		131758	127644	97053	35169	0	-9145	-49499	0.0	-8.6	-58.5
Hydro (pumping excluded)		90794	99471	102706	104524	2357	1438	128	2.4	1.4	0.1
Wind		12769	98838	162297	216862	22706	40966	50052	29.8	33.8	30.0
Solar		176	1645	6890	17564	0	2177	7737	0.0	46.2	78.7
Thermal		352586	405813	402287	428174	-15822	-92294	-135679	-3.8	-18.7	-24.1
of which cogeneration units		88543	122181	160245	198118	-2518	-15304	4105	-2.0	-8.7	2.1
Solids fired		144882	113327	68770	75625	-3194	-48379	-78560	-2.7	-41.3	-51.0
Gas fired		125804	208661	223210	220727	-19291	-66413	-94652	-8.5	-22.9	-30.0
Oil fired		67470	54574	43216	36210	-4407	1487	6794	-7.5	3.6	23.1
Biomass-waste fired		13407	26235	62848	90529	9409	18284	27300	55.9	41.0	43.2
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3017	4243	5083	1661	2726	3440	122.4	179.7	209.3
Indicators											
Efficiency for thermal electricity production (%)		36.9	39.1	42.7	46.9	-1.4	-3.6	-1.1	-3.4	-7.7	-2.2
Load factor for gross electric capacities (%)		50.0	45.8	42.3	39.9	-2.8	-5.7	-6.0	-5.8	-11.9	-13.1
CHP indicator (% of electricity from CHP)		13.4	18.0	26.2	34.4	1.3	5.8	12.8	7.5	28.2	59.1
Non fossil fuels in electricity generation (%)		49.4	56.0	60.4	60.0	7.5	12.5	12.2	15.5	26.2	25.6
- nuclear		33.5	30.5	21.5	10.1	1.4	-1.6	-8.3	4.8	-6.8	-45.0
- renewable energy forms		15.9	25.5	38.9	49.8	6.1	14.1	20.5	31.6	56.8	70.0
Transport sector											
Passenger transport activity (Gpkm)	**4130.1**	**4997.7**	**5831.0**	**6636.1**	**7205.6**	-1.0	-9.8	-23.2	0.0	-0.1	-0.3
Public road transport	369.0	401.8	423.3	416.5	408.7	0.8	2.5	4.2	0.2	0.6	1.0
Private cars and motorcycles	3265.7	3928.0	4544.9	5164.4	5588.8	-0.9	-10.0	-22.9	0.0	-0.2	-0.4
Rail	309.8	351.3	395.7	430.1	459.5	-0.5	0.5	2.4	-0.1	0.1	0.5
Aviation	157.3	283.6	428.1	580.4	700.1	-0.3	-2.7	-6.7	-0.1	-0.5	-1.0
Inland navigation	28.4	33.0	39.1	44.7	48.5	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	11292	13219	14926	16696	18071	-2.5	-24.6	-58.1	0.0	-0.1	-0.3
Freight transport activity (Gtkm)	**1419.2**	**1825.6**	**2141.5**	**2480.9**	**2755.3**	-1.6	-10.5	-20.9	-0.1	-0.4	-0.8
Trucks	914.2	1309.3	1589.1	1888.2	2132.3	-1.1	-11.5	-24.2	-0.1	-0.6	-1.1
Rail	254.9	249.5	267.4	280.4	289.4	-0.7	-0.3	0.6	-0.3	-0.1	0.2
Inland navigation	250.1	266.8	284.9	312.3	333.7	0.2	1.2	2.6	0.1	0.4	0.8
Freight activity per unit of GDP (tkm/000 Euro'00)	203	213	206	193	184	-0.2	-0.8	-1.4	-0.1	-0.4	-0.8
Energy demand in transport (ktoe)	**252606**	**310102**	**341535**	**333798**	**322608**	-7689	-34034	-37583	-2.2	-9.3	-10.4
Public road transport	6250	5860	5925	5048	4259	-32	-309	-295	-0.5	-5.8	-6.5
Private cars and motorcycles	129911	146708	154543	147747	135981	-639	-4422	-4754	-0.4	-2.9	-3.4
Trucks	75351	100615	122725	127880	127035	-460	-12611	-18678	-0.4	-9.0	-12.8
Rail	6970	7579	6937	5121	4811	-176	-424	-322	-2.5	-7.6	-6.3
Aviation	27742	44025	45666	42012	44478	-6370	-16114	-13288	-12.2	-27.7	-23.0
Inland navigation	6383	5314	5740	5990	6043	-11	-154	-246	-0.2	-2.5	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	41.2	40.7	36.4	30.1	26.3	-1.2	-3.1	-2.5	-3.3	-9.4	-8.6
Freight transport (toe/Mtkm)	58.0	58.5	60.3	54.0	48.3	-0.2	-4.9	-6.5	-0.3	-8.4	-11.8

Source: PRIMES

NMS: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario						SUMMARY ENERGY BALANCE AND INDICATORS (A)					
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**169598**	**136955**	**136587**	**121807**	**117265**	**9808**	**-4215**	**-16105**	**7.7**	**-3.3**	**-12.1**
Solids	140913	103966	84471	46223	32860	-1798	-24864	-28720	-2.1	-35.0	-46.6
Oil	2614	3079	2347	2096	1814	-13	-35	-38	-0.6	-1.6	-2.0
Natural gas	6749	6084	5743	5067	4724	-15	-247	-65	-0.3	-4.7	-1.4
Nuclear	15481	14818	17254	17587	12922	0	-3890	-20299	0.0	-18.1	-61.1
Renewable energy sources	3841	9008	26771	50834	64945	11634	24820	33018	76.9	95.4	103.4
Hydro	1116	1355	1723	1858	1950	261	198	83	17.9	11.9	4.5
Biomass & Waste	2725	7609	21938	43745	55955	8849	20777	29482	67.6	90.5	111.4
Wind	0	1	1052	2064	3179	647	1002	145	159.7	94.3	4.8
Solar and others	0	35	243	354	509	78	53	-19	47.6	17.5	-3.6
Geothermal	0	8	1814	2812	3351	1798	2791	3326	11614.0	13295.0	13453.5
Net Imports	**68016**	**59470**	**83318**	**102105**	**107969**	**-16532**	**-34686**	**-46755**	**-16.6**	**-25.4**	**-30.2**
Solids	-14214	-15836	-8154	3055	3090	-5360	-1862	-9876	191.9	-37.9	-76.2
Oil	51224	45604	53058	57416	60901	-3881	-8886	-12131	-6.8	-13.4	-16.6
- Crude oil and Feedstocks	43747	41220	44150	48126	51146	-3375	-7417	-10203	-7.1	-13.4	-16.6
- Oil products	7477	4384	8908	9290	9755	-506	-1468	-1928	-5.4	-13.6	-16.5
Natural gas	31158	31202	40123	43619	47050	-7168	-23605	-24436	-15.2	-35.1	-34.2
Electricity	-152	-1500	-1709	-1986	-3072	-122	-334	-312	7.7	20.2	11.3
Gross Inland Consumption	**236229**	**196904**	**218763**	**222638**	**223878**	**-6724**	**-38901**	**-62860**	**-3.0**	**-14.9**	**-21.9**
Solids	128332	90799	76317	49278	35950	-7158	-26725	-38597	-8.6	-35.2	-51.8
Oil	51587	46785	54264	58239	61359	-3894	-8920	-12169	-6.7	-13.3	-16.5
Natural gas	37140	36994	45866	48687	51774	-7184	-23852	-24501	-13.5	-32.9	-32.1
Nuclear	15481	14818	17254	17587	12922	0	-3890	-20299	0.0	-18.1	-61.1
Electricity	-152	-1500	-1709	-1986	-3072	-122	-334	-312	7.7	20.2	11.3
Renewable energy forms	3841	9008	26771	50834	64945	11634	24820	33018	76.9	95.4	103.4
as % in Gross Inland Consumption											
Solids	54.3	46.1	34.9	22.1	16.1	-2.1	-6.9	-9.9	-5.8	-23.8	-38.2
Oil	21.8	23.8	24.8	26.2	27.4	-1.0	0.5	1.8	-3.8	1.9	6.9
Natural gas	15.7	18.8	21.0	21.9	23.1	-2.6	-5.9	-3.5	-10.9	-21.2	-13.1
Nuclear	6.6	7.5	7.9	7.9	5.8	0.2	-0.3	-5.8	3.1	-3.8	-50.2
Renewable energy forms	1.6	4.6	12.2	22.8	29.0	5.5	12.9	17.9	82.3	129.6	160.5
Electricity Generation in GWh_e	**316734**	**324333**	**378020**	**409943**	**440245**	**-22416**	**-111091**	**-190909**	**-5.6**	**-21.3**	**-30.2**
Nuclear	59996	57434	66876	68167	50086	0	-15079	-78687	0.0	-18.1	-61.1
Hydro & wind	12978	15771	32292	45782	60314	10564	13955	2657	48.6	43.8	4.6
Thermal (incl. biomass)	243760	251128	278851	295993	329846	-32980	-109967	-114879	-10.6	-27.1	-25.8
Fuel Inputs for Thermal Power Generation [1]	**73176**	**66652**	**71803**	**67602**	**66032**	**-4457**	**-17945**	**-18444**	**-5.8**	**-21.0**	**-21.8**
Solids	62206	56391	51913	30715	21459	-6681	-24981	-34666	-11.4	-44.9	-61.8
Oil (including refinery gas)	5236	3281	2728	1976	1679	-206	-378	-643	-7.0	-16.0	-27.7
Gas	5360	6292	7580	5995	4160	-4312	-12883	-11253	-36.3	-68.2	-73.0
Biomass & Waste	374	687	7792	26132	35410	4951	17513	24793	174.3	203.2	233.5
Geothermal heat	0	0	1791	2785	3324	1791	2785	3324			
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**93232**	**70786**	**70056**	**72298**	**74680**	**-2892**	**-8945**	**-12564**	**-4.0**	**-11.0**	**-14.4**
Refineries	47239	44972	47413	51294	54168	-3423	-7544	-10323	-6.7	-12.8	-16.0
Biofuels and hydrogen production	0	33	2230	4429	5704	963	1618	1850	76.0	57.6	48.0
District heating	17949	8544	8197	5567	5088	-317	-2789	-3998	-3.7	-33.4	-44.0
Others	28043	17236	12216	11008	9719	-116	-230	-92	-0.9	-2.0	-0.9
Energy Branch Consumption	**9477**	**12681**	**11998**	**11750**	**11750**	**-655**	**-1895**	**-2177**	**-5.2**	**-13.9**	**-15.6**
Non-Energy Uses	**10089**	**10135**	**10750**	**13368**	**15328**	**-35**	**-35**	**-54**	**-0.3**	**-0.3**	**-0.4**
Final Energy Demand	**155460**	**124696**	**146951**	**157141**	**165145**	**-4320**	**-26258**	**-41383**	**-2.9**	**-14.3**	**-20.0**
by sector											
Industry[1]	68606	45281	49658	57185	63655	6	-2160	-1777	0.0	-3.6	-2.7
- energy intensive industries	34503	28649	29269	32029	33670	23	-1073	-1009	0.1	-3.2	-2.9
- other industrial sectors	34103	16632	20389	25156	29986	-17	-1088	-768	-0.1	-4.1	-2.5
Residential	40986	34898	41558	42202	41984	-1287	-9542	-16188	-3.0	-18.4	-27.8
Tertiary	25276	21599	24260	23752	23620	-2606	-10886	-17207	-9.7	-31.4	-42.1
Transport	20592	22917	31476	34003	35885	-434	-3670	-6211	-1.4	-9.7	-14.8
by fuel [1]											
Solids	44176	21303	16652	13520	11152	75	-585	-1260	0.5	-4.1	-10.2
Oil	34795	33764	42235	45544	47839	-1970	-7096	-10143	-4.5	-13.5	-17.5
Gas	27229	25471	33048	37382	41101	-1460	-6851	-9196	-4.2	-15.5	-18.3
Electricity	20539	19641	24457	27817	29870	-1689	-8494	-15077	-6.5	-23.4	-33.5
Heat (from CHP and District Heating)	26534	18005	19222	18575	18911	-1064	-4360	-7423	-5.2	-19.0	-28.2
Other	2188	6512	11337	14303	16270	1788	1128	1716	18.7	8.6	11.8
CO2 Emissions (Mt of CO2)	**707.7**	**547.1**	**534.7**	**439.5**	**399.2**	**-56.3**	**-188.0**	**-244.8**	**-9.5**	**-30.0**	**-38.0**
Power generation/District heating	341.5	280.2	254.2	152.0	105.6	-44.0	-144.7	-185.8	-14.8	-48.8	-63.7
Energy Branch	14.3	17.9	7.9	7.5	7.7	-3.3	-3.7	-2.4	-29.4	-33.3	-24.1
Industry	153.7	96.1	100.6	109.5	114.3	-0.6	-5.0	-4.3	-0.6	-4.4	-3.6
Residential	86.4	50.6	53.3	49.2	45.6	-2.1	-10.9	-15.9	-3.9	-18.1	-25.9
Tertiary	53.5	37.2	33.2	33.3	35.3	-2.9	-9.3	-13.9	-8.1	-21.8	-28.3
Transport	58.2	65.1	85.5	88.1	90.7	-3.4	-14.4	-22.4	-3.8	-14.0	-19.8
CO2 Emissions Index (1990=100)	**100.0**	**77.3**	**75.6**	**62.1**	**56.4**	-8.0	-26.6	-34.6	-9.5	-30.0	-38.0

Source: PRIMES

NMS: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	75.039	74.853	73.401	71.813	70.628	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	312.8	374.8	555.3	820.6	1102.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	755.2	525.3	393.9	271.3	203.0	-12.1	-47.4	-57.0	-3.0	-14.9	-21.9
Gross Inl. Cons./Capita (toe/inhabitant)	3.15	2.63	2.98	3.10	3.17	-0.09	-0.54	-0.89	-3.0	-14.9	-21.9
Electricity Generated/Capita (kWh/inhabitant)	4221	4333	5150	5708	6233	-305	-1547	-2703	-5.6	-21.3	-30.2
Carbon intensity (t of CO_2/toe of GIC)	3.00	2.78	2.44	1.97	1.78	-0.18	-0.43	-0.46	-6.7	-17.7	-20.6
CO_2 Emissions/Capita (t of CO_2/inhabitant)	9.43	7.31	7.28	6.12	5.65	-0.77	-2.62	-3.47	-9.5	-30.0	-38.0
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	2262.2	1459.6	962.9	535.6	362.1	-101.4	-229.1	-222.0	-9.5	-30.0	-38.0
Import Dependency %	28.7	30.1	37.9	45.6	47.9	-6.2	-6.4	-5.8	-14.0	-12.4	-10.7
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	52.9	35.2	27.2	23.3	0.0	-1.0	-0.7	0.0	-3.6	-2.7
Residential (Energy on Private Income)	100.0	70.0	55.3	37.6	27.7	-1.7	-8.5	-10.7	-3.0	-18.4	-27.8
Tertiary (Energy on Value added)	100.0	65.9	49.8	32.4	23.2	-5.3	-14.8	-16.9	-9.7	-31.4	-42.1
Transport (Energy on GDP)	100.0	92.9	86.1	62.9	49.4	-1.2	-6.8	-8.6	-1.4	-9.7	-14.8
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.50	0.46	0.36	0.21	0.13	-0.05	-0.12	-0.14	-11.4	-37.6	-51.4
Final energy demand (t of CO_2/toe)	2.26	2.00	1.85	1.78	1.73	-0.01	0.04	0.07	-0.4	2.3	4.4
Industry	2.24	2.12	2.03	1.92	1.80	-0.01	-0.02	-0.02	-0.6	-0.8	-1.0
Residential	2.11	1.45	1.28	1.16	1.09	-0.01	0.00	0.03	-0.9	0.4	2.7
Tertiary	2.12	1.72	1.37	1.40	1.49	0.02	0.17	0.29	1.8	14.1	23.9
Transport	2.83	2.84	2.72	2.59	2.53	-0.07	-0.13	-0.16	-2.5	-4.7	-5.9
Electricity and steam generation											
Generation Capacity in MW_e		**73667**	**86923**	**97927**	**125130**	**585**	**-16563**	**-41609**	**0.7**	**-14.5**	**-25.0**
Nuclear		9324	8786	8786	6522	0	-1952	-10026	0.0	-18.2	-60.6
Hydro (pumping excluded)		6374	7385	7745	8009	565	395	204	8.3	5.4	2.6
Wind		16	5890	11080	16801	3631	4787	679	160.7	76.1	4.2
Solar		0	13	138	537	0	0	0	0.0	0.0	0.0
Thermal		57953	64849	70179	93261	-3610	-19794	-32465	-5.3	-22.0	-25.8
of which cogeneration units		24415	26107	29422	46649	-64	-3990	-7337	-0.2	-11.9	-13.6
Solids fired		43996	39035	23634	23180	-981	-16023	-33870	-2.5	-40.4	-59.4
Gas fired		6071	10952	12918	20351	-6534	-18667	-24403	-37.4	-59.1	-54.5
Oil fired		6832	7070	4608	3478	1	-1594	-2072	0.0	-25.7	-37.3
Biomass-waste fired		1055	7396	28404	45516	3508	15874	27144	90.2	126.7	147.7
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		0	396	616	735	396	616	735			
Indicators											
Efficiency for thermal electricity production (%)		32.4	33.4	37.7	43.0	-1.8	-3.2	-2.3	-5.0	-7.7	-5.1
Load factor for gross electric capacities (%)		50.3	49.6	47.8	40.2	-3.3	-4.2	-3.0	-6.2	-8.0	-7.1
CHP indicator (% of electricity from CHP)		23.5	29.3	33.3	46.7	2.6	2.3	6.8	9.8	7.5	17.1
Non fossil fuels in electricity generation (%)		23.3	35.7	63.7	70.0	10.9	33.3	32.2	44.1	109.9	85.1
- nuclear		17.7	17.7	16.6	11.4	1.0	0.7	-9.0	5.9	4.1	-44.2
- renewable energy forms		5.6	18.0	47.0	58.7	9.9	32.7	41.2	123.2	227.6	236.4
Transport sector											
Passenger transport activity (Gpkm)	**510.7**	**468.6**	**617.0**	**753.9**	**894.8**	-0.4	-2.3	-6.6	-0.1	-0.3	-0.7
Public road transport	135.1	78.3	72.7	67.2	63.3	0.1	0.6	1.0	0.2	0.9	1.7
Private cars and motorcycles	263.6	325.1	470.4	603.9	740.2	-0.3	-2.4	-6.6	-0.1	-0.4	-0.9
Rail	102.1	51.4	50.0	48.7	48.1	-0.2	-0.3	-0.5	-0.4	-0.5	-1.0
Aviation	9.0	13.3	23.2	33.4	42.4	0.0	-0.2	-0.5	-0.1	-0.5	-1.2
Inland navigation	0.8	0.6	0.7	0.7	0.8	0.0	0.0	0.0	0.0	-0.2	-0.5
Travel per person (km per capita)	6805	6261	8405	10498	12669	-5.3	-31.6	-93.1	-0.1	-0.3	-0.7
Freight transport activity (Gtkm)	**334.6**	**305.9**	**438.2**	**553.4**	**647.3**	-0.9	-3.9	-8.4	-0.2	-0.7	-1.3
Trucks	119.9	177.1	300.3	407.9	492.7	-0.6	-4.2	-8.2	-0.2	-1.0	-1.6
Rail	206.8	124.7	133.6	141.0	150.0	-0.3	0.2	-0.2	-0.2	0.1	-0.1
Inland navigation	7.9	4.2	4.3	4.5	4.6	0.0	0.0	0.1	0.2	0.6	1.1
Freight activity per unit of GDP (tkm/000 Euro'00)	1070	816	789	674	587	-1.6	-4.8	-7.6	-0.2	-0.7	-1.3
Energy demand in transport (ktoe)	**20592**	**22917**	**31476**	**34003**	**35885**	-434	-3670	-6211	-1.4	-9.7	-14.8
Public road transport	1591	1159	1059	856	665	-5	-61	-102	-0.5	-6.6	-13.3
Private cars and motorcycles	8290	11641	14897	16010	16471	-97	-721	-2645	-0.6	-4.3	-13.8
Trucks	7093	7453	12405	14483	15974	-59	-1857	-2698	-0.5	-11.4	-14.4
Rail	2096	1317	1161	856	742	-33	-118	-144	-2.7	-12.1	-16.2
Aviation	1190	1294	1898	1738	1972	-240	-912	-620	-11.2	-34.4	-23.9
Inland navigation	331	54	56	60	61	0	-1	-2	-0.1	-2.0	-3.9
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	23.9	31.4	29.7	25.1	21.6	-0.6	-2.2	-3.6	-1.8	-8.2	-14.3
Freight transport (toe/Mtkm)	25.0	26.7	30.0	27.3	25.5	-0.1	-3.3	-4.0	-0.4	-10.7	-13.5

Source: PRIMES

EU27: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (A)										
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**928078**	**937145**	**921475**	**745368**	**659716**	**43287**	**-5701**	**-72929**	**4.9**	**-0.8**	**-10.0**
Solids	364706	214324	149806	95701	73213	-16070	-47288	-58311	-9.7	-33.1	-44.3
Oil	128402	170011	122602	57545	49126	-823	-1627	-528	-0.7	-2.7	-1.1
Natural gas	162645	207644	180188	108674	88735	-4717	-852	-1015	-2.6	-0.8	-1.1
Nuclear	200702	243761	253537	182144	92355	0	-53548	-128952	0.0	-22.7	-58.3
Renewable energy sources	71623	101405	215342	301304	356287	64896	97614	115877	43.1	47.9	48.2
Hydro	25013	30483	33747	35931	36636	2030	1555	225	6.4	4.5	0.6
Biomass & Waste	43297	65264	143836	205824	241841	46683	71002	86476	48.1	52.7	55.7
Wind	67	1913	21849	35858	47831	6013	9457	9700	38.0	35.8	25.4
Solar and others	145	417	2155	3683	5663	641	810	1042	42.3	28.2	22.6
Geothermal	3101	3329	13755	20008	24316	9529	14789	18434	225.5	283.4	313.4
Net Imports	**749474**	**817569**	**955723**	**1024437**	**1003707**	**-92821**	**-247378**	**-311621**	**-8.9**	**-19.5**	**-23.7**
Solids	81418	98469	114336	84481	81423	-23642	-53058	-103250	-17.1	-38.6	-55.9
Oil	529724	525771	581141	603396	578897	-31088	-83047	-93480	-5.1	-12.1	-13.9
- Crude oil and Feedstocks	503451	507009	546639	579376	561349	-30785	-78213	-89822	-5.3	-11.9	-13.8
- Oil products	26273	18762	34502	24020	17548	-303	-4834	-3658	-0.9	-16.8	-17.2
Natural gas	135011	191643	258762	335454	342034	-37960	-110793	-114503	-12.8	-24.8	-25.1
Electricity	3321	1687	1484	1106	1353	-132	-480	-388	-8.2	-30.3	-22.3
Gross Inland Consumption	**1645474**	**1709133**	**1828917**	**1716767**	**1607793**	**-49534**	**-253079**	**-384550**	**-2.6**	**-12.8**	**-19.3**
Solids	450795	320708	264142	180182	154636	-39711	-100346	-161560	-13.1	-35.8	-51.1
Oil	624250	648970	655462	607902	572392	-31911	-84674	-94008	-4.6	-12.2	-14.1
Natural gas	294782	392603	438950	444129	430769	-42676	-111644	-115519	-8.9	-20.1	-21.1
Nuclear	200702	243761	253537	182144	92355	0	-53548	-128952	0.0	-22.7	-58.3
Electricity	3321	1687	1484	1106	1353	-132	-480	-388	-8.2	-30.3	-22.3
Renewable energy forms	71623	101405	215342	301304	356287	64896	97614	115877	43.1	47.9	48.2
as % in Gross Inland Consumption											
Solids	27.4	18.8	14.4	10.5	9.6	-1.7	-3.7	-6.3	-10.7	-26.3	-39.4
Oil	37.9	38.0	35.8	35.4	35.6	-0.8	0.3	2.2	-2.1	0.7	6.4
Natural gas	17.9	23.0	24.0	25.9	26.8	-1.6	-2.3	-0.6	-6.4	-8.3	-2.3
Nuclear	12.2	14.3	13.9	10.6	5.7	0.4	-1.4	-5.4	2.7	-11.3	-48.3
Renewable energy forms	4.4	5.9	11.8	17.6	22.2	3.8	7.2	10.1	47.0	69.7	83.6
Electricity Generation in GWh_e	**2561205**	**2993398**	**3432599**	**3402333**	**3399546**	**-169568**	**-761375**	**-1164871**	**-4.7**	**-18.3**	**-25.5**
Nuclear	794718	944823	982718	705992	357966	0	-207553	-499822	0.0	-22.7	-58.3
Hydro & wind	291642	376697	648026	842393	1002695	93524	131390	127266	16.9	18.5	14.5
Thermal (incl. biomass)	1474844	1671878	1801855	1853948	2038885	-263092	-685212	-792315	-12.7	-27.0	-28.0
Fuel Inputs for Thermal Power Generation [1]	**384763**	**402753**	**411161**	**384580**	**381354**	**-41268**	**-103433**	**-133845**	**-9.1**	**-21.2**	**-26.0**
Solids	261342	225135	191303	118631	102953	-36790	-96916	-156284	-16.1	-45.0	-60.3
Oil (including refinery gas)	56108	43691	33622	22549	22762	-157	-1690	2627	-0.5	-7.0	13.0
Gas	54301	109769	125195	130569	108191	-32101	-58655	-52112	-20.4	-31.0	-32.5
Biomass & Waste	10237	21219	47839	93415	123680	18263	39020	53417	61.8	71.7	76.0
Geothermal heat	2774	2939	13203	19416	23768	9518	14808	18508	258.3	321.4	351.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**840016**	**818581**	**815505**	**785664**	**754807**	**-23485**	**-69294**	**-77331**	**-2.8**	**-8.1**	**-9.3**
Refineries	673728	727122	718350	678534	646068	-32885	-82617	-93160	-4.4	-10.9	-12.6
Biofuels and hydrogen production	2	637	27052	47613	57752	10149	16289	20381	60.0	52.0	54.5
District heating	38458	19291	16990	11793	10690	1555	-2123	-4155	10.1	-15.3	-28.0
Others	127829	71530	53113	47723	40297	-2304	-844	-397	-4.2	-1.7	-1.0
Energy Branch Consumption	**78427**	**85834**	**84774**	**77467**	**72683**	**-3812**	**-11888**	**-14383**	**-4.3**	**-13.3**	**-16.5**
Non-Energy Uses	**98844**	**109187**	**110068**	**113779**	**115186**	**-318**	**-385**	**-402**	**-0.3**	**-0.3**	**-0.3**
Final Energy Demand	**1071205**	**1126314**	**1250593**	**1236854**	**1220091**	**-30567**	**-160334**	**-223173**	**-2.4**	**-11.5**	**-15.5**
by sector											
Industry[1]	372041	342654	374052	396305	414269	-18	-10216	-7667	0.0	-2.5	-1.8
- energy intensive industries	239834	220752	233732	239480	240878	530	-5291	-4453	0.2	-2.2	-1.8
- other industrial sectors	132206	121902	140321	156825	173391	-548	-4925	-3214	-0.4	-3.0	-1.8
Residential	267394	283857	314998	291827	273720	-8883	-61623	-93939	-2.7	-17.4	-25.6
Tertiary	151680	161545	178481	167664	156371	-13419	-49081	-75331	-7.0	-22.6	-32.5
Transport	280091	338258	383061	381059	375731	-8247	-39414	-46236	-2.1	-9.4	-11.0
by fuel [1]											
Solids	128087	58191	46554	39843	34089	-766	-1767	-2401	-1.6	-4.2	-6.6
Oil	441141	476894	507063	474771	446875	-24406	-74511	-88251	-4.6	-13.6	-16.5
Gas	219636	259889	280395	282992	288756	-10328	-43408	-54122	-3.6	-13.3	-15.8
Electricity	183815	216343	254278	256631	259847	-12308	-56851	-88046	-4.6	-18.1	-25.3
Heat (from CHP and District Heating)	67635	73194	79592	84270	87088	-4331	-8258	-14145	-5.2	-8.9	-14.0
Other	30892	41802	82711	98347	103436	21570	24463	23793	35.3	33.1	29.9
CO2 Emissions (Mt of CO2)	**4009.9**	**3800.2**	**3690.8**	**3222.1**	**2991.4**	**-352.0**	**-909.5**	**-1189.0**	**-8.7**	**-22.0**	**-28.4**
Power generation/District heating	1483.5	1359.8	1198.5	873.6	752.5	-235.6	-548.1	-762.0	-16.4	-38.6	-50.3
Energy Branch	151.1	154.0	117.2	91.6	77.2	-16.5	-30.1	-26.8	-12.4	-24.7	-25.8
Industry	761.0	594.1	592.1	590.4	588.9	-19.5	-48.5	-32.6	-3.2	-7.6	-5.2
Residential	516.6	459.7	475.6	425.5	384.8	-18.2	-84.2	-118.7	-3.7	-16.5	-23.6
Tertiary	285.7	247.7	250.1	237.0	225.4	-15.5	-44.2	-63.5	-5.8	-15.7	-22.0
Transport	812.0	984.9	1057.2	1004.1	962.7	-46.7	-154.3	-185.5	-4.2	-13.3	-16.2
CO2 Emissions Index (1990=100)	**100.0**	**94.8**	**92.0**	**80.4**	**74.6**	-8.8	-22.7	-29.7	-8.7	-22.0	-28.4

Source: PRIMES

EU27: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	472.712	483.520	492.838	496.408	494.784	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7358.9	9001.0	11044.1	13825.4	16315.6	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	223.6	189.9	165.6	124.2	98.5	-4.5	-18.3	-23.6	-2.6	-12.8	-19.3
Gross Inl. Cons./Capita (toe/inhabitant)	3.48	3.53	3.71	3.46	3.25	-0.10	-0.51	-0.78	-2.6	-12.8	-19.3
Electricity Generated/Capita (kWh/inhabitant)	5418	6191	6965	6854	6871	-344	-1534	-2354	-4.7	-18.3	-25.5
Carbon intensity (t of CO_2/toe of GIC)	2.44	2.22	2.02	1.88	1.86	-0.13	-0.22	-0.24	-6.2	-10.5	-11.3
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.48	7.86	7.49	6.49	6.05	-0.71	-1.83	-2.40	-8.7	-22.0	-28.4
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	544.9	422.2	334.2	233.1	183.3	-31.9	-65.8	-72.9	-8.7	-22.0	-28.4
Import Dependency %	44.6	46.7	50.9	57.9	60.3	-3.5	-5.0	-3.9	-6.4	-7.9	-6.1
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	80.2	74.4	63.1	56.2	0.0	-1.6	-1.0	0.0	-2.5	-1.8
Residential (Energy on Private Income)	100.0	87.2	79.1	59.1	47.2	-2.2	-12.5	-16.2	-2.7	-17.4	-25.6
Tertiary (Energy on Value added)	100.0	83.5	72.8	53.9	42.3	-5.5	-15.8	-20.4	-7.0	-22.6	-32.5
Transport (Energy on GDP)	100.0	98.7	91.1	72.4	60.5	-2.0	-7.5	-7.4	-2.1	-9.4	-11.0
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.23	0.17	0.14	-0.04	-0.07	-0.09	-13.9	-28.3	-37.8
Final energy demand (t of CO_2/toe)	2.22	2.03	1.90	1.82	1.77	-0.03	-0.03	0.00	-1.7	-1.5	-0.2
Industry	2.05	1.73	1.58	1.49	1.42	-0.05	-0.08	-0.05	-3.2	-5.2	-3.5
Residential	1.93	1.62	1.51	1.46	1.41	-0.01	0.02	0.04	-1.0	1.1	2.7
Tertiary	1.88	1.53	1.40	1.41	1.44	0.02	0.12	0.19	1.2	8.9	15.6
Transport	2.90	2.91	2.76	2.64	2.56	-0.06	-0.12	-0.16	-2.2	-4.4	-5.8
Electricity and steam generation											
Generation Capacity in MW_e		**697174**	**858317**	**907151**	**976112**	**8995**	**-76323**	**-180206**	**1.1**	**-7.8**	**-15.6**
Nuclear		145542	139130	109239	44737	0	-11530	-61700	0.0	-9.5	-58.0
Hydro (pumping excluded)		105185	116033	120324	122950	3657	2443	780	3.3	2.1	0.6
Wind		12786	105906	175121	236753	27100	46165	52250	34.4	35.8	28.3
Solar		176	1661	7042	18173	0	2177	7737	0.0	44.8	74.1
Thermal		433485	495587	495424	553499	-21762	-115579	-179274	-4.2	-18.9	-24.5
of which cogeneration units		120284	158752	203616	265176	-4890	-22101	-8999	-3.0	-9.8	-3.3
Solids fired		203503	165705	107873	116244	-4737	-64162	-115116	-2.8	-37.3	-49.8
Gas fired		135927	226407	241321	250416	-27962	-88377	-128882	-11.0	-26.8	-34.0
Oil fired		78309	65480	49024	40015	-4406	-127	4684	-6.3	-0.3	13.3
Biomass-waste fired		14723	34456	92151	140791	13161	33548	55650	61.8	57.2	65.4
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1022	3539	5056	6033	2183	3539	4389	160.9	233.3	267.1
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.7	41.5	46.0	-1.6	-3.3	-1.3	-4.0	-7.3	-2.7
Load factor for gross electric capacities (%)		49.0	45.7	42.8	39.8	-2.8	-5.5	-5.3	-5.7	-11.4	-11.8
CHP indicator (% of electricity from CHP)		14.9	19.7	28.0	37.2	1.1	5.2	11.4	6.0	23.1	44.2
Non fossil fuels in electricity generation (%)		46.4	53.3	60.1	60.3	7.9	14.9	14.4	17.5	33.0	31.3
- nuclear		31.6	28.6	20.8	10.5	1.3	-1.2	-8.3	4.9	-5.4	-44.0
- renewable energy forms		14.9	24.7	39.4	49.8	6.6	16.1	22.6	36.3	69.2	83.4
Transport sector											
Passenger transport activity (Gpkm)	**4769.3**	**5568.5**	**6594.5**	**7609.8**	**8393.5**	-1.5	-12.6	-31.4	0.0	-0.2	-0.4
Public road transport	554.1	502.3	518.0	508.1	500.7	1.0	3.8	6.6	0.2	0.7	1.3
Private cars and motorcycles	3567.1	4316.4	5125.0	5940.1	6555.0	-1.4	-13.8	-32.8	0.0	-0.2	-0.5
Rail	450.2	417.8	457.0	494.3	528.7	-0.8	0.5	2.8	-0.2	0.1	0.5
Aviation	168.5	298.4	454.7	621.9	759.7	-0.4	-3.0	-7.8	-0.1	-0.5	-1.0
Inland navigation	29.4	33.6	39.7	45.4	49.4	0.0	-0.1	-0.2	0.0	-0.2	-0.4
Travel per person (km per capita)	10089	11517	13381	15330	16964	-3.0	-25.3	-63.4	0.0	-0.2	-0.4
Freight transport activity (Gtkm)	**1861.5**	**2177.1**	**2682.1**	**3185.5**	**3611.7**	-2.7	-16.3	-34.0	-0.1	-0.5	-0.9
Trucks	1075.1	1507.0	1957.1	2407.7	2786.5	-1.9	-17.6	-37.8	-0.1	-0.7	-1.3
Rail	524.7	396.1	425.1	446.3	467.0	-1.1	-0.1	0.7	-0.2	0.0	0.2
Inland navigation	261.8	274.0	299.9	331.5	358.3	0.3	1.4	3.1	0.1	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	253	242	243	230	221	-0.2	-1.2	-2.1	-0.1	-0.5	-0.9
Energy demand in transport (ktoe)	**280091**	**338258**	**383061**	**381059**	**375731**	-8247	-39414	-46236	-2.1	-9.4	-11.0
Public road transport	8685	7514	7435	6318	5288	-38	-387	-456	-0.5	-5.8	-7.9
Private cars and motorcycles	139578	160719	173180	168756	158477	-754	-5332	-7826	-0.4	-3.1	-4.7
Trucks	85770	109568	139909	148898	151824	-539	-15562	-22856	-0.4	-9.5	-13.1
Rail	9564	9423	8377	6211	5811	-236	-580	-492	-2.7	-8.5	-7.8
Aviation	29449	45553	47959	44311	47602	-6669	-17381	-14291	-12.2	-28.2	-23.1
Inland navigation	7044	5481	6202	6565	6729	-12	-172	-315	-0.2	-2.6	-4.5
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.8	35.7	29.6	25.8	-1.2	-3.0	-2.6	-3.1	-9.3	-9.2
Freight transport (toe/Mtkm)	50.8	53.6	55.0	49.0	44.0	-0.2	-4.7	-6.0	-0.3	-8.8	-12.0

Source: PRIMES

EU28: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (A)										
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**961237**	**963855**	**952907**	**786124**	**710315**	**48607**	**381**	**-68405**	**5.4**	**0.0**	**-8.8**
Solids	377116	227617	159032	107383	86333	-17378	-49259	-60079	-9.9	-31.4	-41.0
Oil	132112	172757	125846	60927	52865	-823	-1627	-528	-0.6	-2.6	-1.0
Natural gas	162820	208170	181136	110029	90155	-4843	-852	-1015	-2.6	-0.8	-1.1
Nuclear	200702	243761	253537	182144	94915	0	-53548	-129861	0.0	-22.7	-57.8
Renewable energy sources	88487	111549	233356	325641	386047	71651	105666	123078	44.3	48.0	46.8
Hydro	27003	33138	37312	39714	40785	2447	1809	225	7.0	4.8	0.6
Biomass & Waste	57710	71804	150558	214149	251158	47391	71889	86947	45.9	50.5	52.9
Wind	67	1916	22327	36631	49251	6337	9489	9820	39.6	35.0	24.9
Solar and others	173	679	2917	6172	10263	608	123	-977	26.3	2.0	-8.7
Geothermal	3534	4012	20242	28974	34589	14868	22356	27063	276.6	337.8	359.6
Net Imports	**776740**	**868442**	**1021827**	**1115572**	**1125515**	**-97307**	**-263644**	**-343287**	**-8.7**	**-19.1**	**-23.4**
Solids	85626	107717	126310	95683	94417	-24349	-57690	-111375	-16.2	-37.6	-54.1
Oil	550163	555056	613319	649922	639475	-31895	-88340	-104825	-4.9	-12.0	-14.1
- Crude oil and Feedstocks	523502	528467	576540	622694	617793	-31540	-83166	-100437	-5.2	-11.8	-14.0
- Oil products	26661	26589	36778	27228	21682	-355	-5174	-4387	-1.0	-16.0	-16.8
Natural gas	137693	203694	281031	369095	390582	-40931	-117134	-126697	-12.7	-24.1	-24.5
Electricity	3259	1975	1168	873	1041	-132	-481	-390	-10.2	-35.5	-27.3
Gross Inland Consumption	**1704962**	**1786487**	**1925953**	**1848018**	**1779421**	**-48700**	**-263262**	**-411692**	**-2.5**	**-12.5**	**-18.8**
Solids	467717	343986	285342	203066	180750	-41727	-106949	-171454	-12.8	-34.5	-48.7
Oil	647159	679975	690384	657170	635930	-32718	-89967	-105353	-4.5	-12.0	-14.2
Natural gas	297637	405241	462167	479124	480738	-45774	-117985	-127712	-9.0	-19.8	-21.0
Nuclear	200702	243761	253537	182144	94915	0	-53548	-129861	0.0	-22.7	-57.8
Electricity	3259	1975	1168	873	1041	-132	-481	-390	-10.2	-35.5	-27.3
Renewable energy forms	88487	111549	233356	325641	386047	71651	105666	123078	44.3	48.0	46.8
as % in Gross Inland Consumption											
Solids	27.4	19.3	14.8	11.0	10.2	-1.7	-3.7	-5.9	-10.6	-25.2	-36.8
Oil	38.0	38.1	35.8	35.6	35.7	-0.8	0.2	1.9	-2.1	0.5	5.6
Natural gas	17.5	22.7	24.0	25.9	27.0	-1.7	-2.4	-0.8	-6.7	-8.3	-2.7
Nuclear	11.8	13.6	13.2	9.9	5.3	0.3	-1.3	-4.9	2.5	-11.7	-48.0
Renewable energy forms	5.2	6.2	12.1	17.6	21.7	3.9	7.2	9.7	48.0	69.1	80.8
Electricity Generation in GWh_e	**2618738**	**3118298**	**3596950**	**3621459**	**3722154**	**-178153**	**-801064**	**-1241743**	**-4.7**	**-18.1**	**-25.0**
Nuclear	794718	944823	982718	705992	367887	0	-207553	-503345	0.0	-22.7	-57.8
Hydro & wind	314786	407604	695044	895398	1067646	102142	134716	128663	17.2	17.7	13.7
Thermal (incl. biomass)	1509233	1765871	1919189	2020068	2286621	-280295	-728227	-867061	-12.7	-26.5	-27.5
Fuel Inputs for Thermal Power Generation [1]	**393649**	**424378**	**439589**	**423232**	**429290**	**-40570**	**-104300**	**-139610**	**-8.4**	**-19.8**	**-24.5**
Solids	266482	235098	199534	131546	121678	-38689	-103079	-165329	-16.2	-43.9	-57.6
Oil (including refinery gas)	57294	46624	35653	23641	23633	-70	-1694	2589	-0.2	-6.7	12.3
Gas	56793	118348	137012	145162	124786	-35250	-62037	-58611	-20.5	-29.9	-32.0
Biomass & Waste	10237	21304	48653	95561	126208	18579	39989	54303	61.8	72.0	75.5
Geothermal heat	2842	3004	18737	27322	32984	14859	22521	27437	383.2	469.1	494.6
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**867592**	**846345**	**852013**	**835921**	**819145**	**-24237**	**-73979**	**-87495**	**-2.8**	**-8.1**	**-9.7**
Refineries	696742	750941	751495	725235	706250	-33640	-87570	-103776	-4.3	-10.8	-12.8
Biofuels and hydrogen production	2	637	27165	48109	59210	10172	16511	20915	59.9	52.3	54.6
District heating	38458	19291	17026	11895	10865	1553	-2147	-4198	10.0	-15.3	-27.9
Others	132391	75474	56328	50682	42820	-2322	-773	-436	-4.0	-1.5	-1.0
Energy Branch Consumption	**80396**	**88538**	**87651**	**80987**	**76874**	**-3914**	**-12326**	**-15216**	**-4.3**	**-13.2**	**-16.5**
Non-Energy Uses	**101612**	**112692**	**113453**	**117743**	**119708**	**-324**	**-407**	**-420**	**-0.3**	**-0.3**	**-0.3**
Final Energy Demand	**1109885**	**1180941**	**1322945**	**1339114**	**1359554**	**-32114**	**-172169**	**-248967**	**-2.4**	**-11.4**	**-15.5**
by sector											
Industry[1]	384219	363322	401141	435772	474354	-106	-11540	-9475	0.0	-2.6	-2.0
- energy intensive industries	245670	228215	242029	249700	254092	517	-5505	-4638	0.2	-2.2	-1.8
- other industrial sectors	138549	135107	159112	186072	220263	-623	-6035	-4837	-0.4	-3.1	-2.1
Residential	281949	300854	334358	316905	304853	-8960	-64904	-102847	-2.6	-17.0	-25.2
Tertiary	154275	166339	186370	177964	168257	-14237	-52608	-81254	-7.1	-22.8	-32.6
Transport	289441	350426	401076	408472	412089	-8812	-43116	-55392	-2.1	-9.5	-11.8
by fuel [1]											
Solids	136126	68674	57892	48343	40292	-874	-2223	-3192	-1.5	-4.4	-7.3
Oil	458929	499706	536437	519098	505336	-25181	-79749	-99517	-4.5	-13.3	-16.5
Gas	220792	264489	292158	303953	322211	-10556	-46356	-59809	-3.5	-13.2	-15.7
Electricity	187680	224587	265968	273146	284281	-12900	-59901	-93958	-4.6	-18.0	-24.8
Heat (from CHP and District Heating)	67875	74443	80183	86562	91785	-4524	-7468	-13463	-5.3	-7.9	-12.8
Other	38483	49041	90308	108013	115649	21920	23528	20972	32.1	27.8	22.2
CO2 Emissions (Mt of CO2)	**4136.3**	**3998.9**	**3922.0**	**3528.4**	**3386.0**	**-369.9**	**-966.3**	**-1290.0**	**-8.6**	**-21.5**	**-27.6**
Power generation/District heating	1515.0	1431.1	1267.0	965.0	871.3	-250.4	-580.8	-813.5	-16.5	-37.6	-48.3
Energy Branch	155.8	159.9	119.4	92.2	77.7	-16.2	-30.1	-26.7	-12.0	-24.6	-25.6
Industry	796.2	650.1	664.6	681.3	712.1	-19.7	-54.2	-39.8	-2.9	-7.4	-5.3
Residential	538.0	481.6	500.6	459.2	426.7	-18.7	-88.9	-130.4	-3.6	-16.2	-23.4
Tertiary	291.5	255.8	261.1	248.5	234.5	-16.5	-46.7	-65.9	-5.9	-15.8	-22.0
Transport	839.9	1020.5	1109.4	1082.2	1063.6	-48.4	-165.7	-213.5	-4.2	-13.3	-16.7
CO2 Emissions Index (1990=100)	**100.0**	**96.7**	**94.8**	**85.3**	**81.9**	-8.9	-23.4	-31.2	-8.6	-21.5	-27.6

Source: PRIMES

EU28: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	528.913	550.981	569.992	582.152	587.546	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7511.4	9217.8	11370.5	14408.7	17374.7	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	227.0	193.8	169.4	128.3	102.4	-4.3	-18.3	-23.7	-2.5	-12.5	-18.8
Gross Inl. Cons./Capita (toe/inhabitant)	3.22	3.24	3.38	3.17	3.03	-0.09	-0.45	-0.70	-2.5	-12.5	-18.8
Electricity Generated/Capita (kWh/inhabitant)	4951	5660	6311	6221	6335	-313	-1376	-2113	-4.7	-18.1	-25.0
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.24	2.04	1.91	1.90	-0.14	-0.22	-0.23	-6.3	-10.3	-10.8
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.82	7.26	6.88	6.06	5.76	-0.65	-1.66	-2.20	-8.6	-21.5	-27.6
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	550.7	433.8	344.9	244.9	194.9	-32.5	-67.1	-74.2	-8.6	-21.5	-27.6
Import Dependency %	44.6	47.5	51.7	58.7	61.3	-3.6	-5.0	-4.0	-6.4	-7.9	-6.2
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.8	75.9	64.8	58.2	0.0	-1.7	-1.2	0.0	-2.6	-2.0
Residential (Energy on Private Income)	100.0	87.3	79.0	59.6	47.7	-2.1	-12.2	-16.1	-2.6	-17.0	-25.2
Tertiary (Energy on Value added)	100.0	84.3	74.1	55.2	43.0	-5.7	-16.3	-20.8	-7.1	-22.8	-32.6
Transport (Energy on GDP)	100.0	98.7	91.5	73.6	61.6	-2.0	-7.8	-8.3	-2.1	-9.5	-11.8
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.42	0.30	0.23	0.17	0.15	-0.04	-0.07	-0.08	-14.0	-27.2	-35.5
Final energy demand (t of CO_2/toe)	2.22	2.04	1.92	1.85	1.79	-0.03	-0.02	0.00	-1.6	-1.3	-0.1
Industry	2.07	1.79	1.66	1.56	1.50	-0.05	-0.08	-0.05	-2.8	-4.9	-3.4
Residential	1.91	1.60	1.50	1.45	1.40	-0.02	0.01	0.03	-1.0	0.9	2.4
Tertiary	1.89	1.54	1.40	1.40	1.39	0.02	0.12	0.19	1.2	9.1	15.7
Transport	2.90	2.91	2.77	2.65	2.58	-0.06	-0.11	-0.15	-2.1	-4.1	-5.5
Electricity and steam generation											
Generation Capacity in MW_e		**725459**	**900425**	**957061**	**1056260**	**11603**	**-81024**	**-188866**	**1.3**	**-7.8**	**-15.2**
Nuclear		145542	139130	109239	46000	0	-11530	-62150	0.0	-9.5	-57.5
Hydro (pumping excluded)		116592	128145	132944	136599	4211	2780	780	3.4	2.1	0.6
Wind		12806	107782	178604	245198	28362	46323	52943	35.7	35.0	27.5
Solar		176	1661	7073	18320	0	2177	7737	0.0	44.5	73.1
Thermal		450343	523708	529201	610142	-20971	-120774	-188177	-3.9	-18.6	-23.6
of which cogeneration units		122684	162956	216126	288839	-5607	-19614	-3022	-3.3	-8.3	-1.0
Solids fired		210547	175797	116975	134096	-4737	-67716	-123407	-2.6	-36.7	-47.9
Gas fired		143140	239383	260296	279462	-28226	-92502	-134955	-10.5	-26.2	-32.6
Oil fired		80801	68854	50998	41864	-4600	-247	4567	-6.3	-0.5	12.2
Biomass-waste fired		14814	34898	94115	146633	13241	34457	59266	61.1	57.8	67.8
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	4776	6817	8088	3352	5232	6352	235.4	330.2	366.0
Indicators											
Efficiency for thermal electricity production (%)		35.8	37.5	41.0	45.8	-1.8	-3.8	-1.9	-4.7	-8.4	-3.9
Load factor for gross electric capacities (%)		49.1	45.6	43.2	40.2	-2.9	-5.4	-5.3	-5.9	-11.2	-11.6
CHP indicator (% of electricity from CHP)		14.8	19.2	28.2	37.3	1.0	5.7	12.1	5.5	25.5	47.8
Non fossil fuels in electricity generation (%)		45.6	52.5	58.5	57.7	8.1	14.7	13.8	18.2	33.5	31.3
- nuclear		30.3	27.3	19.5	9.9	1.3	-1.2	-7.7	5.0	-5.6	-43.7
- renewable energy forms		15.3	25.2	39.0	47.8	6.8	15.8	21.4	37.0	68.5	81.2
Transport sector											
Passenger transport activity (Gpkm)	**4881.2**	**5752.9**	**6895.7**	**8248.6**	**9445.6**	-1.5	-16.3	-48.8	0.0	-0.2	-0.5
Public road transport	618.4	589.7	619.8	631.2	615.5	1.3	5.6	9.3	0.2	0.9	1.5
Private cars and motorcycles	3601.6	4397.4	5299.0	6392.6	7371.2	-1.7	-20.4	-56.4	0.0	-0.3	-0.8
Rail	456.6	423.6	465.7	516.5	573.9	-0.7	2.2	8.6	-0.1	0.4	1.5
Aviation	170.7	304.7	466.2	653.1	822.3	-0.4	-3.5	-9.9	-0.1	-0.5	-1.2
Inland navigation	33.9	37.4	45.0	55.2	62.7	0.0	-0.2	-0.4	0.0	-0.3	-0.7
Travel per person (km per capita)	9229	10441	12098	14169	16076	-2.7	-28.0	-83.1	0.0	-0.2	-0.5
Freight transport activity (Gtkm)	**1958.3**	**2352.3**	**2944.1**	**3590.4**	**4183.8**	-3.3	-21.6	-47.6	-0.1	-0.6	-1.1
Trucks	1159.5	1668.6	2201.9	2785.7	3319.9	-2.4	-23.5	-53.6	-0.1	-0.8	-1.6
Rail	532.6	405.9	437.0	465.2	495.3	-1.1	0.4	2.6	-0.2	0.1	0.5
Inland navigation	266.3	277.8	305.3	339.5	368.6	0.3	1.5	3.4	0.1	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	261	255	259	249	241	-0.3	-1.5	-2.7	-0.1	-0.6	-1.1
Energy demand in transport (ktoe)	**289441**	**350426**	**401076**	**408472**	**412089**	-8812	-43116	-55392	-2.1	-9.5	-11.8
Public road transport	9634	8758	8868	7856	6465	-42	-472	-654	-0.5	-5.7	-9.2
Private cars and motorcycles	140266	162549	176706	176690	170616	-778	-5645	-10361	-0.4	-3.1	-5.7
Trucks	92511	116941	151003	163487	169067	-616	-17518	-27653	-0.4	-9.7	-14.1
Rail	9807	9691	8629	6469	6269	-253	-615	-472	-2.9	-8.7	-7.0
Aviation	29928	46814	49402	46982	52413	-7110	-18675	-15888	-12.6	-28.4	-23.3
Inland navigation	7295	5673	6470	6988	7259	-13	-192	-364	-0.2	-2.7	-4.8
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.5	39.3	35.1	28.8	24.9	-1.2	-3.0	-2.7	-3.2	-9.4	-9.9
Freight transport (toe/Mtkm)	51.8	52.8	53.9	47.6	42.2	-0.2	-4.7	-6.2	-0.3	-8.9	-12.8

Source: PRIMES

EU30: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (A)										
ktoe	**1990**	**2000**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**	**2010**	**2020**	**2030**
						Difference from Baseline			**% Diff. from Baseline**		
Primary Production	**1091087**	**1200143**	**1184888**	**1031281**	**917909**	**26558**	**-28610**	**-91510**	**2.3**	**-2.7**	**-9.1**
Solids	377317	228042	159565	107648	86476	-17378	-49321	-60240	-9.8	-31.4	-41.1
Oil	216359	337714	257187	185246	134701	-1019	-1627	-528	-0.4	-0.9	-0.4
Natural gas	186970	253987	253663	202193	189670	-27311	-28841	-19426	-9.7	-12.5	-9.3
Nuclear	206883	250675	260487	187930	97190	-51	-54904	-134572	0.0	-22.6	-58.1
Renewable energy sources	103557	129725	253985	348264	409872	72317	106083	123256	39.8	43.8	43.0
Hydro	40003	48250	52599	56055	57385	2656	1767	-86	5.3	3.3	-0.1
Biomass & Waste	59720	74749	155696	220146	258102	48118	72780	88192	44.7	49.4	51.9
Wind	67	1919	22408	36787	49382	6062	9058	9062	37.1	32.7	22.5
Solar and others	173	703	2951	6220	10337	615	134	-962	26.3	2.2	-8.5
Geothermal	3595	4103	20331	29057	34666	14866	22345	27050	272.1	332.9	355.2
Net Imports	**695727**	**684878**	**846612**	**925933**	**970012**	**-77122**	**-240695**	**-329386**	**-8.3**	**-20.6**	**-25.3**
Solids	86632	108508	126951	96072	94651	-24522	-57838	-111563	-16.2	-37.6	-54.1
Oil	490237	412700	503382	545163	576321	-33281	-91513	-107936	-6.2	-14.4	-15.8
- Crude oil and Feedstocks	458354	384418	464338	516083	553378	-33044	-86077	-103284	-6.6	-14.3	-15.7
- Oil products	31883	28282	39044	29080	22943	-237	-5436	-4653	-0.6	-15.7	-16.9
Natural gas	117149	163941	216515	285150	299382	-19187	-90863	-109496	-8.1	-24.2	-26.8
Electricity	1710	-272	-237	-452	-342	-132	-481	-390	126.3	-1690.3	-806.5
Gross Inland Consumption	**1751588**	**1839144**	**1981660**	**1902243**	**1829998**	**-50564**	**-269305**	**-420896**	**-2.5**	**-12.4**	**-18.7**
Solids	468937	345317	286516	203720	181127	-41900	-107158	-171803	-12.8	-34.5	-48.7
Oil	669257	702393	710730	675438	653099	-34300	-93140	-108464	-4.6	-12.1	-14.2
Natural gas	301245	411306	470179	487343	489052	-46498	-119705	-128923	-9.0	-19.7	-20.9
Nuclear	206883	250675	260487	187930	97190	-51	-54904	-134572	0.0	-22.6	-58.1
Electricity	1710	-272	-237	-452	-342	-132	-481	-390	126.3	-1690.3	-806.5
Renewable energy forms	103557	129725	253985	348264	409872	72317	106083	123256	39.8	43.8	43.0
as % in Gross Inland Consumption											
Solids	26.8	18.8	14.5	10.7	9.9	-1.7	-3.6	-5.8	-10.5	-25.2	-36.9
Oil	38.2	38.2	35.9	35.5	35.7	-0.8	0.1	1.9	-2.2	0.3	5.5
Natural gas	17.2	22.4	23.7	25.6	26.7	-1.7	-2.3	-0.7	-6.7	-8.4	-2.7
Nuclear	11.8	13.6	13.1	9.9	5.3	0.3	-1.3	-5.0	2.5	-11.7	-48.4
Renewable energy forms	5.9	7.1	12.8	18.3	22.4	3.9	7.2	9.7	43.4	64.2	75.9
Electricity Generation in GWh_e	**2794856**	**3323905**	**3808057**	**3841949**	**3942340**	**-183532**	**-820391**	**-1275298**	**-4.6**	**-17.6**	**-24.4**
Nuclear	818651	971593	1009630	728396	376699	-199	-212806	-521587	0.0	-22.6	-58.1
Hydro & wind	465941	583374	873767	1087278	1262337	101372	129205	116232	13.1	13.5	10.1
Thermal (incl. biomass)	1510263	1768938	1924660	2026275	2303304	-284705	-736789	-869942	-12.9	-26.7	-27.4
Fuel Inputs for Thermal Power Generation [1]	**394358**	**425676**	**441549**	**425166**	**432673**	**-41037**	**-105712**	**-140563**	**-8.5**	**-19.9**	**-24.5**
Solids	266510	235114	199648	131546	121678	-38770	-103101	-165329	-16.3	-43.9	-57.6
Oil (including refinery gas)	57394	46636	35828	23705	23684	-54	-1699	2574	-0.1	-6.7	12.2
Gas	56913	118562	137019	145162	124829	-36112	-62972	-59222	-20.9	-30.3	-32.2
Biomass & Waste	10698	22359	50316	97432	129498	19039	39538	53977	60.9	68.3	71.5
Geothermal heat	2842	3004	18737	27322	32984	14859	22521	27437	383.2	469.1	494.6
Hydrogen - Methanol	0	0	0	0	0	0	0	0			
Fuel Input in other transformation proc.	**884427**	**866713**	**871130**	**854747**	**838011**	**-25821**	**-76360**	**-89820**	**-2.9**	**-8.2**	**-9.7**
Refineries	713481	771184	769866	742363	723154	-35327	-90448	-106614	-4.4	-10.9	-12.8
Biofuels and hydrogen production	2	637	27598	49449	60795	10270	17049	21482	59.3	52.6	54.6
District heating	38512	19379	17313	12238	11235	1558	-2181	-4244	9.9	-15.1	-27.4
Others	132432	75512	56353	50697	42826	-2323	-781	-444	-4.0	-1.5	-1.0
Energy Branch Consumption	**83789**	**92950**	**91899**	**84904**	**80214**	**-4315**	**-12896**	**-15610**	**-4.5**	**-13.2**	**-16.3**
Non-Energy Uses	**103762**	**115166**	**115660**	**119879**	**121885**	**-327**	**-412**	**-426**	**-0.3**	**-0.3**	**-0.3**
Final Energy Demand	**1145388**	**1220510**	**1365701**	**1381891**	**1401522**	**-33320**	**-176277**	**-254250**	**-2.4**	**-11.3**	**-15.4**
by sector											
Industry[1]	394004	375356	413656	449312	488352	-149	-11721	-9677	0.0	-2.5	-1.9
- energy intensive industries	252212	236839	250943	259213	263656	507	-5580	-4771	0.2	-2.1	-1.8
- other industrial sectors	141792	138517	162713	190099	224697	-656	-6140	-4906	-0.4	-3.1	-2.1
Residential	290806	310280	344501	326846	314323	-9076	-65801	-104234	-2.6	-16.8	-24.9
Tertiary	160718	172911	193984	185257	175225	-14802	-54237	-83521	-7.1	-22.6	-32.3
Transport	299860	361964	413560	420475	423621	-9293	-44519	-56819	-2.2	-9.6	-11.8
by fuel [1]											
Solids	137278	69933	58854	48958	40661	-956	-2372	-3479	-1.6	-4.6	-7.9
Oil	477192	518412	554787	535774	520850	-26141	-82534	-102279	-4.5	-13.3	-16.4
Gas	222317	266915	296062	308207	326922	-10632	-46971	-60335	-3.5	-13.2	-15.6
Electricity	200044	238509	281099	289328	300544	-13326	-61433	-96638	-4.5	-17.5	-24.3
Heat (from CHP and District Heating)	68198	75229	81278	87834	93576	-4405	-7662	-13829	-5.1	-8.0	-12.9
Other	40359	51512	93621	111789	118968	22141	24695	22310	31.0	28.4	23.1
CO2 Emissions (Mt of CO2)	**4207.7**	**4076.8**	**3999.6**	**3599.0**	**3452.1**	**-376.8**	**-980.5**	**-1303.3**	**-8.6**	**-21.4**	**-27.4**
Power generation/District heating	1515.7	1431.7	1268.4	965.6	872.0	-252.8	-583.3	-815.5	-16.6	-37.7	-48.3
Energy Branch	163.4	170.4	127.8	100.0	84.2	-17.4	-31.4	-27.5	-12.0	-23.9	-24.6
Industry	807.4	663.2	675.7	692.8	724.3	-20.4	-56.2	-41.8	-2.9	-7.5	-5.5
Residential	551.3	493.5	512.6	469.7	435.8	-19.0	-90.0	-131.5	-3.6	-16.1	-23.2
Tertiary	300.2	264.5	270.9	257.2	242.6	-17.2	-48.5	-68.0	-6.0	-15.9	-21.9
Transport	869.6	1053.4	1144.2	1113.7	1093.2	-50.0	-171.0	-219.1	-4.2	-13.3	-16.7
CO2 Emissions Index (1990=100)	**100.0**	**96.9**	**95.1**	**85.5**	**82.0**	-9.0	-23.3	-31.0	-8.6	-21.4	-27.4

Source: PRIMES

EU30: Combined 12% renewables share in 2010 and efficiency case Comparison to Baseline scenario	SUMMARY ENERGY BALANCE AND INDICATORS (B)										
	1990	2000	2010	2020	2030	2010	2020	2030	2010	2020	2030
						Difference from Baseline			% Diff. from Baseline		
Main Energy System Indicators											
Population (Million)	539.950	562.681	582.130	594.587	600.252	0.000	0.000	0.000	0.0	0.0	0.0
GDP (in 000 MEUR'00)	7877.3	9665.6	11898.8	15057.8	18137.4	0.0	0.0	0.0	0.0	0.0	0.0
Gross Inl. Cons./GDP (toe/MEUR'00)	222.4	190.3	166.5	126.3	100.9	-4.2	-17.9	-23.2	-2.5	-12.4	-18.7
Gross Inl. Cons./Capita (toe/inhabitant)	3.24	3.27	3.40	3.20	3.05	-0.09	-0.45	-0.70	-2.5	-12.4	-18.7
Electricity Generated/Capita (kWh/inhabitant)	5176	5907	6542	6462	6568	-315	-1380	-2125	-4.6	-17.6	-24.4
Carbon intensity (t of CO_2/toe of GIC)	2.40	2.22	2.02	1.89	1.89	-0.14	-0.22	-0.23	-6.3	-10.3	-10.7
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.79	7.25	6.87	6.05	5.75	-0.65	-1.65	-2.17	-8.6	-21.4	-27.4
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	534.2	421.8	336.1	239.0	190.3	-31.7	-65.1	-71.9	-8.6	-21.4	-27.4
Import Dependency %	38.9	36.4	41.7	47.3	51.4	-2.7	-5.1	-4.9	-6.1	-9.7	-8.7
Energy intensity indicators (1990=100)											
Industry (Energy on Value added)	100.0	81.7	75.8	64.8	58.1	0.0	-1.7	-1.2	0.0	-2.5	-1.9
Residential (Energy on Private Income)	100.0	87.4	79.0	59.7	47.8	-2.1	-12.0	-15.8	-2.6	-16.8	-24.9
Tertiary (Energy on Value added)	100.0	84.5	74.5	55.5	43.3	-5.7	-16.3	-20.7	-7.1	-22.6	-32.3
Transport (Energy on GDP)	100.0	98.4	91.3	73.4	61.4	-2.1	-7.8	-8.2	-2.2	-9.6	-11.8
Carbon Intensity indicators											
Electricity and Steam production (t of CO_2/MWh)	0.40	0.29	0.22	0.17	0.15	-0.04	-0.06	-0.08	-14.1	-27.6	-35.8
Final energy demand (t of CO_2/toe)	2.21	2.03	1.91	1.83	1.78	-0.03	-0.03	0.00	-1.6	-1.5	-0.3
Industry	2.05	1.77	1.63	1.54	1.48	-0.05	-0.08	-0.06	-2.9	-5.1	-3.6
Residential	1.90	1.59	1.49	1.44	1.39	-0.02	0.01	0.03	-1.0	0.8	2.3
Tertiary	1.87	1.53	1.40	1.39	1.38	0.02	0.11	0.18	1.2	8.8	15.3
Transport	2.90	2.91	2.77	2.65	2.58	-0.06	-0.11	-0.15	-2.0	-4.1	-5.5
Electricity and steam generation											
Generation Capacity in MW_e		**769539**	**948444**	**1007797**	**1106916**	**10635**	**-83442**	**-194642**	**1.1**	**-7.6**	**-15.0**
Nuclear		148992	142580	112689	47100	0	-11530	-64475	0.0	-9.3	-57.8
Hydro (pumping excluded)		155831	169704	176315	180413	4488	3001	1074	2.7	1.7	0.6
Wind		12886	108213	179658	246188	27252	44640	49965	33.7	33.1	25.5
Solar		195	1705	7184	18552	0	2177	7737	0.0	43.5	71.5
Thermal		451636	526242	531951	614663	-21105	-121731	-188944	-3.9	-18.6	-23.5
of which cogeneration units		123656	164368	217890	292553	-5422	-19649	-2696	-3.2	-8.3	-0.9
Solids fired		210703	175952	117053	134096	-4675	-67654	-123407	-2.6	-36.6	-47.9
Gas fired		143723	240860	261694	280702	-28577	-93213	-135632	-10.6	-26.3	-32.6
Oil fired		80968	69031	51099	41920	-4567	-213	4562	-6.2	-0.4	12.2
Biomass-waste fired		15202	35623	95290	149858	13362	34117	59180	60.0	55.8	65.3
Fuel Cells		0	0	0	0	0	0	0			
Geothermal heat		1040	4776	6817	8088	3352	5232	6352	235.4	330.2	366.0
Indicators											
Efficiency for thermal electricity production (%)		35.7	37.5	41.0	45.8	-1.9	-3.8	-1.8	-4.8	-8.4	-3.8
Load factor for gross electric capacities (%)		49.3	45.8	43.5	40.7	-2.8	-5.3	-5.1	-5.7	-10.8	-11.2
CHP indicator (% of electricity from CHP)		14.0	18.3	26.7	35.7	0.9	5.3	11.4	5.3	24.6	46.8
Non fossil fuels in electricity generation (%)		48.9	55.1	60.9	60.1	7.9	14.3	13.5	16.6	30.8	29.0
- nuclear		29.2	26.5	19.0	9.6	1.2	-1.2	-7.7	4.8	-6.1	-44.5
- renewable energy forms		19.6	28.6	41.9	50.5	6.6	15.5	21.2	30.3	59.0	72.0
Transport sector											
Passenger transport activity (Gpkm)	**5032.5**	**5925.5**	**7096.8**	**8471.5**	**9680.4**	-1.5	-16.6	-49.3	0.0	-0.2	-0.5
Public road transport	625.6	596.9	628.1	640.0	624.7	1.3	5.6	9.4	0.2	0.9	1.5
Private cars and motorcycles	3720.2	4530.1	5452.3	6562.0	7549.3	-1.8	-20.6	-56.9	0.0	-0.3	-0.7
Rail	473.5	443.8	488.6	541.0	599.3	-0.6	2.1	8.7	-0.1	0.4	1.5
Aviation	178.7	316.3	481.6	671.9	843.0	-0.4	-3.5	-10.0	-0.1	-0.5	-1.2
Inland navigation	34.5	38.4	46.2	56.5	64.1	0.0	-0.2	-0.4	0.0	-0.3	-0.7
Travel per person (km per capita)	9320	10531	12191	14248	16127	-2.6	-27.9	-82.1	0.0	-0.2	-0.5
Freight transport activity (Gtkm)	**2026.8**	**2447.9**	**3056.6**	**3721.3**	**4327.9**	-3.3	-22.3	-49.1	-0.1	-0.6	-1.1
Trucks	1179.2	1705.6	2253.2	2854.7	3404.8	-2.5	-24.1	-55.2	-0.1	-0.8	-1.6
Rail	544.1	419.3	452.8	481.7	511.9	-1.0	0.4	2.7	-0.2	0.1	0.5
Inland navigation	303.5	323.0	350.6	384.9	411.1	0.3	1.5	3.5	0.1	0.4	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	257	253	257	247	239	-0.3	-1.5	-2.7	-0.1	-0.6	-1.1
Energy demand in transport (ktoe)	**299860**	**361964**	**413560**	**420475**	**423621**	-9293	-44519	-56819	-2.2	-9.6	-11.8
Public road transport	9802	8917	9045	8019	6607	-43	-481	-664	-0.5	-5.7	-9.1
Private cars and motorcycles	145794	168062	182475	181959	175395	-805	-5809	-10515	-0.4	-3.1	-5.7
Trucks	94266	119351	154351	167319	173092	-635	-18003	-28363	-0.4	-9.7	-14.1
Rail	10142	10079	9018	6766	6539	-262	-642	-491	-2.8	-8.7	-7.0
Aviation	31627	49160	51470	48710	54082	-7532	-19376	-16398	-12.8	-28.5	-23.3
Inland navigation	8229	6394	7202	7701	7907	-15	-208	-387	-0.2	-2.6	-4.7
Efficiency indicator (activity related)											
Passenger transport (toe/Mpkm)	38.9	39.6	35.3	28.9	25.0	-1.2	-3.0	-2.7	-3.3	-9.5	-9.9
Freight transport (toe/Mtkm)	51.4	52.0	53.3	47.2	41.9	-0.2	-4.6	-6.1	-0.3	-9.0	-12.8

Source: PRIMES

(1) EUROSTAT Energy Balances do not take into account non-marketed steam, i.e. steam generated - either in boilers or in CHP plants - and used on site by industrial consumers. Using statistical information provided by EUROSTAT on CHP, the non-marketed steam generated in CHP units as well as the corresponding fuel input have been estimated for this study. In the PRIMES model, steam has been attributed to the demand side and the fuel input to the supply side. This approach ensures a better comparability of historical figures with the projections. However, slight differences exist for certain figures related to steam generation - both in terms of final energy demand and transformation input - in this report compared to EUROSTAT energy balances.

Disclaimer: Energy and transport statistics reported in this publication and used for the modelling are taken mainly from EUROSTAT and from the publication "EU Energy and Transport in Figures" of the Directorate General for Energy and Transport. Energy and transport statistical concepts have developed differently in the past according to their individual purposes. Energy demand in transport reflects usually sales of fuels at the point of refuelling, which can differ from the region of consumption. This is particularly relevant for airplanes and trucks. Transport statistics deal with the transport activity within a country but may not always fully include transit shipments. These differences should be borne in mind when comparing energy and transport figures. This applies in particular to transport activity ratios, such as energy efficiency in freight transport, which is measured in tonnes of oil equivalent per million tonne-km.

Abbreviations

GIC: Gross Inland Consumption
CHP: combined heat and power

Geographical regions
EU15: EU15 Member States
EU25: EU15 Member States + New Member States
NMS: New Member States (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia)
EU27: EU25 Member States + Bulgaria + Romania
EU28: EU27 + Turkey
Europe 30: EU28 + Norway + Switzerland

Units
toe: tonne of oil equivalent, or 10^{7} kilocalories, or 41.86 GJ (Gigajoule)
Mtoe: million toe

GW: Gigawatt or 10^{9} watt
kWh: kilowatt-hour or 10^{3} watt-hour
MWh: megawatt-hour or 10^{6} watt-hour
TWh: Terawatt-hour or 10^{12} watt-hour

t: metric tonnes, or 1000 kilogrammes
Mt: Million metric tonnes

km: kilometre
pkm: passenger-kilometre (one passenger transported a distance of one kilometre)
tkm: tonne-kilometre (one tonne transported a distance of one kilometre)
Gpkm: Giga passenger-kilometre, or 10^{9} passenger-kilometre
Gtkm: Giga tonne-kilometre, or 10^{9} tonne-kilometre

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