



GOVERNMENT OF SPAIN
MINISTRY OF ECOLOGICAL TRANSITION AND THE DEMOGRAPHIC CHALLENGE
Energy Saving and Diversification Institute (IDAE)

ANNEX I:

PART II, POINT 5: OBJECTIVES, STRATEGIES AND POLICY MEASURES

In accordance with Commission Delegated Regulation (EU) 2019/826 of 4 March 2019 amending Annexes VIII and IX to Directive 2012/27/EU of the European Parliament and of the Council on the contents of comprehensive assessments of the potential for efficient heating and cooling

TABLE OF CONTENTS

Introduction	2
1. Point 5 – planned contribution of the Member State to its national objectives, targets and contributions for the five dimensions of the energy union	3
1.1. Contribution of heating and cooling to decarbonising the economy	3
1.2. Contribution of heating and cooling to the renewable energy target	4
1.3. Contribution of heating and cooling to energy efficiency targets	4
1.4. Contribution of efficient and/or renewables-based heating and cooling to the other dimensions of the energy union: energy security, internal energy market, research, innovation and competitiveness	7
1.5. Contribution to Member States' long-term strategies: Article 15(4)(b) of Regulation (EU) 2018/1999	8

INTRODUCTION

Following the amendment of Annex VIII to Directive 2012/27/EU by Commission Delegated Regulation 2019/826, the required format for **national comprehensive assessments of the potential for efficiency in heating and cooling** includes a ‘Part II’, the contents of which include:

- Point 5 – planned contribution of the Member State to its national objectives, targets and contributions for the five dimensions of the energy union, as laid out in Article 3(2)(b) of Regulation (EU) 2018/1999, delivered through efficiency in heating and cooling, in particular related to points 1 to 4 of Article 4(b) and to paragraph (4)(b) of Article 15, identifying which of these elements is additional compared to integrated national energy and climate plans.

(As we will explain later, another point required under Part II by the Commission Delegated Regulation, point 6 – *General overview of the existing policies and measures* – is covered by Annex II).

1. POINT 5 – PLANNED CONTRIBUTION OF THE MEMBER STATE TO ITS NATIONAL OBJECTIVES, TARGETS AND CONTRIBUTIONS FOR THE FIVE DIMENSIONS OF THE ENERGY UNION

Planned contribution of the Member State to its national objectives, targets and contributions for the five dimensions of the energy union, as laid out in Article 3(2)(b) of Regulation (EU) 2018/1999, delivered through efficiency in heating and cooling, in particular related to points 1 to 4 of Article 4(b) and to paragraph (4)(b) of Article 15, identifying which of these elements is additional compared to integrated national energy and climate plans.

1.1. CONTRIBUTION OF HEATING AND COOLING TO DECARBONISING THE ECONOMY

	Unit	2030
Greenhouse gas emissions reduction targeted for 2030 (compared to 1990)	%	23
<i>Contribution of heating and cooling to this reduction target</i>	%	24*

* As a percentage of the 23% reduction shown in the line immediately above, which is the national emission reduction target stated in the National Energy and Climate Plan.

Source: authors' own

Methodology: We calculated the emissions from energy consumption associated with the use of heating and cooling in the industry, housing and services sectors in 1990 (the year against which the emission reduction target is benchmarked) and in 2030. In order to estimate the emissions associated with each use in 2030 with the required level of detail, we used the Times-Sinergia model projections, which was used to draw up the National Energy and Climate Plan, and more specifically its target scenario. To find out emissions from heating and cooling uses in 1990, we used the inventory of greenhouse gas emissions by sector. Where this inventory did not provide a sufficiently detailed breakdown by sector we made assumptions based on the Times-Sinergia model. Our final step was to calculate the CO₂e (carbon dioxide equivalent) reduction between the two years and the contribution to the overall CO₂e emissions reduction target.

1.2. CONTRIBUTION OF HEATING AND COOLING TO THE RENEWABLE ENERGY TARGET

	Unit	2015	2020	2025	2030
Share of renewable energy in gross final consumption of energy	%	16.00	20.08	29.85	42.19
<i>Share of renewable energy in gross final consumption of energy in heating and cooling</i>	%	16.84	17.86	24.72	31.23

Source: authors' own

Methodology: We used the results presented in the 2030 integrated National Energy and Climate Plan (NECP), which are based on Times-Sinergia projections. One of the results of the NECP's modelling is the share of renewable energy in gross final consumption of energy in heating and cooling in 2030, namely 31.23%.

1.3. CONTRIBUTION OF HEATING AND COOLING TO ENERGY EFFICIENCY TARGETS

1.3.1. AS PER ARTICLE 4(B)(1) OF REGULATION (EU) 2018/1999: THE INDICATIVE NATIONAL ENERGY EFFICIENCY CONTRIBUTION TO ACHIEVING THE UNION'S ENERGY EFFICIENCY TARGETS OF AT LEAST 32.5 % IN 2030 AS REFERRED TO IN ARTICLE 1(1) AND ARTICLE 3(5) OF DIRECTIVE 2012/27/EU

	Unit	2030
Energy efficiency savings target (primary energy) for 2030	Mtoe	64.2
Energy efficiency savings target (primary energy) for 2030 in %	%	39.5
<i>Estimated % of overall savings attributable to heating and cooling</i>	%	[40-45]

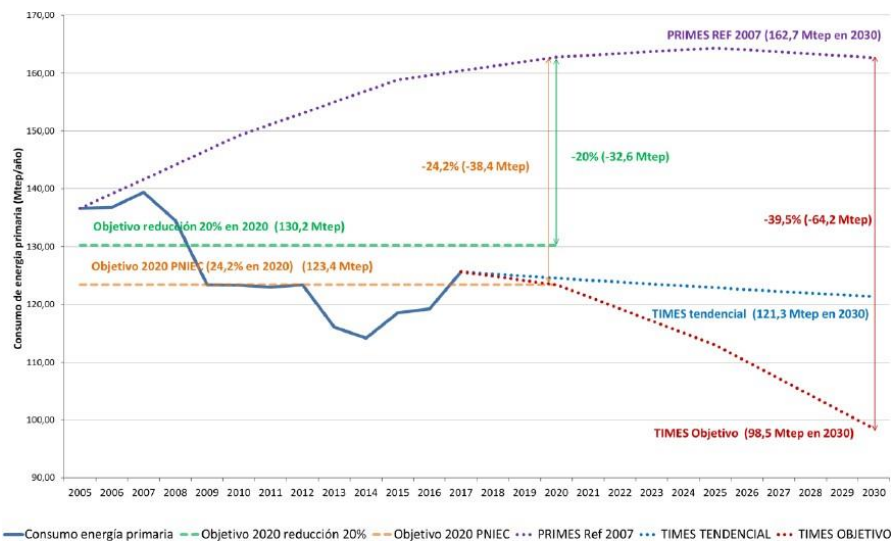
Source: authors' own

Methodology: Starting by using the model shown in Figure 1 to identify the contribution of heating and cooling to the energy efficiency savings target, we then calculated the difference between the two scenarios in terms of the energy consumption on heating and cooling projected for 2030. To do so we estimated the contribution of heating and cooling in the 2007 PRIMES REF model for Spain and the projection to 2030¹ for the industry, housing and services sectors.

¹ Wherever the model's output for Spain did not go down to the required level of detail, we had to use the assumptions applied in the model for the EU as a whole to break projected consumption for 2030 down by use between the industry, services and housing sectors.

We also calculated the contribution of heating and cooling to primary consumption in 2030 for the same sectors according to the Times-Sinergia model, which was used to draw up the National Energy and Climate Plan, and more specifically its target scenario. By applying a sensitivity analysis specifically targeting the assumptions used to break consumption down by use in the 2007 PRIMES REF model for Spain, we can obtain a reliable estimate of energy savings through heating and cooling uses: between 40% and 45%.

Figure 1: Spain's targets for 2030 according to the National Energy and Climate Plan



PRIMES REF 2007 (162,7 Mtep en 2030)	PRIMES REF 2007 (162.7 Mtoe in 2030)
xxx Mtep	xxx Mtoe
Objetivo reducción 20% en 2020 (130,2 Mtep)	Target of 20% reduction by 2020 (130.2 Mtoe)
Objetivo 2020 PNIEC (24,2% EN 2020) (123,4 Mtep)	NECP target for 2020 (24.2% by 2020, 123.4 Mtoe)
TIMES tendencial (121,3 Mtep en 2030)	TIMES baseline (121.3 Mtoe in 2030)
TIMES Objetivo (98,5 Mtep en 2030)	TIMES objective (98.5 Mtoe in 2030)
Consumo de energía primaria (Mtep/año)	Primary energy consumption (Mtoe per year)
Consumo energía primaria	Primary energy consumption
Objetivo 2020 reducción 20%	20% reduction targeted for 2020
Objetivo 2020 PNIEC	NECP 2020 target
PRIMES Ref 2007	PRIMES Ref 2007
TIMES TENDENCIAL	TIMES baseline
TIMES OBJETIVO	TIMES objective

Source: NECP 2030

1.3.2.AS PER ARTICLE 4(B)(2) OF REGULATION (EU) 2018/1999: THE CUMULATIVE AMOUNT OF END-USE ENERGY SAVINGS TO BE ACHIEVED OVER THE PERIOD 2021-2030 UNDER ARTICLE 7(1)(B) ON THE ENERGY SAVING OBLIGATIONS PURSUANT TO DIRECTIVE 2012/27/EU

	Unit	2030
Cumulative amount of end-use energy savings targeted for 2021-2030 under Article 7(1)(b) of Directive 2012/27/EU	ktoe	36 809
<i>Contribution of heating- and cooling-related measures to the 2021-2030 cumulative end-use energy savings target</i>	ktoe	14 124

Source: authors' own

Methodology: In accordance with Article 7 of the Energy Efficiency Directive, the NECP establishes a cumulative end-use energy savings target of 36 809 ktoe. The Plan establishes ten main energy efficiency measures that allow this target to be achieved. As a reduction in demand for heating and cooling is among the outcomes of those measures, we selected the relevant measures – from the industry, housing, services, agriculture and fisheries sectors – to allow us to estimate the share of the overall cumulative savings target attributable to end-use energy savings measures in heating and cooling, namely 14 124 ktoe.

1.3.3.AS PER ARTICLE 4(B)(3) OF REGULATION (EU) 2018/1999: INDICATIVE MILESTONES FOR THE LONG-TERM RENOVATION STRATEGY FOR THE NATIONAL STOCK OF RESIDENTIAL AND NON-RESIDENTIAL BUILDINGS

How the Spanish Building Sector Long-Term Energy Renovation Strategy (ERESEE 2020) contributes to savings milestones

Housing sector	Unit	2030
Overall housing sector savings target 2020-2050	GWh	64 154
Expected savings from heating and cooling uses in the housing sector	GWh	58 884.2
<i>Reduction in heating and cooling as a percentage of overall 2020-2050 savings target for the housing sector</i>	%	91.8

Source: authors' own

Services sector	Unit	2030
Overall services sector savings target 2020-2050	GWh	47 394.8
Expected savings from heating and cooling uses in the services sector	GWh	38 937.3
<i>Reduction in heating and cooling as a percentage of overall 2020-2050 savings target for the services sector</i>	%	82.2

Source: authors' own

Methodology: These calculations were based on the 2020-2050 energy consumption projections by type of use in the building sector (housing and services) shown in the Spanish Building Sector Long-Term Energy

Renovation Strategy (ERESEE 2020). The modelling was provided by the Ministry of Transport, Mobility and the Urban Agenda, with the collaboration of the Ministry of Ecological Transition and Demographic Challenge, which provided input from the projections performed using the Times-Sinergia model for the 2050 Long-Term Decarbonisation Strategy.

1.3.4. AS PER ARTICLE 4(B)(4) OF REGULATION (EU) 2018/1999: THE TOTAL FLOOR AREA TO BE RENOVATED OR EQUIVALENT ANNUAL ENERGY SAVINGS TO BE ACHIEVED FROM 2021 TO 2030 UNDER ARTICLE 5 OF DIRECTIVE 2012/27/EU ON THE EXEMPLARY ROLE OF PUBLIC BODIES' BUILDINGS

Contribution by public bodies to total floor area or equivalent energy savings

	Unit	2030
Total floor area of public buildings to be renovated in 2021-2030	m ² per year	300 000

Source: authors' own

Methodology: The NECP sets a target for renovating Spain's central authorities' building stock, as required by the Energy Efficiency Directive, of an estimated 2 220 000 m² over the 2021-2030 period covered by the NECP (and these are buildings with heating and cooling installations). That estimate reflects not only the inventoried floor area but also changes due to energy renovations carried out up to 2018 and the resulting reduction in non-energy-efficient floor space in central authority buildings. However, to ensure a level of ambition that is consistent with a decarbonised model in 2050, the Plan evaluates and promotes the savings that could be achieved by renovating 300 000 m² per year in central authority buildings. It also sets an annual renovation target of 3% for regional and local authorities.

1.4. CONTRIBUTION OF EFFICIENT AND/OR RENEWABLES-BASED HEATING AND COOLING TO THE OTHER DIMENSIONS OF THE ENERGY UNION: ENERGY SECURITY, INTERNAL ENERGY MARKET, RESEARCH, INNOVATION AND COMPETITIVENESS

As we will discuss in more detail under point 6, the measures that promote efficient or renewables-based heating and cooling fall, for the most part, within the decarbonisation (reduction of emissions and switching to renewables) and energy efficiency dimensions, and can be quantified within those dimensions. Indirectly, however, there are also fundamental synergies between these measures and the other dimensions of the Energy Union. These are discussed below, with further details under point 6.

In terms of security of energy supply, there is no doubt that efficient heating and cooling measures such as efficient cogeneration, district heating and efficiency initiatives, particularly in thermal installations, go a long way towards helping to reduce fuel consumption, and thus reducing reliance on imported energy.

Increasing the share of home-grown renewable sources of energy also makes the system less dependent on fossil fuel imports. That said, the increasing electrification of the systems used to meet some demands, one example being the use of heat pumps to meet thermal energy needs, increases electricity demand, which, along with the expected increase in power generation from renewable energy sources, does pose a challenge in terms of electricity system security and stability. The parallel development of energy storage and demand management are among the initiatives that are key to achieving the targets set.

Turning to the internal energy market, the current hydrocarbon transmission network and natural gas transmission infrastructure planning are components of internal market infrastructure and market connectivity that have an impact on the heating and cooling sector. There is no doubt that greater efficiency in transmission, minimising leakage and planning efficient networks that allow the progressive penetration of other energy carriers, such as green hydrogen, will bring greater efficiency in heating and cooling services, which we understand as also including the supply system. Similarly, the effective development and management of the electricity transmission network will play a key role in a future scenario where the expected trend is a shift toward electricity to meet certain thermal demands (e.g. the use of heat pumps in sectors such as housing or to meet specific demands in the industrial sector). Energy market reform initiatives – such as opening up and increasing competition in wholesale and retail markets, giving suitable price signals to end consumers, and removing the barriers to the development of self-consumption or consumers’ access to data for more efficient management and decision-making – will play a key role in this transition towards an increased role of electricity in meeting heating and cooling demands. Policies to develop energy storage and other systems that make electricity demand more flexible, including efficient heating and cooling systems, will make electricity services, and the electricity system as a whole, more efficient.

One final notable point at overall framework level is that research activities promote and benefit, albeit tangentially and indirectly, technological processes that result in innovative or competitive heating and cooling systems. This undoubtedly improves overall competitiveness and innovation, which is something that is difficult to quantify but that undoubtedly has a contribution to make.

1.5. CONTRIBUTION TO MEMBER STATES’ LONG-TERM STRATEGIES: ARTICLE 15(4)(B) OF REGULATION (EU) 2018/1999

	Unit	1990-2050
Greenhouse gas emission reduction 1990-2050	MtCO ₂ e	21 479.6
<i>Contribution of heating and cooling to the 1990-2050 reduction target</i>	%	16

Source: authors' own

Methodology: We calculated the emissions from energy consumption associated with the use of heating and cooling in the industry, housing and services sectors in 1990 (the year against which the emission reduction target is benchmarked) and in 2050. We calculated emissions per use for 2050 using the Times-Sinergia model projections, which were developed for the Long-Term Decarbonisation Strategy (2050) and have the required level of detail. To find out emissions from heating and cooling uses in 1990, we used the inventory of greenhouse gas emissions by sector. Where this inventory did not provide a sufficiently detailed breakdown by sector we made assumptions based on the Times-Sinergia model. Our final step was to calculate the CO₂e reduction between the two years and the contribution to the overall CO₂e emissions reduction target.