

NEMZETI FEJLESZTÉSI  
MINISZTERIUM

# **Hungary's National Energy Efficiency Action Plan until 2020**

**Mandatory reporting under Article 24(2) of Directive 2012/27/EU of the  
European Parliament and of the Council on energy efficiency**

**August 2015**

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## LIST OF ABBREVIATIONS

**BU** Bottom-Up mathematical method

**CCB** Change in Customer Behaviour

**CHP** combined heat and power

**DSM** Demand Side Management

**EED** Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

**ÉMI NKft.** Építésügyi Minőségellenőrző Innovációs Nonprofit Kft. [Non-Profit Company for Quality Control and Innovation in Construction]

**EPBD** Energy Performance of Buildings Directive

**ESCO** Energy Service Company

**ESD** the Energy Services Directive (Directive 2006/32/EC on energy end-use efficiency and energy services)

**EU** European Union

**GDP** Gross Domestic Product

**GEFS** Green Economy Financing Scheme

**GIS** Green Investment Scheme, system of tendering based on emissions trading revenues for climate protection

**KSH** Central Statistical Office

**MEKH** Hungarian Energy and Public Utility Regulatory Authority

**MNV** Hungarian National Asset Management Inc.

**NBES** National Building Energy System

**NEEAP** National Energy Efficiency Action Plan

**NFM** Ministry of National Development

**NREUAP** National Renewable Energy Utilisation Action Plan

**NRP** National Reform Programme

**NSDCP** National Statistical Data Collection Programme

**NTS** National Transport Strategy

**SMEs** Small and medium-sized enterprises

**TD** Top-Down mathematical method

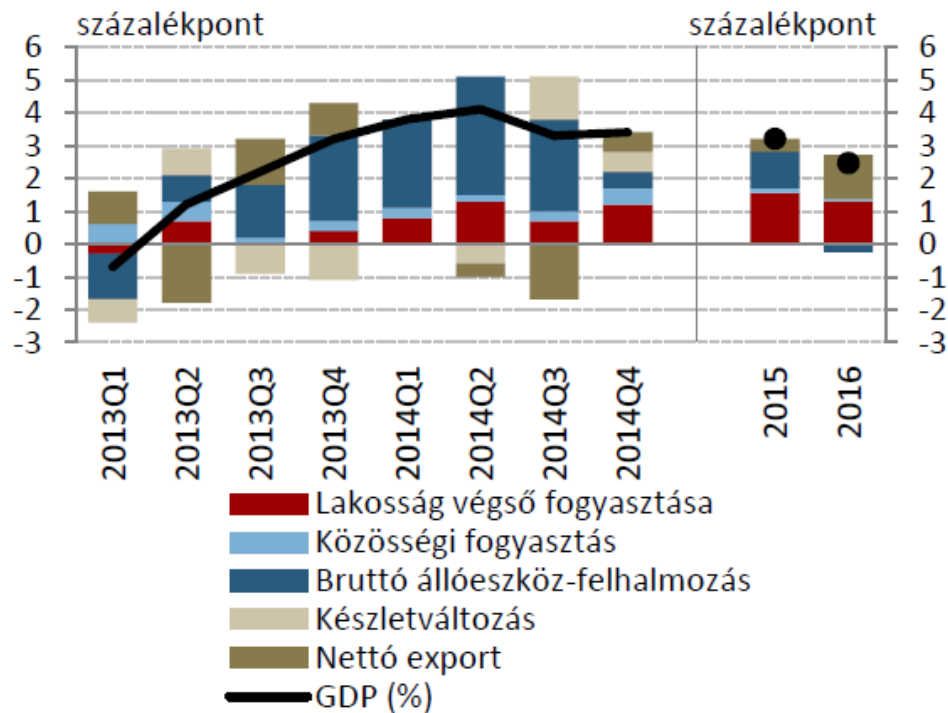
**TEEIAP** Transport Energy Efficiency Improvement Action Plan

## 1. INTRODUCTION & BACKGROUND INFORMATION

Article 24(2) of the EED provides that by 30 April 2014, and every three years thereafter, Member States shall submit National Energy Efficiency Action Plans. On the basis of that obligation, the 3<sup>rd</sup> National Energy Efficiency Action Plan ('**NEEAP**') must be submitted to the European Commission. The document also includes the report on progress in terms of end-use efficiency in comparison with the 9 % energy savings target to be met by 2016, determined on the basis of Directive 2006/32/EC of the European Parliament and of the Council on energy end-use efficiency and energy services (ESD).

## 1.1 Hungary's economic situation, influencing factors

In 2013 Q4, economic activity picked up in a wide range of economic sectors. In addition to export industries, economic output also increased in sectors producing to satisfy domestic demand (e.g. construction industry). The slowing down of potential growth for almost ten years in the past stopped in 2013, due principally to an increase in investment projects. The contribution of various sectors to economic growth is shown in the chart below. (Figure 1)



százalékpont	percentage point
Lakosság végső fogyasztása	Final residential consumption
Közösségi fogyasztás	Community consumption
Bruttó állóeszköz-felhalmozás	Gross fixed capital formation
Készletváltozás	Change in inventories
Nettó export	Net exports
GDO (%)	GDO (%)

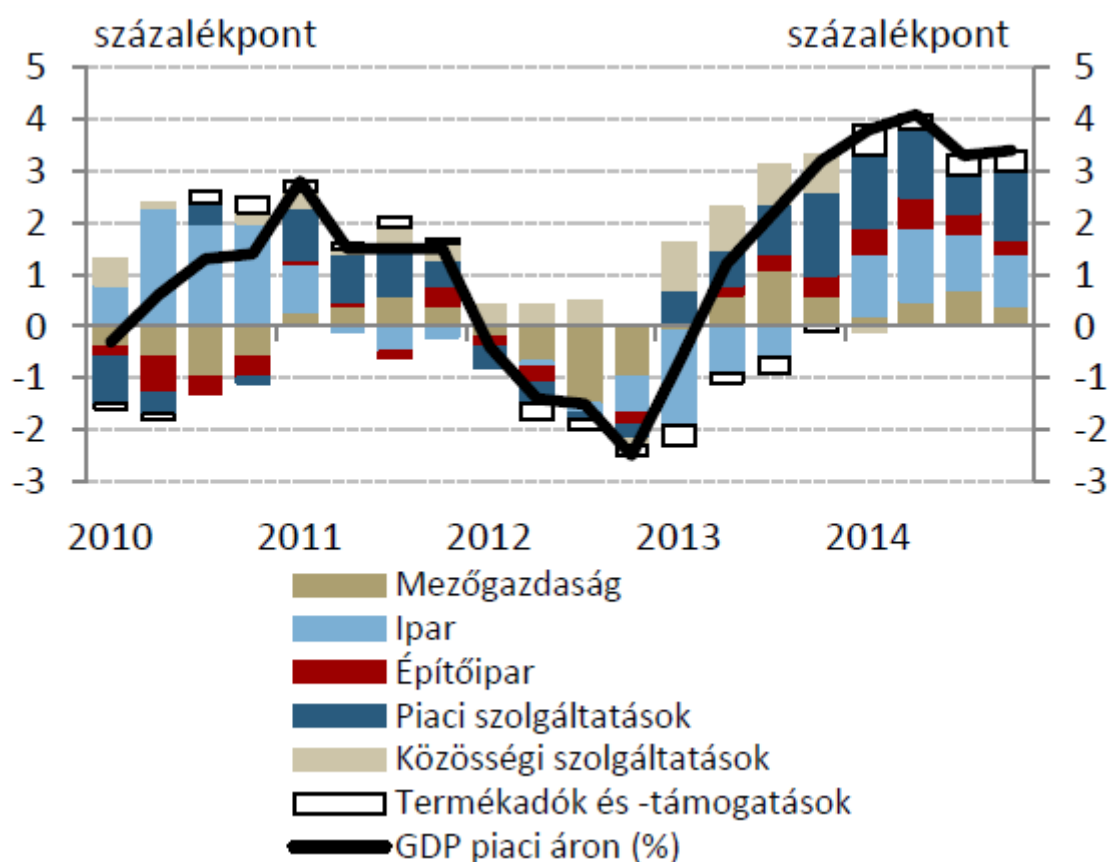
**Figure 1: Rate of economic growth**

Source: Report on inflation, Hungarian Central Bank, March 2015

Hungarian economic output continued to grow at the end of 2013. Compared to Q3, added value increased by 0.5 %. Growth in output was observed in a wide range of industries during the second half of 2013. In addition to the construction industry, agriculture and trade, industry and market services also made a positive contribution to the increase in gross domestic product during Q4.

From Q1 to Q3 2014, the output of the Hungarian economy grew by 3.6 % compared to the equivalent period of the previous year. According to the seasonally and calendar-adjusted indices used for international comparisons, Hungarian GDP increased by 3.4 % from January to September 2014 compared to the same period of the previous year.

In Q4 2014, gross domestic product in Hungary grew by 3.4 % compared to the same period of the previous year. There was a substantial increase in output in manufacturing, construction and agriculture. During the same period, according to seasonally and calendar-adjusted data, economic output increased compared to both the equivalent quarter of the previous year and to the previous quarter, by 3.4 % and 0.8 % respectively. In the whole of 2014, economic output grew by 3.6 % against the previous year<sup>1</sup>. (Figure 2)



százalékpont	percentage point
Mezőgazdaság	Agriculture
Ipar	Industry
Építőipar	Construction
Piaci szolgáltatások	Market services
Közösségi szolgáltatások	Community services
Termékadók és -támogatások	Product taxes and subsidies
GDP piaci áron (%)	GDP at market price (%)

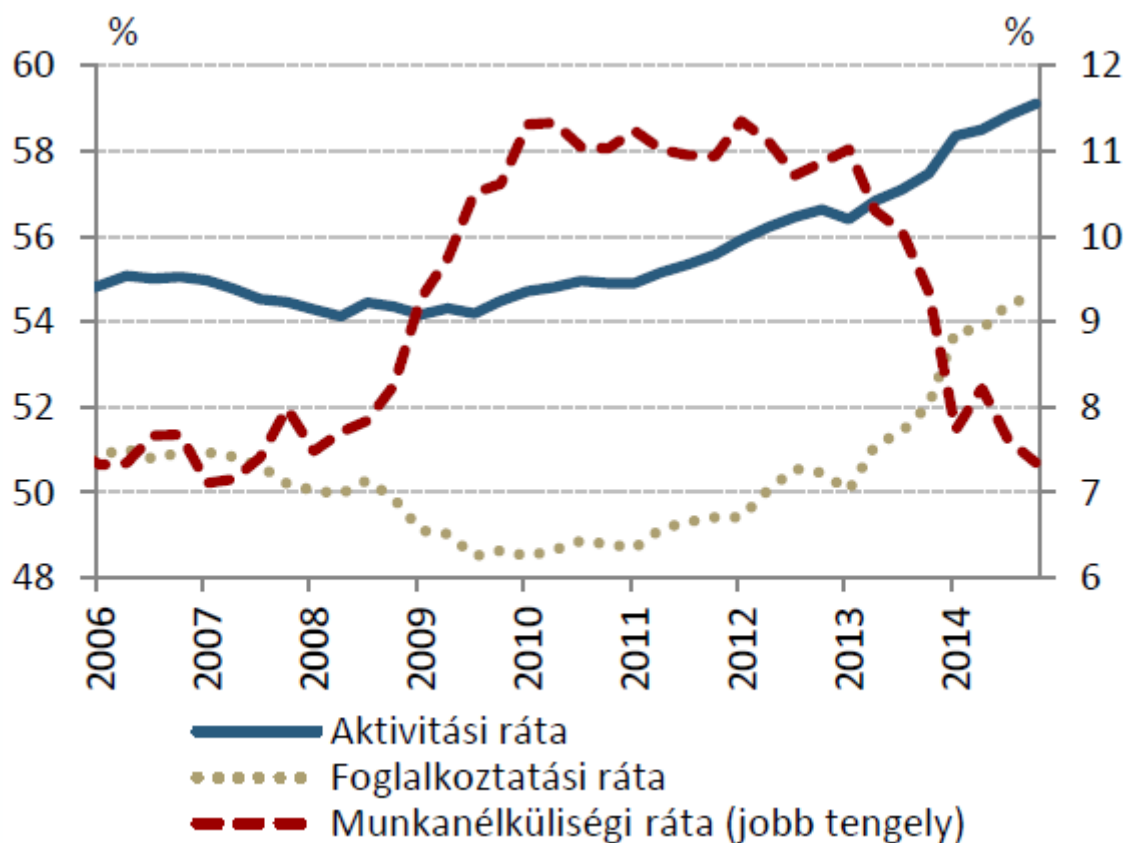
**Figure 2: Contribution of the output of major sectors of the national economy to GDP growth**

<sup>1</sup> Source of data and chart: Report on inflation, Hungarian Central Bank, March 2015

## Labour market situation & forecast

From November 2014 to January 2015, the number of unemployed declined by 54 000 to 330 000, whereas the unemployment rate decreased by 1.4 pps to 7.4 % compared to a year before (*Figure 3*). The rate of unemployment among men and women was nearly equal.<sup>2</sup>

According to the forecast, the rate of employment in the national economy will increase in 2015. The increase in employment in the competitive sector and workfare programmes may both contribute to growth in employment. Following economic recovery, there has been a steady increase in the number of persons employed in the competitive sector. Part-time employment may continue to gain ground. As businesses are cutting their payroll and other costs with a view to recovering profitability, modest wage dynamics are expected in 2015. According to forecasts, the rate of unemployment may remain near the 2014 level; an improvement of approximately 1 percentage point is expected.



Aktivítási ráta	Activity rate
Foglalkoztatási ráta	Employment rate
Munkanélküliségi ráta (jobb tengely)	Unemployment rate (right axis)

**Figure 3: Employment and unemployment in the national economy**

<sup>2</sup> Source of data and chart: Report on inflation, Hungarian Central Bank, March 2015



## 1.2. Energy policy

### Situation and objectives<sup>3</sup>

As a consequence of Hungary's geographical conditions and the lack of competitively extractable supplies of traditional energy sources, the long-term maintenance of the security of supply remains a chief priority. Over the time-frame of the National Energy Strategy 2030 ('Energy Strategy'), Hungary will probably continue to need to rely on energy imports, which would not present a major risk if appropriately diversified supply routes and supply sources were available. However, Hungary is in a vulnerable situation in terms of the supply of traditional energy sources (particularly natural gas) due to the sources and transit routes available in the medium term. The most efficient and effective way, also viable in the short term, of increasing the security of supply is to lower consumption and to treat energy conservation and energy efficiency as priorities.

As an open, export-oriented economy with low stocks of economically exploitable fossil fuels, Hungary obviously cannot be entirely independent in terms of energy supply. The cornerstones of reducing Hungarian energy imports are reducing energy consumption, improving energy efficiency, the greatest possible utilisation of domestic energy sources and the long-term maintenance of our nuclear energy capacities.

The Government's energy strategy objectives include guaranteeing the safe energy supply of Hungary, taking into account the country's economic competitiveness, environmental sustainability and the load-bearing capacity of consumers (*Figure 4*), while enabling a shift toward structural change in terms of energy.

The energy policy of the future should be developed on the basis of the answers to the most important domestic and global challenges and the energy policy efforts of the EU, also taking into consideration our specific geopolitical features. It should focus on achieving both a rationalised energy demand and an energy supply (infrastructure and supply) encouraging the growth of the Hungarian economy, ensuring the accessibility of the services and prices affordable to a large group of consumers. At the same time, through its positive impacts to economic growth, the development of the green economy gives a major economic stimulus.

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<sup>3</sup> This chapter is based on the National Energy Strategy, adopted by Decision No 77/2011 of 14 October 2011 of the Parliament, taking into consideration the amendment by Decision No 5/2015 of 20 March 2015 of the Parliament.



VIDÉKFEJLESZTÉS	RURAL DEVELOPMENT
OKTATÁS ÉS FOGLALKOZTATÁS	TRAINING AND EMPLOYMENT
ESZKÖZÖK	ASSETS
ELLÁTÁSBIZTONSÁG	SECURITY OF SUPPLY
VERSENYKÉPESSÉG	COMPETITIVENESS
FENNTARTHATÓSÁG	SUSTAINABILITY
GAZDASÁGÉLÉNKÍTÉS	ECONOMIC STIMULUS
KÖRNYEZET ÉS TERMÉSZETVÉDELEM	ENVIRONMENTAL PROTECTION AND NATURE CONSERVATION
TÁRSADALMI ÉS SZOCIÁLIS SZEMPONTOK	SOCIAL AND WELFARE CONSIDERATIONS

**Figure 4: Pillars of the Energy Strategy**

Source: National Energy Strategy 2030<sup>4</sup>

The path to the future is to ensure the lowering of energy consumption as a result of energy efficiency measures and the application of innovative technologies and to increase the carbon consciousness of stakeholders through targeted awareness-raising campaigns.

*The change of the energy structure should include:*

- energy efficiency measures spanning the entire supply and consumption chain;
- increasing the share of low CO<sub>2</sub>-intensive electricity generation based primarily on renewable sources of energy;
- promoting renewable and alternative methods of heat generation;
- increasing the share of low CO<sub>2</sub>-emission modes of transport.

By achieving the above four objectives, we could take a significant step toward the establishment of sustainable and safe energy systems, paying special attention to increasing the competitiveness of the economy.

<sup>4</sup> Decision No 77/2011 of 14 October 2011 of the Parliament on the National Energy Strategy, as amended by Decision No 5/2015 of 20 March 2015 of the Parliament

## Energy saving

The most efficient and effective way, also viable in the short term, of increasing the security of supply is to reduce consumption through improving energy conservation and energy efficiency.

Substantial energy saving measures, spanning the entire utilisation and consumption value chain and affecting both producers and consumers, are required in order to maintain the use of primary energy at the target level. This may reduce the country's vulnerability and dependency on the import of fossil fuels as well as decrease the volatility of domestic energy prices.

Awareness-raising also plays an important role in promoting energy conservation and reducing the environmental load of ecosystems. Through various tools from school education to adult training, as many people as possible should be encouraged to become environmentally conscious consumers.

In Hungary, 40 % of total energy consumption is currently consumed in buildings, about two-thirds of which is used for heating and cooling. Nearly 80 % of approximately 4.4 million Hungarian homes<sup>5</sup> fail to meet modern functional technical and thermal engineering requirements<sup>6</sup>, and the ratio is similar in public buildings. Heat-generation (heating, hot water supply and cooking) accounts for more than 80 % of household energy consumption, which is satisfied primarily by individual heating appliances powered by mains natural gas, firewood and communal district heating systems. According to a survey of buildings under the Building Energy National Strategy, the energy efficiency of buildings built between 1946 and 1980 is particularly poor and, of the latter, detached houses are the least efficient in terms of energy consumption. A number of energy efficiency measures have been implemented by Hungary with a view to improving the situation described above; a major modernisation of the energy efficiency of buildings may result in a breakthrough.

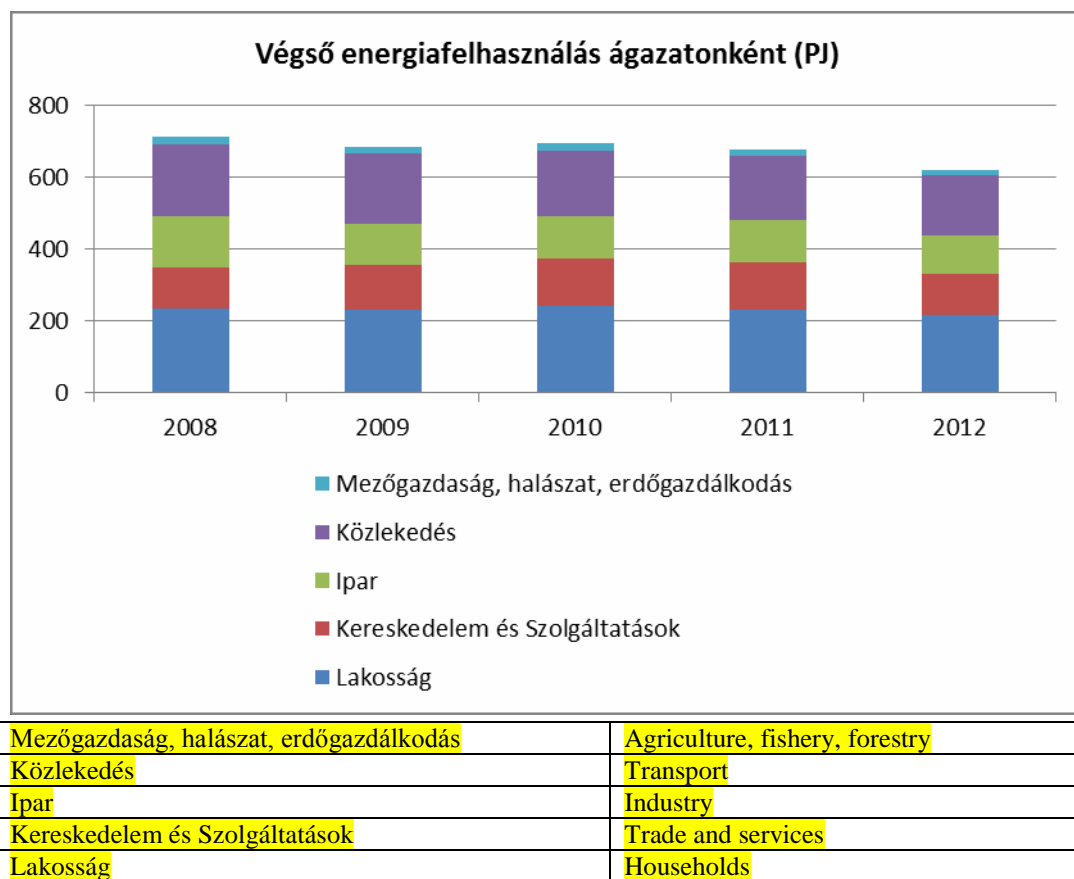
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<sup>5</sup> KSH data 2014

<sup>6</sup> Based on the survey of residential buildings under the Building Energy National Strategy, the share of homes in owner-occupied blocks built before 1946 and in detached houses built before 1990 compared to the number of all homes, where specific energy consumption is higher than 300 kWh/m<sup>2</sup>

## Energy consumption during the period between 2008 and 2012

Based on the national energy balance of the MEKH, energy consumption in Hungary declined significantly between 2008 and 2012 (*Figure 5*). In addition to the effects of economic crisis, this was partly due to energy efficiency measures. Favourable weather in winter both in 2012 and 2013 resulted in a substantially lower consumption of heating energy. However, despite existing and future efforts by the population and the industry, analyses calculate with a slow growth of energy demand in the long term<sup>7</sup>.



**Figure 5: Final energy consumption, 2008–2012<sup>8</sup>**

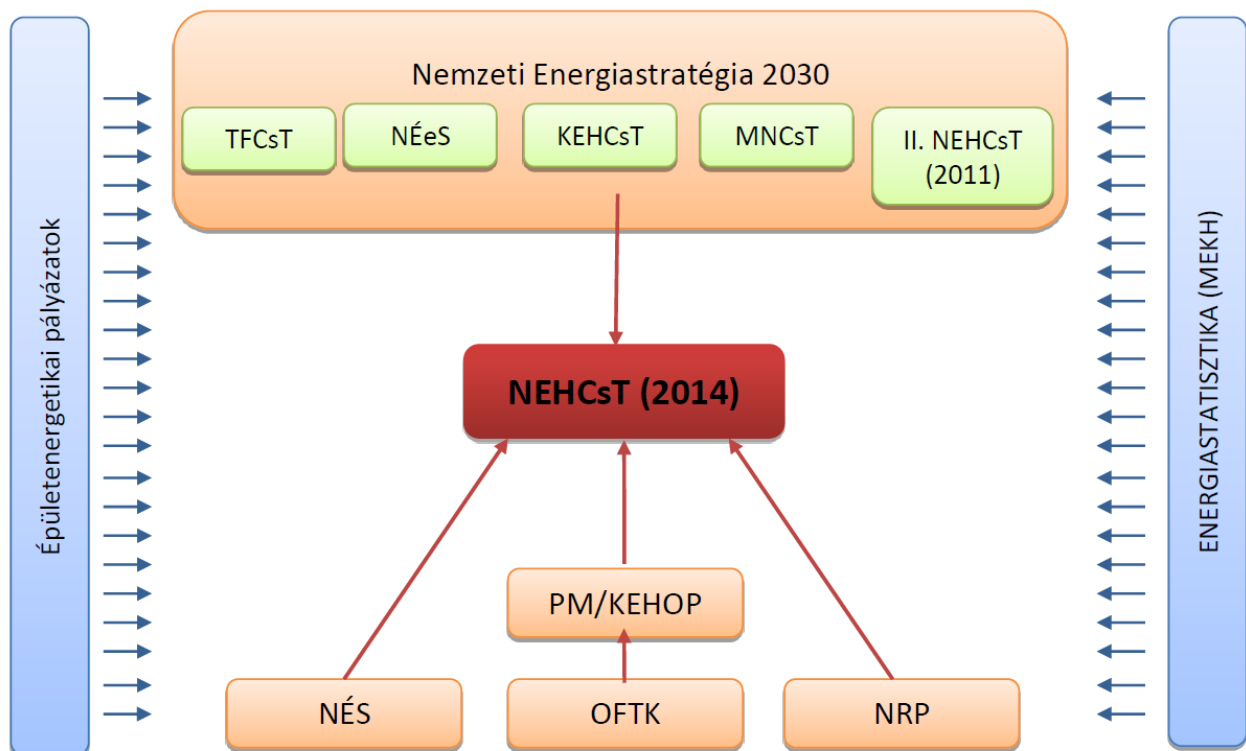
Source: MEKH national energy balance

<sup>7</sup> Government Resolution No 1160/2015 of 20 March 2015 on updating the energy consumption forecasts of the National Energy Strategy

<sup>8</sup> Explanatory note to Figure 5:

Final energy consumption need not include raw material-related and non-energy uses.

The NEEAP takes into account other policies and strategic documents relevant to energy efficiency (*Figure 6*)



Nemzeti Energiastratégia 2030	National Energy Strategy 2030
Épületenergetikai pályázatok	Building energy tenders
ENERGIASZTATISZTIKA (MEKH)	ENERGY STATISTICS (MEKH)

#### Key to acronyms

DHAP	District Heating Action Plan (draft)
BENS	Building Energy National Strategy
TEEIAP	Transport Energy Efficiency Improvement Action Plan (draft)
REUAP	Renewable Energy Utilisation Action Plan
2 <sup>nd</sup> NEEAP	Hungary's 2 <sup>nd</sup> National Energy Efficiency Action Plan (2011)
NEEAP	Hungary's 3 <sup>rd</sup> National Energy Efficiency Action Plan (2015)
NCCS	National Climate Change Strategy
NDRDC	National Development and Regional Development Concept
PA/EEEOP	Partnership Agreement / Environment and Energy Efficiency Operational Programme
NRP	National Reform Programme
MEKH	Hungarian Energy and Public Utility Regulatory Authority

**Figure 6: The NEEAP's links to policies – System of links between national energy policy strategies and action plans**

## 2. OVERVIEW OF NATIONAL ENERGY EFFICIENCY TARGETS AND SAVINGS

### 2.1 Indicative national 2020 energy efficiency target

Based on Article 3 of the EED, the indicative target notified in April 2013 for 2020 under the joint effort scenario was 1 113 PJ (expected value of primary energy use). That energy use forecast was notified on the basis of the Energy Strategy, based on 2008 data.

During the period since the drawing up of the National Energy Strategy, economic growth has been significantly lower than originally expected, which resulted in lower energy use. According to information by the KSH and the Hungarian Energy and Public Utility Regulatory Authority, factual data for 2012 show a value of 992 PJ for primary energy use, which represents 12 % decline in the primary energy demand compared to the 2008 initial data of the Energy Strategy.

On the basis of values in 2012, taking into account current trends, GDP forecasts and proposed energy efficiency measures and based on Government Resolution No 1160/2015 of 20 March 2015 on updating the energy consumption forecasts of the National Energy Strategy, **the target value of primary energy consumption in 2020 is 1 009 PJ** (under the 'joint effort' scenario). The target value for final energy consumption is 693 PJ.

Accordingly, the expected value of **gross final energy consumption** (the difference between primary energy consumption, conversion, calculation and grid losses and non-energy uses) in 2020 is 603 PJ/year.<sup>9</sup>

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<sup>9</sup> Data sourced from Government Resolution No 1160/2015 of 20 March 2015 on updating the energy consumption forecasts of the National Energy Strategy

## 2.2 Method of calculation

No harmonised methodology exists for the calculation of primary energy and final energy savings. The calculation and estimation techniques employed by Hungary on calculating energy savings were the ones included in the former Commission publication “Recommendations on Measurement and Verification Methods in the Framework of the Directive 2006/32/EC on Energy End-Use Efficiency and Energy Services”.

Energy savings were determined on the level of final energy consumption as the initial data required for the calculations are primarily available in the form of final energy consumption in the various data sources. No harmonised international methodology exists for the conversion to primary energy of final energy savings. The difference between the energy supply systems in various countries results in considerable differences in terms of the ratio of primary energy and final energy consumption. The latter ratio is primarily affected by the share of electric energy within the total energy consumption and the composition of electric energy sources (import to domestic ratio, CHP (combined heat and power) to individual production ratio etc.). (For example, a unit of electric energy savings may result in up to 2 to 3 times higher primary energy saving in a country where electric energy is generated in traditional thermal power plants than where the country’s total electric energy demand is supplied from imports or water power). Similarly, the conversion of energy savings determined on the level of final energy consumption to primary energy raises significant methodological issues as far as savings on national level are concerned and, particularly, on industry or sector-level energy savings. Therefore, in order to avoid unjustified distortions of data, energy savings have been determined on the level of final energy consumption only. In the light of the above technical problems of accounting, the estimated primary energy saving target for 2020 is also presented in accordance with the requirements concerning the drafting of the NEEAP (NEEAP III-ESD).

The NEEAP shows energy savings achieved by 2012, as 2012 was the last statistically closed year at the time the report was drawn up. Energy savings by 2012 were determined in two steps. During the drafting of the NEEAP II in 2011, calculations and estimates were drawn up enabling energy savings achieved during the period between 2008 and 2010 to be quantified.

Based on and accepting the results of the above calculations, during the drafting of the NEEAP (NEEAP III-ESD), the savings were determined for the period between 2010 and 2012. Total energy savings achieved by 2012 were the sum of these two calculation results.

**Final energy savings were determined essentially in accordance with guidelines according to the methodology recommended earlier by the Commission.** Consequently, both top-down (TD) and bottom-up (BU) indicators were employed everywhere this was possible. Concerning energy consumption methods whose energy demand is significantly affected by temperatures during the heating season, temperature adjustment was made using degree-day data. Within building energy savings, such adjustment was applied to room heating energy uses.

For investment projects, energy savings achieved were determined on the basis of available tender data basis (BU method). As known, however, energy savings are generated not only as a result of investment projects. A great deal of savings are due to increasing energy awareness, changing consumer habits, the savings-stimulating effects of changes of energy prices, DSM (Demand Side Management) activities, typically carried out by energy providers as well as a number of other factors. Such effects can only be observed on a collective basis. Since they are virtually impossible to separate in a reliable manner, the resulting energy savings effects can collectively be treated as effects of CCB (Change in Customer Behaviour). Therefore, TD indicators, as presented in the recommended methodology, were employed in order to determine energy consumption in the various sectors and industries. The results calculated based on TD indicators, however, include both CCB and investment effects and, therefore, in order to avoid any duplication, investment-related savings based on project databases were not repeatedly taken into consideration in the industries concerned. Similarly, in order to avoid duplication, the results of intersectoral horizontal measures were not included separately, as their effects are already included in sectoral results.



For the calculation of energy savings TD indicators, data made available by the Hungarian Energy and Public Utility Regulatory Authority (MEKH), the body operating the Hungarian energy statistics data collection system were primarily used. Such data are in agreement with the national energy balance calculations and they also serve as the basis for the system of Eurostat data concerning Hungary. In addition to energy statistics data, data published or disclosed by the Central Statistical Office (KSH) (e.g. demographic data, data concerning the housing stock etc.) were used for the generation of indicators. The above two main data sources were supplemented by other information drawn from various government strategies, policies and action plans and technical studies drawn up by independent analytical research institutes. The basic data of BU indicators come from project databases (their results, however, were not independently included in order to avoid duplication but were only calculated for purposes of verification).

## 2.3 Overall primary energy consumption in 2020 and values by specific industries

(EED Article 24(2))

Since Hungary's previous energy documents, which were approved by the government and the European Commission, set out the country's energy targets for primary energy consumption, as allowed by the EDD, the current target is also based on primary energy consumption.

The sectoral energy consumption data for 2008–2012 and 2020 are based on the energy consumption forecasts in Annex 1 to Government Resolution No 1160/2015 of 20 March 2015 (see Table 1).

According to our calculations, the following energy savings target figures should be used:

- The primary energy consumption difference under the revised National Energy Strategy 2030 'Sitting and waiting' and 'Joint effort' scenarios is 92 PJ, whereas calculated in terms of final energy consumption, selected as the basis for our energy efficiency commitments, it is 73 PJ by 2020.
- In terms of reducing GHG emissions, taking 1990 as the base, for energy efficiency targets by 2020, savings in primary energy consumption amount to 16.2 %.

<b>Unit: PJ</b>	<b>2008</b>	<b>2012</b>	<b>2020</b>
<b>Primary energy consumption</b>	<b>1 120</b>	<b>992</b>	<b>1 009</b>
<b>Final energy consumption*</b>	<b>704</b>	<b>600</b>	<b>603</b>
Industry	139	96	114
Transport	192	157	147
Residential	233	215	207
Trade & services	117	116	118
Agriculture and fishery	22	17	17

\* Excluding non-energy fuel consumption

**Table 1: Actual data for 2008–2012 and expected energy consumption by 2020 in specific industries<sup>10</sup>**

<sup>10</sup> Data sourced from Government Resolution No 1160/2015 of 20 March 2015 on updating the energy consumption forecasts of the National Energy Strategy

The above values are confirmed by the estimated energy consumption value for 2020 based on the PRIMES model amended in 2007. According to Hungarian data of the 2013 version of the model, savings in primary energy consumption amount to 10.4 %.

## 2.4 Final energy savings

(Article 4(1) to (4) of Directive 2006/32/EC (ESD), EED Article 27(1) and EED Annex XIV Part 2, 2(b))

Sector/Industry/Groups of measures	Savings achieved by 2008–2012 (PJ)	National target for 2012–2016 (PJ)	National target*** for 2012–2020 (PJ)
Residential	29.7	20.0	40.0
Industry	13.1*	5.0	10.0
Transport	26.6**	7.0	14.0
Agriculture, trade, services and other industries, including public bodies	9.9*	4.5	9.0
<b>Total</b>	<b>79.3</b>	<b>36.5</b>	<b>73.0</b>

**Table 2: Estimated final energy savings by 2008–2012<sup>11</sup> and proposed final energy savings by 2016 and 2020**

\* *The revision of 2012 is expected to substantially reduce savings in Industry and increase savings in Other sectors*

\*\* *Savings data for Road transport was based on the technical distribution based on the vehicle stock, which may overestimate savings*

*Savings targets from the Government's energy consumption forecasts, approved by Government Resolution No 1160/2015 of 20 March 2015, based on the 'Sitting and waiting' and the 'Joint effort' scenarios*

Source: For achieved savings: MEKH calculation

For residential consumption, savings were determined taking climatic differences into account. Savings were taken into consideration on the basis of projecting consumption to the housing stock registered by the Statistical Office (KSH).

<sup>11</sup> Due to effects of the economic crisis, actual energy consumption data are significantly lower than the forecast. That decline, however, was primarily the result of the shrinking of economy and decline in consumption. Therefore, the decline in energy consumption due to the actual improvement of energy efficiency cannot be accurately established.

For Industry, consumptions in the energy statistics, broken down to sub-sectors, were projected on the industrial output data for the same sub-sectors as registered by the KSH; the indicator thus takes into account the effects of the crisis through the decline of industrial output. Calculations include data for industrial companies under the ETS. Due to methodology-related comparability problems of energy statistics between 2008 and 2012 and accounting problems between the Industry and Other sectors, actual savings may be lower than the calculated level.

During the calculation of data for the Transport sector, energy consumption data were projected on road, rail and water transport performance as registered by the KSH. In road transport, technical distribution based on changes of the vehicle stock was the only alternative, whereas in rail transport, the share of passenger and freight transport is an estimated value within energy consumption.

In the case of Agriculture, savings were determined by projecting energy consumption on added value. For the Trade and public utilities sector, savings were determined by projecting energy consumption on aggregated sector-level employment data, while energy consumption other than electric energy was adjusted by climatic data.

### **3. POLICY MEASURES IMPLEMENTING EED**

#### **3.1 Horizontal measures**

##### **3.1.1 Energy efficiency obligation schemes and alternative policy measures**

(EED Article 7, Annex XIV Part 2, Section 3.2)

On the basis of Article 7 of the Energy Efficiency Directive, the savings target for final customers must be at least equivalent to achieving new savings each year of 1.5 % of the annual energy sales to final customers of all energy distributors or all residential energy sales companies by volume, averaged over the most recent three-year period prior to 1 January 2013 (2010–2012). That obligation is the basis of performance by the Member State, which may be met by implementing an energy efficiency obligation scheme and/or applying alternative policy measures.

The level of the obligation is determined as a result of the following steps:

- calculating the energy consumption of final consumers by volume, averaged over the period 2010–2012,
- taking into account the grounds to reduce the level of obligation, as specified by the Directive.

From data of official Hungarian statistical reports to the Directorate–General of the European Commission, responsible for statistical data (‘EUROSTAT’), the following value can be derived as the basis of calculation of the obligation set out in the first subparagraph of Article 7(1) of the Directive.

	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>Average</b>
<b>Final energy consumption*(TJ)</b>	694 813	677 009	620 109	663 977
<b>Of which Transport (TJ)</b>	181 733	176 546	165 735	174 671
<b>Final energy consumption excluding Transport (TJ)</b>	513 080	500 463	454 374	489 306
<b>Estimated own energy production (TJ)**</b>	213	234	234	227
<b>Basis of obligation (PJ)</b>	512.87	500.22	454.14	<b>489.08</b>

**Table 3: Determining the basis of obligation**

\* *final energy supplied to industry, transport, households, trade and services, agriculture, forestry and fishery.*

\*\* *own production recorded in the final energy consumption by Eurostat*

On determining the obligation of the Member State, sales of energy, by volume, used in transport may be partially or fully excluded from the calculation. **On determining its basis of calculation, Hungary does not take into account energy consumption by the transport sector.** The level of the resulting 1.5 % obligation is the equivalent of **7 336 PJ a year in new final energy savings, whereas the sum of new final energy savings achieved in each year during the period 2014–2020 is 51 353 PJ.**

In addition to the exclusion of sales of energy, by volume, used in transport, ‘grounds for allowance’ are set out in Article 7(2) of the Directive. It is up to each Member State whether it wants to exercise allowances and, if so, which one or the combination of which ones, provided that the reduction must not exceed 25 % of the amount of new energy savings calculated according to the basis for the calculation of obligation for the period 2014–2020. (In numerical terms, this means that the obligation concerning new energy savings resulting after the application of allowances must not be lower than  $51\,353\text{ PJ} * 0.75 = \mathbf{38\,515\text{ PJ}}$ .)

On the basis of Article 7(2)(a) of the Directive, the obligation may be complied with gradually, which results in the following annual obligations:

Year	Projection base (TJ)	Required annual savings ( %)							Final energy savings <u>per year</u> (PJ)	Final energy savings <u>in total</u> (PJ)
2014	489.08	1 %							4.89	4.89
2015		1 %	1 %						4.89	9.78
2016		1 %	1 %	1.25 %					6.11	15.9
2017		1 %	1 %	1.25 %	1.25 %				6.11	22.01
2018		1 %	1 %	1.25 %	1.25 %	1.5 %			7.34	29.34
2019		1 %	1 %	1.25 %	1.25 %	1.5 %	1.5 %		7.34	36.68
2020		1 %	1 %	1.25 %	1.25 %	1.5 %	1.5 %	1.5 %	7.34	44.02

**Table 4: Gradual introduction of the obligation**

**In addition to the allowance resulting from gradual introduction, Hungary intends to apply the allowance under Article 7(2)(b) and (c).** Accordingly, it intends to exclude from the calculation of the obligation the sales, by volume, of energy used in industrial activities listed in Annex I to Directive 2003/87/EC ('ETS sector') as well as to allow part of the energy savings achieved in the energy transformation, distribution and transmission sectors to be counted towards the amount of required energy savings. The sales, by volume, of final energy in the ETS sector on average during the period 2010–2012 amount to 32.5 PJ, reducing the basis of obligation to 456.579 PJ.

The amount of new savings over the entire period, excluding the ETS sector, is 41.092 PJ.

Since taking into consideration the entire volume of savings achieved in the energy transformation, distribution and transmission sectors expected during the obligation period would, due to the exclusion of sales, by volume, of final energy used in the ETS sector, result in exceeding the maximum reduction level of 25 %, only such part of the energy savings achieved in the energy transformation, distribution and transmission sectors must be counted toward the obligation that will ensure that the 25 % limit is exploited as much as possible.

On the basis of the relevant guidance issued by the European Commission to specific Articles of the Directive, on determining a Member State's obligation, it is in the discretion of each Member State to choose which allowance and to what extent it intends to apply. Applying the allowances, i.e. reducing the Member State's obligation by specific elements, is without prejudice to the accountability of savings achieved in various sectors, including in particular Transport and the ETS sector, provided that they comply with other conditions specified by the Directive.

	<b>New savings, taking into account savings achieved in energy transformation, distribution and transmission deductible for the year concerned [PJ/year]</b>	Achieved during the period 2014–2020, counted towards the obligation for the year as earlier performance [PJ/year]	Total energy savings during the year, counted towards the obligation [PJ]
2014	<b>4.279</b>	0	4.279
2015	<b>4.279</b>	4.279	8.559
2016	<b>5.349</b>	8.559	13.908
2017	<b>5.349</b>	13.908	19.258
2018	<b>6.419</b>	19.258	25.677
2019	<b>6.419</b>	25.677	32.096
2020	<b>6.419</b>	32.096	38.515
	<b>38.515</b>	<b>103.776</b>	<b>142.291</b>

**Table 5: Schedule of savings during measures intended to be implemented by Hungary<sup>12</sup>**

<sup>12</sup> NFM-MEKH calculation



### **3.1.1.1** *Scope of the obligation*

Article 7 of the Energy Efficiency Directive can be implemented through the application or establishment of one of the following policy measures or a combination of such measures:

- setting up an energy efficiency obligation scheme and/or
- taking alternative policy measures.

**In accordance with former objectives of the government, with a view to meeting energy efficiency requirements and achieving the fullest possible integrity or sources, in lieu of implementing the energy efficiency obligation scheme, Hungary intends to achieve Union targets through alternative policy measures according to Article 7(9).**

### **3.1.1.2** *Applying alternative policy measures*

The EED allows the application of financing schemes and instruments, fiscal incentives, regulations or voluntary agreements that lead to the application of energy-efficient technology or techniques and have the effect of reducing end-use energy consumption.

Savings equivalent to volumes of energy savings referred to in Article 7(1) to (3) may be achieved through policy measures including, but not restricted to, the following policy measures or combinations thereof:

- (a) energy or CO<sub>2</sub> taxes that have the effect of reducing end-use energy consumption;

(b) financing schemes and instruments or fiscal incentives that lead to the application of energy-efficient technology or techniques and have the effect of reducing end-use energy consumption;

(c) regulations or voluntary agreements that lead to the application of energy-efficient technology or techniques and have the effect of reducing end-use energy consumption;

(d) standards and norms that aim at improving the energy efficiency of products and services, including buildings and vehicles, except where these are mandatory and applicable in Member States under Union law;

(e) energy labelling schemes, with the exception of those that are mandatory and applicable in the Member States under Union law;

(f) training and education, including energy advisory programmes, that lead to the application of energy-efficient technology or techniques and have the effect of reducing end-use energy consumption.

**Having reviewed international models, Hungary intends to draw up a financial package by way of an alternative policy measure.** On the basis of the financial package, it is intended to provide attractive loans with a view to encouraging the Hungarian business and residential sectors to carry out investments in order to reduce their energy consumption and environmental impacts.

The financial package would include the following:

- energy audit mentor services, i.e. direct consulting services aiming to reduce energy consumption by businesses and thus their greenhouse gas emissions and specific energy costs through measures identified as a result of a review of the energy consumption patterns of the businesses concerned,
- providing a green loan programme or other financial instruments suitable for the financing of residential energy efficiency projects, which would enable residents to carry out energy efficiency projects in order to improve energy efficiency in their homes (e.g. building society schemes to encourage energy efficiency etc.),

- providing low-interest financing to residential energy providers for their ESCO financing activities.

A background study will be drawn up in order to assess the measures and their impacts, facilitating decision-making by the government.

With a view to set up a system to register and keep record of measures resulting in energy savings and measurable improvements in energy efficiency as a result of other policy measures, the Government adopted Government Resolution No 1215/2015 of 17 April 2015 on certain duties of the government in order to achieve energy savings.

According to the Government Resolution, the competent ministers are obliged to ensure that the energy efficiency target should be specified during the development of the relevant policy measures taken in order to achieve energy savings, including in particular the publication of tenders under operational programmes, other tenders, grants, tax allowances, taxes and technical standards, and to arrange for the development of the methodology to certify energy savings and of the rules of monitoring savings.

Hungary does not intend to apply a calculation method other than Section 2(e) of Annex V to the EED for the calculation of the lifetime of energy savings.

In the future, on adopting any policy measure or legislation, the impact on energy efficiency of such measure or legislation must be assessed. Indicating the energy efficiency assessment criterion on the impact assessment sheet currently used for the preliminary and subsequent impact assessment of draft legislation may ensure that energy efficiency impacts are not ignored on the drafting of legislation. That may ensure that the energy efficiency target is included in the legislation concerned and appropriate rules of certification and monitoring are drawn up.

According to the measures proposed, the Hungarian Energy and Public Utility Regulatory Authority will be entrusted with the collection and registration of measures resulting in energy savings and the continuous monitoring of savings achieved.

Energy savings data achieved through specific policy measures shall be published by the MEKH. The energy savings data shall be reported to the Commission in an annual report drawn up by the Minister for National Development. In the event it is observed by the Hungarian Energy and Public Utility Regulatory Authority that total energy savings are below the proposed value specified in the report to the Commission, it shall notify the Minister responsible for energy policy without delay. The Minister shall put forth a proposal to the Government for a review or, if appropriate, the extension of the policy measures concerned in order to ensure that the cumulative savings target for 2020 can be met.

With a view to achieving energy savings targets for end users, opportunities for setting up a tariff scheme to encourage energy efficiency projects and introducing an ESCO financing model and the conditions and circumstances of setting up a National Network of Energy Engineers.

Of other eligible policy measures, it is intended to enter into voluntary agreements. Voluntary agreements are a policy instrument that includes mandatory commitments by accessing parties, quantitative targets concerning the improvement of energy efficiency, energy savings or reductions of CO<sub>2</sub> emissions and the financial and regulatory allowances the accessing parties obtain in return for their respective commitments.

Hungary does not envisage any derogation from the coefficients set out in Annex IV to the EED<sup>13</sup>.

### **3.1.2 Energy audits and energy management systems** (EED Article 8)

Enterprises other than small and medium-sized enterprises (SMEs) shall carry out an energy audit by 5 December 2015 and subsequently at least every four years. The obligated parties, i.e. large enterprises will be identified in accordance with the provisions of Act XXXIV of 2004 on small and medium-sized enterprises and the supporting of their development. The provisions set out in that law are compatible with Commission Recommendation 2003/361/EC concerning the definition of micro, small and medium-sized enterprises.

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<sup>13</sup> According to Annex 6 to Government Decree No 122/2015 of 26 May 2015 implementing the Act on energy efficiency

In accordance with the above, large enterprises include enterprises employing more than 250 workers, whose net annual sales exceed EUR 50 million and/or their balance sheet total is more than EUR 43 million. When a company is classified as a large enterprise, the above data concerning its related undertakings also need to be taken into consideration, i.e. the relevant values must be added to the values of the enterprise concerned.

In Hungary, most functioning businesses are small and medium-sized enterprises (i.e. employing fewer than 250 workers). In 2011, there were nearly 690 000 such enterprises, whereas only 865 large enterprises employing 250 or more workers were recorded by the KSH in 2013. The group of obligated parties is unlikely to include more than 2 000 large enterprises even if partners and other related undertakings are considered<sup>14</sup>.

Similarly to these large enterprises, enterprises other than SMEs on the basis of Section 3(4) of Act XXXIV of 2004, in which the direct or indirect business share of the government or a municipal government (on the basis of equity or voting rights) jointly or separately exceeds 25 %, shall also be subject to audit. The number of such enterprises is currently unknown.

Most businesses with an ISO 50001 qualification have already carried out energy loss assessments fulfilling the requirements under Article 8(5), which can be considered as energy audits.

In order to ensure that audits are carried out in a higher number of businesses and that energy audits of adequate quality are available to all end users (households, SMEs and large enterprises), a register of energy auditors must be established. The basic rules of that register are set out in Act LVII of 2015 on energy efficiency. Auditors are registered by the Hungarian Energy and Public Utility Regulatory Authority at the proposal of registration bodies. The MEKH keeps a public record of registration bodies and energy auditors. Registration in the register of energy auditors may be applied for by any person holding an engineering degree and professional experience specified in the legislation and having successfully passed the aptitude test organised by a registration body.

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<sup>14</sup> MEKH estimate, based on the current energy consumption statistics and voluntary data disclosures

The operation of organisations registering auditors is authorised by a resolution of the Hungarian Energy and Public Utility Regulatory Authority. Registration bodies carry out ongoing data disclosure, on the basis of which auditors are registered in the register, registrations are modified or deleted. However, the MEKH may also modify or delete auditors from the register on the basis complaints received or based on its own verification.

Energy auditors are entitled to employ other experts in order to carry out a complete audit. This may be useful in particular in professional fields requiring special expertise for the assessment of production or operation.

Provisions concerning the audit obligation, data disclosure, the rules of verifying an audit and the requirements concerning persons and organisations entitled to carry out audits are set out in Act LVII of 2015 on energy efficiency, whereas implementing rules are set out in Government Decree No 122/2015 of 26 May 2015 implementing the Act on energy efficiency and Decree No 26/2015 of 26 May 2015 of the Minister for National Development laying down detailed rules of data disclosure related to energy audits and the annual reports of registration bodies.

#### ***3.1.2.1 Minimum requirements of energy audits***

Energy audits should take into account relevant European or International Standards, such as EN ISO 50001 (Energy Management Systems), or the EN 16247 series of standards (Energy Audits), or, if including an energy audit, EN ISO 14000 (Environmental Management Systems). Therefore, the EED provides for an exemption for businesses having implemented specific standards: enterprises that are not SMEs and are implementing an energy or environmental management system, certified by an independent body according to the relevant European or International Standards, shall be exempted from the requirements referred to above, provided that the management system concerned includes an energy audit on the basis of the minimum criteria based on Annex VI to the EED.

The compulsory energy audit is based on up-to-date, measurable, traceable operational data on energy consumption and (for electricity) load profiles and comprises a detailed review of the energy consumption profile of buildings or groups of buildings, industrial operations or installations, including transportation. Where the required data are available, the compulsory energy audit is built upon life-cycle cost analysis in order to take account of long-term savings, residual values of long-term investments and discount rates, provides an overall picture of the actual energy profile and is based on detailed and validated calculations. It includes the definition of fuels used and their expenses, the identification of consumption trends, base values and specific values, the identification and presentation of wasting-of-energy points, the exploration and analysis of more energy efficient methods of energy use, possibilities to use renewable energy sources and the presentation of more advanced operational processes and potential new devices. The audit puts forth proposals concerning potential energy efficiency improvement alternatives and measures, quantifying potential savings opportunities, the required investment costs and the payback period. The data used during the audit must be retained at least until the next audit in order to ensure retrospective analysis and performance monitoring. The energy audit may include the provision of information concerning the possible steps of implementing recommendations, subsidy and financing programmes and the opportunity to connect to an existing or planned district heating/cooling system.

#### **3.1.2.2**      *Record-keeping system*

The auditor must provide data to the registration body on the completion of the audit and certain audit data as specified by legislation (e.g. level of potential energy savings and the level of savings from measures implemented since the previous audit). The registration bodies provide summary information on the number of audits completed and the audit data as specified by legislation in an annual report. Hungary is required to provide data to the Commission on the number of energy audits completed (separately for compulsory and non-compulsory audits) in the framework of the national energy efficiency plan. The data from energy audits completed, concerning the level of potential savings of energy, enable the identification of target groups for subsidy or incentive programmes and the integration of achieved results.

The Hungarian Energy and Public Utility Regulatory Authority will build up an electronic database based on the records and data provided. The database is expected to start operating by early 2016. Until the start of operation of the electronic database, data collection is ensured by different methods through temporary measures. Since in earlier years the enterprises ordering an audit were not required to submit such audits to a registration body, no accurate numerical data are available on earlier audits.

### **3.1.2.3**      *Rules of procedure of quality control*

Energy audits are verified in the framework of the independent verification system by the Hungarian Energy and Public Utility Regulatory Authority. The MEKH will notify the company and the energy auditor concerned of the follow-up verification of the compulsory energy audit in writing. The company and the energy auditor concerned are required to cooperate during the verification conducted in the framework of the independent verification system. The energy auditor is required to provide access to the energy audit selected for verification and to remedy any deficiencies. During the follow-up verification of compulsory energy audit, the findings of the compulsory energy audit, its preliminary calculation results and the demonstration of its final result, the soundness of the proposal based on the former, the appropriate identification, on the site if appropriate, of basic data of the compulsory energy audit and the adequacy of data used and the entire calculation are verified.



### **3.1.2.4 Institutional framework of implementation**

The Hungarian Energy and Public Utility Regulatory Authority, the body in charge of the verification, checks whether various large enterprises have complied with their audit obligation. In addition to the above, the MEKH also verifies the proper technical scope of compulsory energy audits. Each year, they specify, in their own discretion, the level of a statistically significant proportion of audits to be verified and conduct verifications in accordance with such proportion. The MEKH obtains the audits designated for verification directly from the auditors having conducted the audit and retaining it for a period of 10 years.

Companies infringing the obligation of conducting energy audits are fined to an amount specified in an administrative resolution by the MEKH. Similarly, auditors failing to cooperate or conducting an audit whose findings have been demonstrated to be false are planned to be sanctioned through a fine or deletion from the register.

No decision has yet been made concerning the allowances related to voluntary agreements. The number of audits conducted under voluntary agreements is therefore not known. Where a company conducts an audit on a voluntary basis, it must comply with the requirements concerning compulsory audits. The MEKH is also responsible for managing, collecting and verifying voluntary audits.

### **3.1.3 Metering and billing** (EED Articles 9 to 11)

**Measures related to individual meters for electricity, natural gas, district heating and domestic hot water have been transposed in the case of electricity and natural gas. Only minor amendments were required, which are set out in Government Decree No 123/2015 of 26 May 2015 amending certain government decrees in connection with energy efficiency.** In the case of natural gas, it takes place in accordance with provisions of the Rules of Operation and Trading and the regulations of the natural gas distributor on the basis of Sections 99 to 102 (Chapter VIII) of Act XL of 2008 on Natural Gas Supply ('Act XL of 2008') and Sections 115 to 115/B of Government Decree No 19/2009 of 30 January 2009 implementing the provisions of Act XL of 2008 on Natural Gas Supply ('Implementing Decree'). With regard to cost efficiency, residential consumers are equipped with meters wherever this is technically possible. According to February 2014 data, within total residential consumption, the proportion of natural gas consumption billed on a flat-rate basis is 1.21 %<sup>15</sup>.

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<sup>15</sup> MEKH statistics

**For non-residential consumers, the measurement of consumption has been completely resolved.** Gas meters measure and display the volume of natural gas consumed in m<sup>3</sup>, which simplifies the monitoring of consumption. Natural gas consumption, measured by volume (m<sup>3</sup>) by gas meters, can be converted to quantity of heat on the basis of the correction factor and thermal value (MJ/m<sup>3</sup>). For electricity available for consumers supplied under the universal service, the rules are transposed by Section 21/A of Government Decree No 273/2007 of 19 October 2007 implementing certain provisions of Act LXXXVI of 2007 on electric energy ('Government Decree No 273/2007').

With regard to natural gas and/or electricity, pilot projects are currently in progress in connection with the Hungarian implementation of EED obligations concerning smart metering systems and smart meters in the field of electricity and natural gas supply. Rules of conduct of system operators and consumers participating in these projects are set out in Section 142 of Act XL of 2008.

According to the obligations concerning the installation of heat and hot water volume meters, where heating and cooling or hot water to a building are supplied from a district heating network or from a central source servicing multiple buildings, a heat or hot water meter shall be installed at the heat exchanger or point of delivery. With regard to district heat, the provisions have been transposed in full, as set out in Annex 3 (Public Utility Regulations for District Heating Services) to Government Decree No 157/2005 of 15 August 2005 implementing Act XVIII of 2005 on district heating services ('Government Decree No 157/2005').

In multi-apartment and multi-purpose buildings with a central heating/cooling source or supplied from a district heating network or from a central source servicing multiple buildings, individual consumption meters shall also be installed. The latter obligation was partially transposed earlier, as provided for in Government Decree No 157/2005. Additional requirements were adopted in Government Decree No 123/2015 of 26 May 2015 amending certain government decree in connection with energy efficiency.

The obligations related to accurate billing information based on actual consumption have been met. Where final customers do not have smart meters, Member States shall ensure that billing information is accurate and based on actual consumption for all sectors covered by the EED. Such requirements have been implemented in Hungary by Section 40(4) of Act LXXXVI of 2007 and Section 100(1) of Act XL of 2008.

The provision of the Directive requiring Member States to ensure that final customers have access to meters-based billing information has been implemented. That obligation specifies that the meters installed shall enable access to complementary information on historic consumption.

The obligation concerning access to billing information free of charge has been implemented. This obligation is satisfied by Section 56/A(2) of Act LXXXVI of 2007 and Section 63/A(2) of Act XL of 2008. According to the above, final customers receive all their bills and billing information for energy consumption and have access to their consumption data free of charge.

The distribution of costs of billing information for the individual consumption of heating and cooling in multi-apartment and multi-purpose buildings shall be carried out on a non-profit basis. Costs resulting from the assignment of this task to a third party, such as a service provider or the local energy supplier, covering the measuring, allocation and accounting for actual individual consumption in such buildings, may be passed onto the final customers to the extent that such costs are reasonable. That provision has also been implemented.

### **3.1.4 Consumer information programmes and training**

(EED Articles 12 and 17)

Raising consumer awareness is a key element in encouraging individual investments aiming to improve energy efficiency and shaping conscious energy consumption habits. Considering that Hungary has a significant energy savings potential through the modernisation of energy-wasting buildings and the replacement of high-consumption electric appliances, information programmes in order to promote the reduction of energy consumption should primarily target these areas. Since residential energy consumption accounts for a significant part, i.e. nearly one-third, of final energy consumption it is of key importance to involve households by making them interested in reducing their individual consumption with a view to achieving Hungary's energy efficiency and energy savings targets.

Because of the fact that high energy costs make subsistence more difficult, it is particularly important to provide low-income household with useful information.

Various Articles of the EED (Articles 12, 17 and 18) set out independent provisions on providing information to and shaping the energy consumption-related attitudes of energy consumers, including in particular households, small and medium-sized enterprises, regional and local public bodies. In addition to independent provisions on information, other awareness-raising provisions are linked to several Articles of the Directive (Articles 5, 6 and 8).

In agreement with the Directive, the National Energy Strategy, adopted in October 2011, also puts emphasis in the importance of people's attitudes and the energy savings potentials associated with these attitudes. Therefore, it treats the consumer awareness-raising as a key tool and Section 4(u) of Parliamentary Resolution No 77/2011 of 14 October 2011 on the National Energy Strategy provides that it is the duty of the Government to 'draw up an action plan in order to shape and improve the level of consumers' energy-related and environmental awareness' ('Awareness-Raising AP') and to 'ensure that skills related to sustainable development and energy awareness are taught and promoted over the media; it should set up an energy consulting system easily accessible by large groups of the population'.<sup>16</sup>

Various measures specified by the Awareness-Raising AP are conducive to satisfying the information requirements provided for in the EED. The Awareness-Raising AP specifies the following five main areas with regard to the measures:

- (1) energy efficiency and energy conservation;
- (2) increasing the use of renewable energy sources by residents;
- (3) energy savings in the transport sector;
- (4) achieving a low carbon dioxide emissions society;
- (5) adapting to the changed climatic conditions. The action plan aims to promote climate and energy conscious behavioural patterns, encourage individual action toward reducing energy consumption and carbon dioxide emissions and achieve sustainable energy consumption.

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<sup>16</sup> Decision No 77/2011 of 14 October 2011 of the Parliament on the National Energy Strategy

The long-term aim of the measures is to ensure that interests of the environment and the community should be more decisive than cost considerations in making consumer decisions.

The Awareness-Raising AP requires in the first place that an energy and climatic information website must be set up in order to improve the energy efficiency of domestic customers.

The EED also treats the provision of appropriate information to all interested parties as a priority, including in particular access by businesses to information on energy providers, audits and energy-saving opportunities. Section 20 of Act LVII of 2015 on energy efficiency provides that an energy efficiency information website shall be set up and operated in order to provide information as specified in the EED. The website will be developed and operated by the Hungarian Energy and Public Utility Regulatory Authority, considering that the MEKH already plays an important role in the provision of consumer information and that it possesses the required technical and infrastructure background which ensures that the website is kept up-to-date. Detailed rules concerning the operation of the website are provided for in the Ministerial Decree implementing the Act on Energy Efficiency.<sup>17</sup>

Going beyond the obligation to provide information, certain provisions of the EED, including the first subparagraph of Article 8(2) and the first subparagraph of Article 8(3) provide for the obligation to develop programmes to encourage households and small and medium-sized enterprises to undergo energy audits. Of the communication measures specified by the Awareness-Raising AP, such obligations may be satisfied through the energy and climate awareness campaign. The targets and cornerstones of the campaign are set out in the Awareness-Raising AP.

Hungarian studies on energy poverty<sup>18</sup> have found that single-person households consisting of an adult who has one child and is typically older than 65 are most afflicted by energy poverty. Considering the types of buildings, 75–80 % of energy poor households live in detached houses. However, in addition to the necessity and importance of subsidised programmes for the renovation of residential buildings, awareness-raising and drawing attention to energy-efficient solutions are also important.

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<sup>17</sup> Decree No 25/2015 of 26 May 2015 of the Minister of National Development on the provision of information in order to improve energy efficiency

<sup>18</sup> Fülöp, Orsolya- Lehoczki-Krsjak, Adrienn, Energy Poverty in Hungary, in Statisztikai Szemle (Hungarian Statistical Review), volume 92, 8 and 9; (2014), Tirado Herrero, S., Prof. Ürge-Vorsatz, D., Energy Poverty in Hungary, first assessment, Centre for Climate Change and Sustainable Energy Policy, Budapest 2010.

The Awareness-Raising AP intends to organise targeted information programmes concerning energy conservation in order to efficiently exploit the significant role in awareness raising of the existing local administrative infrastructure, public bodies and organisations, and thus to promote conscious energy consumption among local businesses and households (with particular regard to households in regions that are lagging behind, inflicted by energy poverty). The planned auxiliary materials providing guidance will outline low-cost measures to improve the efficiency of a building or the use of buildings.

Moreover, Article 8(3) of the EED provides that information to households should be provided through appropriate advising services, which obligation is linked to the duty specified in Section 4(u) of Parliamentary Resolution No 77/2011 of 14 October 2011 on the Energy Strategy, i.e. the setting up of an energy advising system. While the existing infrastructure of administrative bodies, public bodies and organisations is available for the advising services, it must be made suitable for the purpose.

The National Network of Energy Engineers ('NEH') may be involved in the implementation of the measure, which plays a key role in improving energy efficiency.

According to plans, the network should be set up in a manner to enable that it can carry out other activities to improve energy efficiency in addition to awareness-raising, including administrative activities.

In public bodies and the municipal sector, setting up a background of energy engineers would directly result in savings in energy costs without significant investment. Municipal energy costs could be reduced by a minimum of 5 to 10 % (approximately HUF 5 to 10 billion/year). Providing advice to SMEs on energy matters by the NEH free of charge may result in energy savings of about 4.9 PJ by 2020<sup>19</sup>.

With the establishment of the NEH, through the energy information service provided free of charge, businesses in the SME sector and local governments can save energy and money, whereas energy savings achieved can be counted toward the energy-saving obligation under Article 7. An independent proposal will be put forth concerning the setting up of the NEH.

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<sup>19</sup> MEKH estimate

Local governments play a significant role in energy-efficient and energy-conscious development and operation of settlements. The achievement of that goal may be assisted by the network of energy engineers referred to above and the drafting of sustainable energy action plans (SEAP). Sustainable energy action plans fit into to system of tools of urban development and urban planning, which can be drafted on the basis of a handbook adopted at European level<sup>20</sup>. While a number of municipalities have already developed a sustainable energy action plan, a tender for supporting the drawing up of similar action plans is planned under the Regional Development Operational Programme. The development of sustainable energy action plans and the process of implementation are accompanied in each case by awareness-raising programmes.

#### ***3.1.4.1 Awareness-raising programmes, 2011–2014***

During the financial period 2007–2013, in the framework of the Environment and Energy Operational Programme ('EEOP'), Hungary offered several opportunities to submit applications for the implementation of awareness-raising programmes to be co-financed by the European Union, which were also able to contribute to numerous programmes to encourage the reduction of energy consumption. Such tender schemes of the EEOP are described below.

Government Decree No 243/2003 of 17 December 2003 on the issue, introduction and application of the National Basic Curriculum (to be phased out by and repealed on 31 August 2017), Government Decree No 110/2012 of 4 June 2012 on the issue, introduction and application of the National Basic Curriculum, to be phased in from the academic year 2013/2014, Decree No 17/2004 of 20 May 2004 of the Minister for Education on the issue and application of the framework curriculum (to be phased out by and repealed on 31 August 2016) and Decree No 51/2012 of 21 December 2012 of the Minister for Human Resources on the rules of the issue and approval of framework curricula, phased in from the academic year 2013/2104 provide for elements required in order to achieve energy consciousness.

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<sup>20</sup> How to Develop a Sustainable Energy Action Plan (Seap) – Guidebook, published by the Covenant of Mayors, 2010

The curricula include skills related to the conscious use of energy for all school grades (grades 1 to 12). In the framework curricula, the elements related to the conscious use of energy are integrated into various subjects including Science, Natural History, Physics, Chemistry, Geography, Technology and Lifestyle. These forms of education affect the energy consumption patterns of future generations and improvements in energy conservation will be achieved by 2016.<sup>21</sup>

### **EEOP 6.1 – ‘Campaigns to encourage a sustainable lifestyle and related behavioural patterns (awareness-raising, information provision and training)’ tender scheme**

The tender scheme enabled the supporting of the organisation of events/series of events on environmental and sustainability issues and the development of networks of domestic consultants.

The call for tenders was published in order to promote a sustainable lifestyle and the related behavioural patterns using information tools (awareness-raising, information provision, training etc.), encourage competent and responsible consumer behaviour and promote the values and tools of a sustainable lifestyle to a wide group of people.

*438 projects were co-financed under the scheme, in the total value of HUF 8 512 107 981.*<sup>22</sup>

### **EEOP 6.2.0 – ‘Model projects for the promotion of a more sustainable lifestyle and consumption alternatives’ tender scheme**

The scheme enabled the supporting of the development of a demonstration centre to promote sustainable solutions related to home renovation and construction and the complex environment-friendly (waste-preventing, water-efficient and energy-efficient) conversion of public buildings and other highly visited buildings.

The call for tenders was published in order to achieve that, as a result of cooperation between various stakeholders (the business community, the NGO sector, education, the academic community, consultants and households), wider groups of society should become aware that sustainability is an ethic in its own right and in order to promote methods related to sustainable alternatives, raise awareness of the environmental impacts of consumption and improve awareness, accessibility and use of various sustainable consumption alternatives.

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<sup>21</sup> Source: Ministry of Human Resources

<sup>22</sup> Source: based on SMIS data as at 27.6.2014



*488 projects were co-financed under the scheme, in the total value of HUF 8 098 205 433<sup>23</sup>*

Due to applying general sustainability criteria, energy savings achieved as a result of the programmes can only be estimated, whereas a number of education and information-related programmes have been implemented whose effects will only become apparent in the longer term.

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<sup>23</sup> *Source: based on SMIS data as at 27.6.2014*

## **Description of several completed projects**

### **'Profitable energy' pilot project**

The project included an awareness-raising campaign and a series of events organised by the ÉMI Nonprofit Kft. between September 2012 and August 2013 in Borsod-Abaúj-Zemplén County. The purpose of the project was to inform residents of the advantages of utilising renewable energy, existing projects in the field and potential methods in order to achieve energy conservation and energy efficiency, which are of key importance for a sustainable lifestyle.

As part of the series of events, practical and professional information was provided in an easily accessible and efficient manner with a view to changing (energy) consumption trends in Hungary. The ultimate goal of the campaign was to establish a new consumer value system and sustainable and responsible consumption and lifestyles.

In the first step, a campaign and series of events were conducted in Borsod-Abaúj-Zemplén ('BAZ') County, including the provision of extensive and professional information. On the basis of its experiences, similar activities are planned in other counties if the pilot campaign proves to be successful.

The target group of the BAZ County campaign encompassed the county's entire population, focusing, however, on people aged between 25 and 59 (financially independent, potential decision-makers). Local government leaders and institution managers from that age group were called on to cooperate, including leaders and managers based in disadvantaged areas. They were called on in order to help promote elements of a sustainable lifestyle, convey information and practical skills, provide information, raise awareness and measure longer-term impacts of the series of events. The project could be broken down into two basic parts: the campaign and the series of events.

During the project, ÉMI Nonprofit Kft. intended to promote green energies among residents. The core of the campaign consisted of the planned county-level non-commercial (ATL) advertising campaign, which used printed, electronic media and out-of-home media (billboards, city-light posters and blank wall banners) in order to reach the target group in the most efficient manner possible.

The part of the project that encompassed all age groups included a series of educational events in 9 stations. During the interactive information sessions, which also included practical information, participants had the opportunity to familiarise themselves with habits, information, best practices and professional guidance on lifestyles supporting sustainability through playful and lifelike activities.

The maintenance of longer-term goals of the project is ensured by a website developed in the framework of the project (<http://www.megteruloenergia.hu/>).

#### Central European Cooperation Program (CEC 5)

#### 'Demonstration of Energy Efficiency and Utilisation of Renewable Energy Sources Through Public Buildings' project

The main purpose of the project is to promote energy efficiency and to demonstrate and propagate possible uses of renewable energy sources in public and residential buildings. The project aims at the development and implementation at Community level of a new building energy standard and rating tool, which would set out uniform energy efficiency measures and calculation, rating and construction methods to be employed for the building and renovation of public and private buildings for all EU Member States with a view to minimise or stop energy consumption by public buildings. The Ministry for National Development is involved as a project partner in carrying out relevant project activities. The project is currently being implemented.

Under the project, 2-day awareness-raising residential campaigns (road shows) are organised in 7 Hungarian regional centres, demonstrating the promotion of use of the so-called Building Energy Rating Tool, the planning and steps of possible and practical energy efficiency improvements of residential buildings, the possible practical uses of renewable energy sources and the targets and achievements of the project. At the campaign sites, an interactive exhibition will be available installed on the platform of a truck, demonstrating practical uses of renewable energy sources in buildings, which will provide opportunities for awareness-raising concerning energy efficiency projects and demonstrating opportunities for improvement. Visitors can actively participate in the demonstration. The demonstration will include the demonstration of buildings analysed using the Building Energy Rating Tool under the project, potential methods of renovating the most common types of buildings and apartments in Hungary, results of specific energy calculations, the size of the required investment and the payback period.

As part of the above, there will be presentations on the most efficient heating systems that best fit specific types of buildings as well as opportunities to give advice.

In addition to the residential awareness-raising campaign, a series of 40 presentations will be organised in order to provide information to local decision-makers, managers, members of county Chambers of Industry and experts on potential uses of the new Building Energy Rating Tool in 19 counties and Budapest.

At the training programme to be organised under the project, 125 experts will have the opportunity to acquire skills related to the practical uses of the Building Energy Rating Tool. Apart from the application of rating tools, these experts will also become capable of providing customised individual advice on energy efficiency.

### 3.1.4.2 Proposed measures<sup>24</sup>

Measure	Description of measure	Target group of measure	Regulatory framework for implementing the measure	Schedule for implementing the measure
Setting up an information website on energy and climate awareness	A central website will be set up in order to provide information to consumers on climate and energy matters. Content on the website will focus on the following areas: energy conservation and energy efficiency, uses of renewable energy, energy conservation in transport, a low carbon dioxide emissions society and climate adaptation. Information on the website will focus on conscious energy consumption, environmental impact of energy consumption and energy conservation potentials through tips on the saving of energy and positive examples.	The entire society, including businesses, NGOs and public bodies.	Energy and Climate Awareness-Raising Action Plan	The website is expected to be launched in November 2015.
Energy and climate awareness campaign: 'The real price of energy'	In order to draw attention to the role of modern consumer society, an extensive and comprehensive communication campaign, including lots of creative elements, must be carried out, which could also manifest the government's commitment to sustainable development and climate protection.	Residents and businesses, including all segments of the latter.	Energy and Climate Awareness-Raising Action Plan	The campaign is expected to be launched in 2016 or 2017.

<sup>24</sup> Proposed measures under the draft Awareness-Raising Action Plan

	<p>Because of the demonstration of commitment, its exemplary value and awareness-raising impact, it is particularly important that the campaign should be implemented by a central body. The campaign will draw the attention of society to conscious energy consumption through various events and media coverage. Its principal messages will be developed on the basis of issues in the Awareness-Raising AP.</p>			
<p>Information exchange platform on best practices in energy conservation</p>	<p>The goal is to set up a public database where energy consultants, investors, local governments, SMEs, large enterprises etc. can obtain structured and thematic information on planning and organising projects resulting in energy savings, the relevant financial and economic conditions and experiences of completed projects ('best practices').</p>		<p>Industrial energy efficiency programme</p>	<p>The platform is expected to be launched in January 2016.</p>
<p>Continuing and expanding transport-related environmental protection programmes and campaigns</p>	<p>Awareness-raising programmes aiming to reduce energy demand in transport will be continued, including the European Mobility Week and Car-Free Day, 'Cycle to Work' campaign and the Bicycle-Friendly City and Workplace competition with a view to boost a climate-friendly approach in addition to energy efficiency. The programmes aim to strengthen responsible decisions by individuals and to encourage local governments and businesses to take permanent measures in order to facilitate the rise of community and non-motorised transport.</p>	<p>Municipal governments, businesses, workers, educational institutions, pupils and students.</p>	<p>Energy and Climate Awareness-Raising Action Plan</p>	<p>Campaigns are implemented on an ongoing basis.</p>

<p>Integrating the information systems of energy providers and widening the range of their residential awareness-raising tools</p>	<p>Service providers in direct communication with consumers already play a key role in encouraging consumers to take energy efficiency and energy-saving measures and communicating the relevant information. Through service providers, information can be provided in an effective and cost-efficient manner. However, as far as the messages displayed in service providers' customer services, information surfaces and websites or their consulting activity with a view to reducing energy consumption is concerned, such messages are not always displayed in a visible and uniform manner, which would be conducive to the information getting across to consumers. Therefore, energy providers are encouraged to provide properly displayed practical tips and useful information to customers, geared toward the specific target groups, on customer habits to reduce energy consumption, potential energy efficiency alternatives available to consumers and the grant schemes available to finance investments. The measure aims to achieve that energy providers should display the details of calls for tenders in their information tools (e.g. including the relevant hyperlinks on the website).</p>	<p>Direct target groups of the measure include electricity, natural gas and district heat providers as tools to reach households and businesses.</p>	<p>Energy and Climate Awareness-Raising Action Plan</p>	<p>30 June 2016 and then on an ongoing basis</p>
<p>Supporting energy and climate awareness-raising</p>	<p>The 5<sup>th</sup> EEEOP priority axle will provide a budget of almost HUF 2 billion for the financing of extensive awareness-raising programmes aiming to reduce energy consumption and</p>	<p>Direct target groups (beneficiaries) if the call for tenders include</p>	<p>Environmental and Energy Efficiency Operational Programme</p>	<p>Calls for tenders are expected to be published starting in autumn 2015</p>

<p>programmes through calls for tenders under the 5<sup>th</sup> EEEOP priority axle 'Increasing energy efficiency and utilising renewable sources of energy'</p>	<p>climate awareness (with an aid intensity of nearly 100 %).</p>	<p>NGOs, churches, local governments, educational institutions and central administration bodies. The programmes will enable the reaching of all segments of the society.</p>		<p>and will be published on a continuous basis until the available budget is depleted.</p>
<p>Developing energy-related secondary and adult education curricula</p>	<p>Due to operational programmes for 2014–2020, there will be significant amounts available to finance investments. In order to ensure the proper implementation of projects, an adequate number of qualified experts are required. In the framework of the measure, the goal is to train niche experts in both secondary and adult education. In the framework of the measure, the development of practical exercises, skills and a system of requirements focusing on innovative tools and solutions was supported.</p>	<p>Students (14+), adults and corporate experts.</p>	<p>Energy and Climate Awareness-Raising Action Plan</p>	<p>The trainings are expected to be launched in September 2016 and will afterwards be organised on an ongoing basis.</p>



### **3.1.5 Availability of qualification, accreditation and certification schemes** (EED Article 16)

According to the EED, where a Member State considers that the national level of technical competence, objectivity and reliability is insufficient, it shall ensure that, by 31 December 2014, certification and/or accreditation schemes and/or equivalent qualification schemes, including, where necessary, suitable training programmes, become or are available for providers of energy services, energy audits, energy managers and installers of energy-related building elements.

In Hungary, a technically sufficient and recognised training system is in place, which guarantees in particular the technical competence, objectivity and reliability of experts providing energy efficiency services in the construction industry (architects, building engineers etc.). The multilevel system of education is suitable to provide adequate theoretical and practical skills on a consistently high level throughout the country. Technical trainings enable the acquisition of comprehensive technical skills that enable professionals to resolve technical tasks independently in a profession subject to extensive and continuously changing legislation. Various supplementary trainings and further trainings and courses are available in the field of energy efficiency and the use of renewable energies. With a view to maintaining technical competence and reliability, professionals who are members of or are registered by trade associations are required to participate in mandatory specific trainings every five years; the curriculum of mandatory trainings include skills related to energy efficiency and building energy certification. In addition to the above, the registers kept by trade associations, indicating professional competences, ensure transparency to consumers, as provided for by the EED.

In the field of services related to energy efficiency, mention must be made of the legal status of experts carrying out building energy certification. In order to engage in their activity, certifiers are required to pass a competence exam whose system of requirements is set out in Government Decree No 266/2013 of 11 July 2013 on construction and construction-related activities. Widely available theoretical and practical preparatory courses provide assistance in order to prepare for the exam. The register of energy certifiers is available on the websites of national trade associations.

**On the basis of the above, the national level of technical competence and reliability is sufficient among providers of energy efficiency services listed in Article 16 and, therefore, with the exception of energy auditors, no additional certification or qualifications systems need to be set up.**

The authentic and publicly accessible register of energy auditors will be kept by the Hungarian Energy and Public Utility Regulatory Authority on the basis of the bill on energy efficiency. Registration bodies will organise aptitude tests in accordance with the examination requirements approved by the MEKH, which energy auditors are required to pass in order to be included in the official register. With regard to the registration of energy auditors, the requirements set out in Article 16 of the Directive are met, i.e. they provide transparency to consumers, whereas on the websites of retail energy providers and the settling bill prepared for them, consumers are provided with information on the contact details of registered energy auditors and building energy certifiers, among others, two times a year.

### **3.1.6 Energy services**

(EED Article 18)

‘Energy service’ means the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings.

That concept covers a wide range of activities, which may include, among others:

- providing energy advice,
- certifying energy management systems,
- providing various building renovation services,
- energy auditing,
- building energy certification,
- building automation and related software development.

‘Energy services’ are defined in Act LVII of 2015 on energy efficiency in accordance with the above.

The EED requires Member States to promote the energy services market by disseminating information on available energy service contracts and clauses and financial instruments to support energy efficiency service projects. In order to fulfil a number of information provision-related obligations set out in the EED, a website in connection with energy and climate awareness-raising will be set up and operated by the Hungarian Energy and Public Utility Regulatory Authority. Information provision in accordance with Article 18(1)(a) of the EED will also be carried out through that website. The obligation of operating the website is provided for in Act LVII of 2015 on energy efficiency, whereas its mandatory scope and detailed rules of its operation are set out in Decree No 25/2015 of 26 May 2015 of the Minister for National Development on the provision of information in order to increase energy efficiency. According to plans, the required content is expected to be uploaded in August 2015, which will temporarily be accessible from the current MEKH website ([www.mekh.hu](http://www.mekh.hu)). A new independent energy efficiency information website will be set up later on.

Similarly, Member States are required to encourage the development of quality labels, *inter alia*, by trade associations. Encouragement to develop quality labels will also be carried out through the website, by describing international models and best practices.

A voluntary register of energy service providers must be established and service providers must be given the opportunity to publish information. The register of energy certifiers is already operating, whereas by way of transposing Article 8 of the Directive, a public register of energy auditors is currently being set up by the Hungarian Energy and Public Utility Regulatory Authority. With a view to developing the market of energy efficiency services and to facilitate access to service providers, the website also enables various energy service providers to publish information approved by the MEKH, including the indication of the type of energy services provided by them.

It is the responsibility of Member States to support the public sector in taking up energy service offers. To that end, the website will provide information to public bodies, *inter alia*, on the benefits of employing energy service providers and energy performance contracting in order to implement plans to finance renovations and to maintain and improve energy efficiency in the long term, as well as on best practices in connection with energy performance contracts (ESCO).

In accordance with Annex XIII referred to in Article 18(1)(d), the implementing decree of the Act on energy efficiency sets out compulsory items to be included in energy performance contracting in the public sector. The model contract for energy performance contracting, including compulsory items, will be published on the website.

Article 18(2) sets out necessary and optional provisions.

On the basis of point (a), points of contact could be identified and publicised in order to enable final customers to obtain information on energy services. As the proposed information will be provided on a website, no points of contact need to be identified. However, a number of points of contact have already been set up, in particular in the customer service offices of energy providers.

In accordance with point (b), if necessary, measures must be taken in order to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models for the identification and/or implementation of energy saving measures. No such barriers have been identified.

In accordance with point (c), where appropriate, it should be considered that an independent mechanism should be put in place or its role should be assigned in order to ensure the efficient handling of complaints and out-of-court settlement of disputes arising from energy service contracts.

Sections 17/A to 37/A of Act CLV of 1997 on the protection of consumers provide for detailed rules on the handling of consumer complaints as well as the out-of-court settlement of disputes through conciliatory bodies. The Consumer Protection Act is applicable to business activities that affect or might affect consumers. 'Businesses' under the Consumer Protection Act include energy service providers with regard to the fact that they pursue their activity in order to achieve goals related to their independent trade or economic activity. 'Consumers' under the Consumer Protection Act include users of energy services. On the basis of the above, the provisions of the Consumer Protection Act in connection with the efficient handling of complaints and out-of-court dispute settlement fulfil the relevant recommendation of the Directive.

The 'independent market intermediaries', as defined in point (d), mean financial intermediaries. In accordance with point (d), where appropriate, Member States are required to enable financial intermediaries to play a role in stimulating market development on the demand and supply sides of energy services. In the opinion of the party submitting the report, on the consumer side, it has been ensured that own financing under the various aid programs can be provided by consumers by way of a bank loan. At the same time, adequate financial products are also available to energy service providers in order to facilitate the provision of services. Moreover, on the energy efficiency website referred to above, financial service providers are entitled to publish information approved by the MEKH on dedicated financial products designed to facilitate the use of energy efficiency financing programmes in accordance with the second subparagraph of Article 17(1) of the Directive. It also ensures that financial service providers can play a role in stimulating the development of the market of energy services.

The MEKH is also authorised to act in the event of complaints concerning the activity specified in Article 18(3) of the Directive; in its procedure, it may apply the legal consequences set out in Section 119 of Act XL of 2008.

On the basis of Section 57 of Act LXXXVI of 2007, the MEKH is entitled to act in the same manner as specified in connection with Act XL of 2008 and to apply legal consequences under Section 96 of Act LXXXVI of 2007. On the basis of Section 163 of Act LXXXVI of 2007, with a view to enforcing the interests of users of the Office shall cooperate with the consumer protection authority and associations representing the interests of users of mains energy systems. Moreover, the MEKH operates the Energy Conciliation Council, the institutional organisation of the protection of consumer interests. Members of the Energy Conciliation Council are delegated by the MEKH, consumer interest organisations and licence holders. Where consumer protection provisions are breached, legal consequences may be imposed by the consumer protection authority. These provisions correspond to sanctions under the EED.

The EED provides for sanctions in order to fulfil the obligation under Article 18(3). On the basis of that paragraph, sanctions must be imposed in order to ensure that energy distributors, distribution system operators and retail energy sales companies refrain from any activities that may impede the demand for and delivery of energy services or other energy efficiency improvement measures, or hinder the development of markets for such services or measures, including foreclosing the market for competitors or abusing dominant positions. In addition to the provisions of Act LXXXVI of 2007 and Act XL of 2008 referred to above, compliance with those provisions is ensured by various provisions of Act CXXI of 1999 on trade associations and Act LVII of 1996 prohibiting unfair market practices and the restriction of competition.

Section 3(2) of Act CXXI on trade associations provides that trade associations shall act in order to promote the development and organisation of economy, fair market conduct and the general and collective interests of economic operators. To that end, they shall draw up rules of ethical conduct in accordance with Section 10(1)(c), (e) and (f) of Act CXXI of 1999, monitor the enforcement of such rules and issue warnings where such rules are breached. They shall monitor the enforcement of provisions prohibiting unfair competition as specified in the Act prohibiting unfair market practices. Where such rules are breached, they may request the competent authority to take appropriate measures. They may warn those members of the trade association whose operation prejudices consumer interests and is thus injurious to or jeopardises the good reputation of a large group of business organisations and may request that measures are taken in order to suspend their operation for a specific period of time.

Section 11 of Act LVII of 1996 prohibiting unfair market practices and the restriction of competition prohibits agreements between and concerted practices by enterprises aiming to prevent, restrict or distort economic competition or having or potentially having such effect. Section 21 prohibits the abuse of a dominant economic position, the specific cases of which correspond to acts defined under Article 18(3) of the Directive. Sections 77 to 79/B provide for legal consequences in order to ensure compliance with Article 13 of the Directive on Sanctions.

### 3.1.7 Other energy efficiency measures of a horizontal nature

(EED Articles 19 and 20)

The EED provides that **Member States shall remove barriers that may hinder energy efficiency projects; two relevant areas are specifically mentioned, i.e. the split of incentives between the owner and the tenant of a building and public purchasing and accounting.**

In Hungary, the overwhelming majority of homes are owned by the occupants. As relatively short-term lease contracts are typical of the residential property market, splitting the incentives, costs and benefits of energy efficiency projects is relevant in the case of owners of co-owned properties rather than between owners and tenants. Several persons may typically have proprietary rights over a building in the following cases.

#### *Joint Ownership*

A property may be in joint ownership inter alia through joint purchase, community of property or inheritance. In the above cases, proprietary rights are divided between the owners according to specific incorporeal interests. In other words, each joint owner has proprietary rights over the entire property, without prejudice to the rights of other joint owners, to the extent of his specific incorporeal interest. In practice, however, the division of possession and use is governed by the relevant agreement between the parties.

Rights, the benefits of the property, expenses, obligations arising from joint ownership of the property and any damage to the property are distributed between joint owners in accordance with their respective incorporeal interests.

With regard to expenses that do not go beyond possession, use, exploitation and the normal management of property, joint owners shall take majority decisions in which the voting rights of each joint owner correspond to their share in the property. Decisions regarding expenses beyond the normal management of property require unanimous resolution by the joint owners.

Projects that do not go beyond the normal management of property include works, expenses and investments not intended to prevent deterioration or damage and, therefore, while not being absolutely necessary, they are useful and do not require disproportionate expenditure compared to the method and circumstances of the management of the property.

In accordance with the above, with regard to buildings in joint or ownership in Hungary, the decision-making procedures and the provisions regarding the splitting of costs and benefits are sufficiently and adequately regulated and, therefore, in the opinion of the person submitting the report, there is no need to remove regulatory gaps or barriers.

Joint ownership may concern an independent apartment or a building comprising several apartments occupied by separate owners. Where the building in question has at least two independent apartments or rooms for non-residential purposes or an independent apartment and a room for non-residential purposes, the proprietary community concerned may, at any time, choose to turn into a building under joint ownership, i.e. to establish a building under joint ownership. Moreover, the termination of joint ownership may be demanded by any joint owner, which may be carried out by converting the property into a building under co-ownership.

#### *Co-Ownership*

Joint ownership of a building may also be established by certain parts of the building, including in particular the apartments, being separately owned by the co-owners whereas those parts, equipment, rooms or apartments of the building that are not specified as being separately owned are placed in the joint ownership of co-owners. The share in joint parts of the building is regarded as an independent property together with the separately owned part of the building; they cannot be transferred or encumbered separately. Such unity of joint and separate proprietary rights give rise to the special character of buildings under co-ownership and the need for special legislation. Special provisions regarding buildings under co-ownership are set out in Act CXXXIII of 2003 on buildings under co-ownership, including in particular the provisions concerning the organisation of buildings under co-ownership and the exercising of proprietary rights over co-owned and separately owned parts of the building.



With regard to their separate property, co-owners have the rights of possession, use, reaping of benefits and disposal to the extent the exercise of such rights does not prejudice the rights and legitimate interests of other co-owners. The rules concerning the use and exploitation of apartments in separate ownership are set out in the internal rules of operation of the building under co-ownership.

Co-owned parts of the building may be occupied and used by any co-owner to the extent it does not prejudice the rights and legitimate interests of other co-owners. As the general rule, costs of the maintenance of co-owned parts of the building, equipment constituting part of the building, rooms for non-residential purposes and co-owned apartments and expenditure beyond the normal management of property are borne by the co-owners as joint expenses in proportion with the share of each co-owner. The general meeting of co-owners, as the main decision-making body of the community, shall have exclusive discretion over the use, exploitation and maintenance of co-owned parts of the building, expenditure beyond the normal management of property and obligations borne by the community. At the general meeting, co-owners have voting rights in proportion with their share in the property. As a general rule, the general meeting shall take decisions by the simple majority of co-owners turning up for the vote, based on their respective share in the property. The unanimous resolution of all co-owners is, however, required for expenses beyond the normal management of property. The terms 'renovation and modernisation of buildings' and 'expenditure beyond the normal management of property' are defined respectively in Section 56(2)(3) and Section 56(3) of the Act on buildings under co-ownership. Since, on the basis of the above definitions, the renovation and modernisation of buildings in order to improve energy efficiency are not expenses beyond the normal management of property, such projects do not require unanimous consent by co-owners.

**On the basis of the above, it is established that decision-making procedures in connection with buildings under co-ownership and the rules of splitting costs and benefits do not hinder energy efficiency and, therefore, no regulatory deficiencies or barriers need to be removed in that respect either.**

#### *Housing cooperatives*

The rules concerning the organisation, operation and property management of housing cooperatives and the legal relationship between housing cooperatives and its members are provided for in Act CXV on housing cooperatives.

Housing cooperatives are economic entities established for the construction and maintenance of residential buildings whose members may include natural persons and incorporated and unincorporated entities. Housing cooperatives do not pursue a profit and carry out their activities for itself, its members and owners who are not members of the housing cooperative.

The financing of the activity of a housing cooperative is generated from payments by members for construction, payments by members and non-member owners for maintenance (operation, maintenance and renovation) and from other revenues of the housing cooperative. The initial general meeting sets out the conditions of construction and maintenance-related payments by members, whereas the rules of financing and splitting construction and maintenance costs are specified in the statutes of the housing cooperative.

In the housing cooperative, apartments are in the ownership of members, non-member owners or the housing cooperative. Where the apartments are in the ownership of members, the plot pertaining to the building, the building structures, common areas and rooms of the buildings, the central equipment, the caretaker's apartment and other buildings and assets serving the needs of the housing cooperative are in the ownership of the housing cooperative.

As a general rule, the general meeting takes its decisions by open ballot, by the votes of more than 50 % of members turning up for the vote. Considering that the Act on housing cooperatives does not provide for the need of an unanimous vote regarding renovation, including renovation and modernisation in order to improve energy efficiency, decisions on such matters shall be made by more than 50 % of the members turning up for the vote.

Having assessed the **legislation concerning housing cooperatives**, it is again established that the decision-making procedures in connection with buildings owned by a housing cooperative and the rules of splitting costs and benefits **do not hinder energy efficiency and, therefore, in the opinion of the person submitting the report, no regulatory deficiencies or barriers need to be removed in that respect either.**

### *Accounting, budgeting and public procurement*

Regulatory and non-regulatory barriers that impede or do not properly support energy efficiency were assessed in recent years. During the improvements, efforts have been made in order to encourage public bodies to invest in projects to improve energy efficiency and minimise anticipated life-cycle costs and to encourage the uptake of energy performance contracting and other third-party financing mechanisms based on long-term contracts.

A good example of the above is the review, for energy efficiency and environmental criteria, of public purchasing-related legislation. Among the assessment criteria, Act CXXIX on public procurement specified the lowest price and the economically most advantageous tender. In particular, quality indicators, operating expenses and cost-efficiency considerations could be evaluated among the sub-criteria. In that assessment system, energy efficiency and environmental considerations were given less priority as equipment having better energy efficiency indicators are typically more expensive. Act CVIII of 2011 on public procurement, applicable to purchases and public purchasing procedures started after 1 January 2012, specifically provides that sustainability criteria can be taken into consideration among the sub-criteria. In order to enforce sustainability considerations, the law authorises the government to issue a decree which may set out the conditions of assessment.

Similarly, no regulatory barriers exist in accounting that would impede the implementation of energy efficiency projects.

Article 20 of the Directive provides that, without prejudice to Articles 107 and 108 of the Treaty on the Functioning of the European Union, Member States shall facilitate the **establishment of financing facilities**, or use of existing ones, **for energy efficiency improvement measures** to maximise the benefits of multiple streams of financing.

With regard to **financial facilities available** for measures to improve energy efficiency, the requirements applicable to the provision of grants from appropriations for building energy and energy efficiency are set out in Decree No 27/2013 of 12 June 2013 of the Minister for National Development on the rules of the management and use of chapter-specific appropriations.

The **appropriations may be used**, inter alia, to finance the construction or subsequent heat insulation of low-energy residential or public buildings, the energy-efficient renewal or replacement of windows and projects in order to replace traditional energy sources with renewable ones.

**Hungary has not exercised the option under Article 20(4) of the Directive, i.e. the setting up of an energy efficiency national fund. In the Hungarian system, there are no subjects obliged to contribute.**

**Savings due to horizontal measures (intersectoral measures or measures not elsewhere listed) appear in the target values of specific sectors.**

## **3.2 Energy efficiency in buildings**

### **3.2.1 Building renovation strategy – Building Energy National Strategy**

(EED Article 4)

In Hungary, the share of buildings in the national consumption of primary energy is approximately 40 %, which figure includes energy for heating, cooling and domestic hot water. This roughly corresponds to the ratio of Member States of the European Union with similar natural endowments. In Hungary, the technical and thermal technology condition of a significant part of buildings is obsolete and, consequently, reducing the energy consumption of buildings has a substantial energy savings potential.

Reducing the energy demand of buildings will primarily enable reducing natural gas consumption as buildings are mostly heated directly by natural gas, which also plays a significant part in district heating. Apart from energy management, increasing the energy efficiency of buildings will also result in performance management benefits in the case of natural gas and electricity. It directly reduces energy imports, i.e. the country's dependence on external energy, increasing the safety of energy supply at the same time.

Hungary's energy strategy, adopted in 2011 (the 'National Energy Strategy 2030') states the reduction of energy consumption by buildings as one of the most important goals related to increasing energy efficiency. Considering that the energy consumption of buildings accounts for four-tenths of the total primary energy consumption, achieving that target may radically improve the income situation of both residents and businesses. For residents, the most important benefit is additional significant and sustainable reduction in the amount of utility bills, which will in turn open new potentials for growth by releasing purchasing power. Businesses may benefit in that area from two aspects, i.e. by obtaining new market opportunities in industries related to rationalising energy consumption and the ability to calculate with far more predictable and stable energy expenses. Due to the reduction in fossil fuels, the requirement of long-term sustainability is becoming an increasingly critical factor or economic policy.

Its two main elements are energy conservation, i.e. achieving lower energy consumption, and the satisfaction of an increasing share of the remaining energy demand by using renewable energy sources.

In preparation for the Building Energy National Strategy<sup>25</sup> ('BENS'), a detailed energy survey was conducted on the stock of residential and public buildings. In addition to taking up detailed energy certifications, the survey was conducted in order to the ratio of renovated buildings in each category. On the basis of survey and analyses completed, buildings were categorised, the energy characteristics of each type of buildings were established and the energy savings and investment cost calculations were carried out regarding renovation alternatives corresponding to the optimum-cost level and nearly-zero energy level. Based on these detailed calculations, renovation scenarios were drawn up in order to determine building energy renovation targets concerning residential and public buildings. Taking typical building structures and mechanical, electrical and plumbing equipment into consideration, by developing renovation alternatives and packages, estimates could be made for specific costs of modernisations in various building categories. Within the energy consumption of buildings, residential buildings account for the largest share, i.e. nearly 60 %. In industry and agriculture, the energy consumption of buildings is relatively low and, consequently, these two sectors exercise negligible influence on the energy consumption of buildings on national level. Therefore, the building energy strategy does not discuss buildings in the latter two sectors in detail.

#### Building energy target values

Taking into consideration the findings of the National Energy Strategy 2030, as far as the energy consumption of buildings is concerned, the **primary energy savings target** set by the BENS is **49 PJ/year by 2020 and 111 PJ/year by 2030**. Findings of the financial sustainability survey are summarised in the table below:

		Primary energy savings target by 2020 (PJ)
1	Renovation of residential and public buildings	40
3	Renovation of the buildings of businesses	4
4	Other building-related energy savings (due primarily to awareness-raising and economical operation)	5
<b>5</b>	<b>TOTAL</b>	<b>49</b>

**Table 6: Proposed building energy savings targets under the BENS by 2020**

*Source: Building Energy National Strategy<sup>26</sup>*

<sup>25</sup> The Building Energy National Strategy was adopted by Government Resolution No 1073/2015 of 25 February 2015. It was published on the website <http://www.kormany.hu/download/d/85/40000/Nemzeti%20Épületenergetikai%20Stratégia%20150225.pdf>.

<sup>26</sup> Savings targets only include direct investments in order to reduce heating and domestic hot water energy requirements of buildings

**The Building Energy National Strategy, adopted as a separate document by Government Decree No 1073/2015 of 25 February 2015, has been forwarded to the Commission.**

### ***3.2.1.1 Action Plan in connection with the implementation of the Building Energy National Strategy***

Section 3 of Government Resolution No 1073/2015 of 25 February 2015 provides that tasks to be carried out on the basis of the strategy, their schedule and the persons in charge should be identified in accordance with other measures of the 3<sup>rd</sup> National Energy Efficiency Action Plan.

The Building Energy National Strategy ('BENS') defines measures in three areas.

- I. Achieving energy savings for the existing stock of buildings;
- II. Tightening and reviewing requirements concerning new buildings and renovations of buildings;
- III. Research, development, demonstration, innovation, knowledge, training, information.

Tasks:

- As far as the existing stock of buildings is concerned, the shortage of sources of financing is the greatest barrier to modernisation projects. A survey conducted a few years ago found that while a relatively significant part of households have the intention to modernise their homes, they lack sufficient savings and do not want to take out a loan. Therefore, any substantial renovation of existing buildings requires the availability of grants. Currently any financing for the modernisation of existing buildings is only included in operational programmes, while the draft budget for 2016 does not provide for funds for such purposes. However, even the preparation of modernisation projects poses a problem. Further consultations are needed in order to identify available public, private and European Union sources of financing and potential financing by international financial institutions.

*Organisations in charge: Ministry of National Development, Prime Minister's Office, Ministry of National Economy*

*Deadline: 30 August 2015*

- The revision of the Renewable Energy Utilisation National Action Plan should include a review of potential administrative measures, regulations and incentive programmes in order to facilitate the use of renewable energy-based energy supply (solar collectors, biomass, heat pumps) in the heating and cooling of buildings and the application of solar panels in order to provide renewable energy for electricity generation in buildings.

*Organisations in charge: Ministry of National Development, Prime Minister's Office*

*Deadline: 31 December 2015*

- Review of energy requirements concerning new buildings and renovations of buildings,
  - in particular, quantifying the energy requirements of nearly zero-energy buildings and setting out requirements by legislation in accordance with Article 9 of Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings;
  - reviewing requirements concerning the replacement of building elements in the case of technical building equipment and the building envelope;
  - setting out requirements for major renovations of existing public buildings after 31 December 2018, and for major renovations of other types of buildings after 31 December 2020 (when the required energy performance of new buildings will be nearly zero).

*Organisations in charge: Prime Minister's Office*

*Deadline: 31 December 2015*

- Processing the experiences concerning the energy rating of buildings and the certification system; upgrading the system if appropriate. Achieving energy savings by a review of the building certification system (e.g. introducing a new 'outstanding energy performance' category).

*Organisations in charge: Prime Minister's Office*

*Deadline: 31 December 2015*

- Research, development and demonstration related to new building energy technologies and promoting the use of new technologies. Drawing on the activity of the Hungarian research and business communities, developing new building energy technologies and rolling them out on the Hungarian market. Using new technologies and fuel cell systems to reduce heat loss in residential buildings and developing and rolling out new technologies in the energy supply of public buildings, industrial, commercial, catering and agricultural establishments for renewable energy applications in buildings. Research concerning the joint review of public health, building energy and energy poverty-related criteria of building energy projects.

*Organisations in charge: Ministry of National Economy, Ministry of National Development, Prime Minister's Office, NHIT*

*Deadline: ongoing*



- Developing energy awareness-raising and educational activities for residents, in accordance with the draft Awareness-Raising AP and Sections 20 and 21 of Act LVII of 2015 on energy efficiency.

*Organisations in charge: Ministry of National Development, MEKH*

*Deadline: in line with the specified legislative requirements and deadlines of the Awareness-Raising AP*

- Encouraging knowledge sharing and popular education by building operators, building owners, energy consultants and municipal energy experts, in accordance with the operation of the website under Section 20 of Act LVII of 2015 on energy efficiency and the operation of the proposed network of energy engineers.

*Organisations in charge: Ministry of National Development, Prime Minister's Office, MEKH*

*Deadline: 31 December 2015*

- Improving building energy vocational training and education in higher education and vocational training. In the case of engineers, consultants and contractors, increased training is required in order to ensure low energy consumption in buildings. The measure must be developed in close cooperation with operators in the construction industry. Engineers, architects, skilled construction workers and plumbing and heating technicians to be trained must be very skilled in the field of energy-efficient construction. Trainings must give appropriate priority to energy efficiency. It is important that operators should have a better overview of the entire construction process.

*Organisations in charge: Ministry of National Development, Prime Minister's Office, Ministry of Human Resources, MEKH*

*Deadline: ongoing*

- Upgrading the building energy data collection system, harmonising the system of project data and the collection of energy data in order to monitor the savings achieved and to improve the provision of statistical data in accordance with the data provision obligation under Sections 13 to 15 of Act LVII on energy efficiency.

*Organisations in charge: Ministry of National Development, Ministry of Human Resources, MEKH*

*Deadline: ongoing*

- Creating a database and records concerning central government buildings with a view to fulfilling and monitoring the renovation requirement under Article 5 of Directive 2012/27/EU on energy efficiency (EED). In order to achieve an exemplary role of public bodies' buildings and energy savings by public bodies, each Member State must ensure that, as from 1 January 2014, 3 % of the total floor area of heated and/or cooled buildings owned and occupied by the central government is renovated each year to meet at least the minimum energy performance requirements that it has set in application of Article 4 of Directive 2010/31/EU. In the absence of the database, the fulfilment of the obligation cannot be monitored. In accordance with Section 9 of Act LVII on energy efficiency and Section 7 of Government Decree No 122/2015 of 26 May 2015<sup>27</sup>.

Organisations in charge: MND

Deadline: 1 September 2015

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<sup>27</sup> Government Decree No 122/2015 of 26 May 2015 implementing the Act on energy efficiency

### 3.2.2 Other energy efficiency in buildings sector

In addition to the renovation of residential and public buildings, the Building Energy National Strategy sets out targets in other areas.

Such targets include:

- building new, energy-efficient buildings and replacing buildings that are technically obsolete and out-of-date,
- renovating the buildings of businesses,
- increasing the energy performance of buildings supplied by a district heating service,
- utilising renewable energy for the energy supply of buildings,
- implementing energy management systems,
- awareness-raising, information provision, consulting and information exchange.

On the whole, by achieving the above goals, **additional primary energy savings of at least 9 PJ must be achieved by 2020.**<sup>28</sup>

Cost-optimised requirements were introduced as from 1 January 2015 also for new buildings whose construction is financed from the central budget. As far as private construction projects are concerned, the requirement, which is 25-30 % more stringent than the previous (2006) requirement, will only become applicable on a mandatory basis from 1 January 2018<sup>29</sup>. The tighter requirement has, however, become a standard for responsible private developers and the construction materials industry and helps prepare for achieving the nearly zero energy requirement applicable to new public buildings from 2019 and all other types of buildings from 2021. At the same time, fulfilling the tighter requirements represents a higher level in the quality of construction, which poses a challenge to the construction industry.

In the case of better insulated and more air-tight buildings, increased attention should be paid to ensuring healthy and energy-efficient ventilation, the coordination and adjustment of mechanical, electrical and plumbing equipment and the integrated and mutually communicating development of the various regulatory and control systems.

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<sup>28</sup> Source: Building Energy National Strategy

<sup>29</sup> The requirement level was adopted by Government Resolution No 1246/2013 of 30 April 2013 on the energy efficiency requirements of buildings and on reaching the cost-optimal energy efficiency level according to Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy efficiency of buildings

In research and development, particular attention must be paid to the energy performance-enhancing retrofitting, modernisation, conversion or renovation of technical building equipment and building structures that are currently used in great numbers, which may result in the saving of energy even during the life span of existing equipment at a lower investment.

The gaining ground of building automation systems is a new area in energy savings. Smart solutions primarily enable the individual regulation of use, e.g. by measurement and by optimising the usage profile; smart solutions also offer additional opportunities; in addition to satisfying energy conservation criteria, they also increase the sustainability of the use of buildings.

An increasing number of smart solutions are becoming available, while they are also becoming increasingly efficient. Modern technologies have been demonstrated to increase the amount of energy that can be saved and reduce/rationalise the amount of energy used. At the same time, they also influence the distribution of use in time, thus affecting the peak load period. Moreover, an important shift must be made in order to increase the feeling of comfort and the sustainable use of energy. With a view to promoting the use of smart systems, standards must be integrated, the systems used must be upgradeable and connectible and the competent experts and installing technicians must be trained.

The energy efficiency website may be a useful tool for providing information on innovative solutions and best practices.

As a result of the economic crisis, a temporary decline was observed in the construction of new buildings, whereas construction began to increase slightly in 2014.

However, compared to the total number of 4.4 million existing homes, the 8 358 new homes put into use in 2014 (taking into consideration that 1 724 homes ceased to exist during the same period) account for as little as 0.15 %<sup>30</sup>. The sound energy characteristics of new homes therefore only exert a small influence on the energy efficiency of the entire stock of homes.

The renovation of buildings will account for the majority of energy savings in years to come. The direct additional labour demand of investment projects results in the employment of 41 or 42 thousand workers, which may be maintained over the period or renewed each year. The additional employment of almost 3 000 workers a year in various sectors of the economy may be added to the above as an indirect effect of the expected increase in consumption demand, which will be generated by increasing savings in residential and public energy expenditure.

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<sup>30</sup> Source: KSH Flash Report, Housing and building permits, 2014, Q1 to Q4

The construction sector is important in terms of the GDP and labour market trends. Other than that, it triggers rippling effects within the economy on other sectors. The construction of new buildings and major renovations generate further investments into the infrastructure (for example, development of the transport infrastructure, furniture and installation, development of infocommunications tools etc.).

### **Measures in the construction industry in order to improve energy efficiency**

The European Construction Technology Platform classified the chief development trends into three main groups:

- achieving a higher level of customer satisfaction,
- increasing social sustainability, and
- modernising the construction industry.

To the three trends referred to above, the Hungarian Construction Technology Platform added catching up and utilising national energy assets. European development trends include the requirement and the first attempts toward a shift from a scale of buildings to a community/city scale, of which the ‘smart cities and communities’ initiative is the best example.

#### ***3.2.2.1 Measures and financing programmes related to the renovation, modernisation and operation of buildings from 2008 to 2014, and programmes for households in order to improve energy efficiency***

Taking into consideration Hungary’s significant import dependency as well as the fact that successful energy efficiency activities may play a substantial role in ensuring uninterrupted energy supply in the future, the Hungarian energy policy treats energy conservation as a priority. Energy conservation helps reduce our energy import dependency, the energy bills of institution and households, increase the number of investment projects, thus improving the level of employment, mobilising domestic capital and accelerating foreign direct investment and financing and helping to live up to our international environmental commitments related to the emission of air pollutants.

Horizontal measures include the extension of building energy requirements.

Decree No 7/2006 of 24 May 2006 of the Minister without Portfolio determining the energy characteristics of buildings provides for the requirements concerning buildings and building elements. Since 9 January 2013, minor renovations have also been subject to these requirements. As far as new buildings and major renovations of existing buildings are concerned, in addition to the requirement concerning the thermal transmittance of the building envelope, the requirement for the specific loss factor of external structures and the combined energy characteristic requirement must also be met. Moreover, it must be verified that the building is adequately protected against summer warming. Since 9 January 2013 the requirements concerning building technical systems must also be fulfilled. Among the requirements concerning building technical systems, the adjustment and regular verification of existing systems are a priority.

The fulfilment of building energy requirements is verified by the construction authority during the licensing of the construction of new buildings and extensions and modernisation of existing buildings that are subject to a building permit. Mandatory annexes to the building permit technical documentation include the review of potential alternative energy supply of the planned building, the potential use of renewable energy sources and potential cogeneration. From 1 January 2015, in the case of construction projects financed from a grant or state aid, minimum requirements specified at a cost-optimal level must be applied in modernisation projects.

The energy certification of new buildings has been mandatory since 1 January 2009 on the basis of Decree No 176/2008 of 24 May 2006 of the Minister without Portfolio determining the energy characteristics of buildings. Since 2012, it has also been applicable to the sale or letting of buildings and apartments. The electronic records of energy certificates have been operating since 2013. As a result of the measure, the energy certificate has become widely known and used. The energy certificate provides a summary of the energy and energy performance characteristics of buildings. The data sheet enables the owner of the building or, in the case of change in ownership, the buyer to briefly and efficiently obtain information on the energy efficiency characteristics of the building, which may positively affect their decision. The certificate helps owners in improving energy efficiency by implementing the renovation projects recommended in the certificate.

The tightening of requirements has led to a change in quality on the market of construction products, accelerating the development of structures or products of better energy characteristics, ousting products of lower quality and insufficient thermal characteristics. It has been observed that builders and buyers take energy criteria into consideration on making purchasing decisions.

#### Developing energy efficiency training/educational materials

The system of energy training and education will also be extended and renewed. In the framework of the measure, the development a system of short, medium and long-term vocational training based on a consistent green training syllabus and curriculum should be supported, which is expected to be implemented through a regional consortium-based cooperation between training institutions and field practice training locations. Higher-education and vocational training institutions should be supported in the specialised training of instructors and the creation of appropriate training conditions at field practice training locations. Energy training materials must be developed for primary and secondary educational institutions. Education is the most efficient awareness-raising tool. The inclusion of energy efficiency in the primary and secondary educational curricula reflects the social recognition of the role of energy efficiency.

**Energy efficiency grant programmes** are typically financed from three sources:

- the Environment and Energy Operational Programme;
- in the framework of the Green Investment System (after 1 January 2014, the Green Economy Financing Scheme);
- central budgetary appropriations.

Between 2007 and 2013, financing was provided under the Environment and Energy Operational Programme. Energy efficiency targets of the OP included the development of a system of tools for energy conservation and the efficient use of energy in production and consumption. Priorities under the 4<sup>th</sup> and 5<sup>th</sup> priorities included increasing the share of renewable energy sources and the efficient use of energy, respectively. In addition to the above, the promotion of sustainable lifestyles and forms of consumption and the preparation of projects under the next programming period were financed in the framework of various programmes.

Investment projects financed under the 4<sup>th</sup> priority:

- (a) financing biomass utilisation;
- (b) financing waste utilisation;
- (c) financing the generation and utilisation of biogas from biological wastes;
- (d) financing the generation and utilisation of geothermal heat and/or electricity;
- (e) financing the installation of state-of-the-art heat pump systems for heating and cooling;
- (f) financing the installation of systems utilising solar energy;
- (g) increasing the life-span and improving the efficiency and energy conversion efficacy of existing hydroelectric power plants and financing the construction of smaller hydroelectric power plants;
- (h) financing wind power-based electricity generation;
- (i) implementing and applying tools and regulatory methods to facilitate the integrability of renewable energy sources into electricity and other energy systems and managing the capacity limitations of systems, taking into account the principle of security of supply. Complex investment projects involving the use of renewable energy sources during building modernisation, financed under measure 4.9 may improve the energy performance of buildings.

Investment projects financed under the 5<sup>th</sup> priority:

- (a) modernising the energy consumption of buildings, including in particular the energy modernisation of public and municipal buildings and development projects to reduce the energy consumption of street lighting;
- (b) modernising district heating systems, including in particular minimising the heat loss of networks, renovation of thermal centres, installation of control systems and, on the supply side, modernising electricity and heat generation equipment, cogeneration of heat and electricity and the use of renewable energy sources.

Under the 4<sup>th</sup> priority, 4 398 applications were received and financing paid out to date amounts to HUF 73 884 602 106. In particular, 263 applications were received and HUF 18 991 323 177 have been paid out under the combined measure 4.9<sup>31</sup>. In total, 2 299 applications have been received and HUF 81 703 866 744 have been paid out under the 5<sup>th</sup> priority<sup>32</sup>.

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<sup>31</sup> 28 May 2015 SMIS data

<sup>32</sup> 28 May 2015 SMIS data



Table 7 shows a preliminary summary of the energy savings effects of financing tenders. (Table 7)

<b>energy efficiency-related operational programmes</b>	<b>New savings in 2014 (PJ)</b>	<b>New savings in 2015 (PJ)</b>
EEOP 4	<b>0.0162</b>	<b>0.1156</b>
EEOP 5	<b>0.1014</b>	<b>0.6918</b>

Measures to improve energy efficiency were also included in other operational programmes.

Financing programmes implemented under the Green Investment System (after 1 January 2014, the Green Economy Financing Scheme)<sup>33</sup>

On the basis of Section 10 of Act LX of 2007 on the framework for implementing the UN Framework Convention on Climate Change and its Kyoto Protocol and Government Decree No 323/2007 of 11 December 2007 laying down certain rules on the implementation of Act LX of 2007 on the framework for implementing the UN Framework Convention on Climate Change and its Kyoto Protocol, the income from Kyoto units sold in the name of the State must be used under a Green Investment Scheme ('GIS') to finance activities and measures to reduce emissions of greenhouse gases in Hungary, increase their removal by sinks and adapt to the effects of climate change.

The rules of operating the GIS are provided for in Instruction No 18/2011 of 29 March 2011 laying down detailed rules for the operation, use, registration and control of the Green Investment Scheme.

Principles of the GIS include that aid is restricted to measures capable of reducing greenhouse gas emissions to the most significant extent possible. They are measures that could not be implemented without GIS financing or could not be implemented in the same quality (i.e. they would not reduce emissions to the same extent); this is the additionality principle. Another important criterion is that Hungary is required to give account of the reduction in emissions achieved through the supported projects to the buyers of Kyoto units. It follows from the above that the reduction in emissions achieved as a direct result of projects must be checked and verified in each case.

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<sup>33</sup> Data of specific financing programmes (amount of financing, number of recipients, estimated savings) were provided by ÉMI Nonprofit Kft, 2015, week 13.

The sub-programmes announced in the framework of the Hungarian GIS focus on reducing the energy consumption of buildings and thus on reducing emissions. Over three-fourths of the quota revenues to date has been allocated to financing building energy improvement projects.

The **GIS Climate-Friendly Pre-Fabricated Homes Sub-Programme (Pre-Fab 2)**, announced in 2009, focuses on supporting the modernisation and renovation of residential buildings built by industrialised technology, reducing carbon dioxide emissions and resulting in energy savings. Eligible activities included the replacement of windows and heat insulation of buildings, preferably through complete renovation. Enabling the use of renewable energy sources was also eligible for financing. During the implementation of the programme, a special climate protection element was introduced for the first time concerning the energy efficient renovation of prefab homes, including a strictly quantified carbon dioxide emissions calculation and the controlling of the CO<sub>2</sub> emission and energy consumption of completed projects for a period of 5 years. The applicants included owner-occupied blocks, housing cooperatives and local governments. Under the tender, the modernisation of 46 000 homes was co-financed in the value of more than HUF 26 billion. The level of total calculated energy savings is 1.01 PJ/year.

The **GIS Climate-Friendly Homes Energy Efficiency Sub-Programme**, launched in December 2009, supports the complex climate-friendly energy efficiency renovation of residential buildings built by traditional technology, the compulsory use of renewable energy sources linked to the building and the construction of new, energy-efficient residential buildings. Investment projects achieving an outstanding level of savings could receive additional financing. The applicants included natural persons, owner-occupied blocks and housing cooperatives. Under the tender the modernisation of about 15 000 was co-financed in the total value of HUF 938 million. The calculated value of annual savings is 0.078 PJ/year.

Under the **GIS Low-Energy Household Appliances Replacement Sub-Programme**, launched in March 2010, persons in need, including elderly people, large families, people with disabilities and registered unemployed persons, were offered an opportunity to replace their high-energy refrigerators and washing machines with low-energy appliances through tenders for the relevant foundations and associations, facilitating quantifiable energy savings and reduction of emissions. Higher amounts of financing were available for purchasing 'A++' category appliances. The applicants included foundations and associations representing the interests of senior citizens, large families, persons with disabilities and registered unemployed people. The purchasing of 195 appliances was financed. The calculated value of annual savings is 0.018 PJ.

The **GIS Low-Energy Bulb Replacement Sub-Programme** was launched in April 2010. The aim of the tender is to support persons in need, including elderly people, large families and people with disabilities, in replacing traditional light bulbs with low-energy bulbs through tenders for the relevant foundations and associations, which will result in quantifiable energy savings and reduction of emissions. The applicants included foundations and associations representing the interests of senior citizens, large families and persons with disabilities. In the tender, there were 238 applicants, whereas the calculated value of annual savings is 81 866 459.766 MJ.

The **GIS Our Home Renovation and New Home Building Sub-Programme** was published in 2011. The sub-programme was designed to support the construction of new low-energy residential buildings and the complex energy efficient renovation and modernisation of existing residential buildings to reduce carbon dioxide emissions and to facilitate the use of renewable energies. Renovation or new construction projects in order to achieve at least the 'B' energy category were eligible under the tenders. In the case of projects for the utilisation of renewable energy sources, the minimum energy category to be achieved using the grant was 'A+'. The applicants included natural persons, owner-occupied blocks, housing cooperatives and organisations having buildings constructed. Grants were awarded for 439 homes, resulting in calculated annual savings of 7 659.351 MJ.

The **GIS Sub-Programme to facilitate the use of a renewable energy source and the construction of a solar thermal collector system to produce domestic hot water and auxiliary heating**, first published in 12 October 2011, supported the purchasing and installation of solar thermal collector systems (for domestic hot water, the heating of buildings or solar combined systems serving both purposes or other heat requirements) reducing the carbon dioxide emissions and improving the energy performance of existing residential buildings.

The applicants included natural persons and owner-occupied blocks. 1 400 applications were received under the tender. The level of calculated annual energy savings is 0.042 PJ.

The **GIS Front Doors and Windows Replacement Sub-Programme** (ZBR-NY/14) was designed to support the replacement of external doors and windows in order to increase energy conservation and reduce emissions of greenhouse gases, where the level of reduction in carbon dioxide emissions is calculable and the level of improvement of the energy performance of buildings can be verified in terms of annual primary energy consumption according to Decree No 7/2006 of 24 May 2006 of the Minister without Portfolio determining the energy characteristics of buildings.

The necessary replacement (according to the applicants' requirements) of external windows of apartments is eligible where the new windows to be installed fulfil the cost-optimal energy requirement. In the event of the replacement of external windows in apartments, the installation of self-adjusting ventilation units in the windows in order to ensure adequate ventilation is a compulsory eligible expense. State aid may only be granted for the replacement of doors and windows in heated residential spaces (rooms).

Improving the summer heat protection of eligible buildings through the installation of sun-protection or shading structures which must be installed at the specified front side of the building in a uniform manner. All interventions are eligible if they are capable of sufficiently reducing the summer solar load of buildings without reducing the winter radiation benefit (mechanical cooling or the installation of air-conditioning appliances are excluded). Only projects combined with the installation of doors and windows are eligible. More than 2 000 applications were received for the tender, published in autumn 2014.

The various sub-programmes under the 'Warmth of Home Programme' are financed from the Green Economy Financing Scheme, which replaced the Green Investment Scheme from 1 January 2014. Aid available under the international cooperation to reduce the emissions of greenhouse gases (GHGs) under Section 2(30) of Act CCXVII of 2012 on participation in the greenhouse gas emission allowance trading scheme of the Community and in the implementation of the Effort Sharing Decision, to absorb GHGs and to adapt to the effects of climate change, the use of which is provided for by Decree No 69/2013 of 28 November 2013 of the Minister for National Development on the utilisation of the Green Economy Financing Scheme chapter-specific appropriation.

The tenders published under the Green Investment Scheme are being closed on an ongoing basis. Their financing sources will remain the same until each sub-programme has been concluded.

The **Replacement of large household appliances in order to save energy sub-programme** (HGCS-2014), under the Warmth of Home Programme, published in October 2014 in the framework of the Green Economy Financing Scheme, was designed to increase the energy efficiency of households by supporting the replacement of existing large household appliances (refrigerators/freezers) with new, low-energy refrigerators/freezers.

The tender primarily targets pensioners or large families, who receive state aid to purchase new large household appliances (freezer/refrigerator) at a reduced price (retail price less the amount of state aid). Under this tender, new refrigerators, combined freezer/refrigerators, upright or chest freezers are eligible for financing. The replacement of appliances must result in energy savings of at least 10 % or a saving of 20 kg/year in CO<sub>2</sub> emissions. The purchasing of nearly 25 000 appliances is co-financed under the programme, whose assessment is currently in progress.

The **Heating Modernisation (boiler replacement) sub-programme of the Warmth of Home Programme** is designed to support the purchasing and installation of heating systems employing condensing boiler technology and utilising renewable energy, improving the energy performance of existing residential buildings and resulting in lower carbon dioxide emissions (modern multi-purpose heat supply systems for the heating of buildings, domestic hot water or a combination of both). Eligible to this source of financing are natural persons who are owners of a residential property affected by the tender. Residential properties affected by the tender may include: row houses, terraced houses, semi-detached houses and owner-occupied blocks with up to 4 apartments, built and occupied prior to 31 December 2006, regardless of their construction technology. The various residential units were eligible to submit separate applications provided that they had an independent (apartment heating, cooling or domestic hot water-producing) technical unit. Grants were awarded for 900 homes, resulting in calculated annual savings of 14 181.745 MJ.

### **Financing programmes from central budgetary sources only**

Tenders using central budgetary financing were primarily intended to support the installation of appliances for the energy modernisation of residential buildings of an industrialised or traditional structure and for increasing the share of renewable energy.

In the framework of the New Hungary Home Renovation Programme, two energy efficiency-related calls for proposals were published on 1 February 2008, i.e. the pre-fab tender (Pre-Fab 1) and the ECO tender.

The **Programme (LFP-2008-LA-2) to support the energy-saving modernisation and renovation of residential buildings built by industrialised technologies** is designed to support the energy-saving renovation of residential buildings built by industrialised technologies on the basis of a building permit issued prior to 1 July 1992, and the installation of appliances in order to renovate and modernise the technical systems and equipment of such residential buildings and to increase the share of renewable energy. For the purposes of the tender, residential buildings built by industrialised technologies include LPS, medium and large blocks, tunnel form, moulded, reinforced concrete structures and other pre-fabricated technologies.

Financing under the tender was only available for works resulting in demonstrable energy savings, including in particular

1. Renewal or replacement of doors and windows resulting in the saving of energy
2. Heat insulation of façades and ceilings
3. Modernisation and renewal of building technical systems
4. Increasing the share of renewable energy.

Under the tender, the modernisation of 36 000 homes was co-financed; the calculated value of energy saved is 0.4 PJ/year.

The ECO Programme (LFP-2008-LA-9) was designed to support the **installation of appliances to adjust and measure the heat consumption, by apartment, of residential buildings supplied by district heating services**. Under the programme, financing could be granted for the following:

1. Installation of equipment (thermostatic valves) required to individually regulate the heating panels of apartments
2. Installation of measuring appliances (calorimeters and/or cost allocators) for measuring the individual heat consumption of apartments, or the distribution, by apartments, of the costs of the heat consumption of buildings
3. Conversion of the building heating system, including in particular:

(a) Installation or replacement of regulators of collecting pipes;

(b) With a view to enabling measurement or control, the conversion of single-pipe flow-through heating systems with bridging sections installed before the heating panels, or the replacement of the single-pipe heating system with a new double-pipe heating system.

Overall, about 110 000 residential consumers participated in the programme and average energy savings were more than 15 %, confirming the efficient use of financing. An awareness-raising campaign was conducted in order to facilitate the implementation of the programme.

### *3.2.2.2 Current and proposed measures and financing programmes related to the renovation and modernisation of buildings*

‘The Warmth of Home Programme’

‘Supporting the energy-saving modernisation and renovation of owner-occupied blocks’ sub-programme (Tender code: ZFR-TH/15)

In the framework of the tender, financing may be applied for by owner communities of residential buildings with a minimum of 5 and a maximum of 60 apartments, built after 1946 and supplied by district heating, common central heating or individual heating in each apartment, installed on the basis of a building permit issued on or before 31 December 2006. Only those buildings or building sections confined by dilatation are eligible for financing, where the thermostatic control and measurement of the building or building section confined by dilatation have either been resolved or will be resolved in the framework of the tender.

Where two or more non-adjacent building sections intend to apply for financing within the same building, where each such building section is confined by dilatation, they are required to submit as many applications as there are non-adjacent building sections intending to participate in the tender. In the case of a property consisting of several buildings registered under a single topographical lot number, each application must be restricted to a single building or building section confined by dilatation, i.e. a separate application must be submitted for each building or building section confined by dilatation to be renovated.

Where, prior to the development, a building/building section is below 'C' rating, it must reach at least 'C' rating when the development is completed. Where, prior to the development, a building/building section has 'C' or higher rating, it must improve at least two ratings when the development is completed and the development must be carried out using a renewable energy source.

For each CO<sub>2</sub> kg/year saved, as demonstrated by the energy certificate:

- HUF 750 in the case of development projects including the replacement of front doors and windows and the thermal insulation of façades/cover ceiling panels;
- HUF 950 in the case of development projects to facilitate the utilisation of renewable energy;
- HUF 850 in the case of development projects in connection with the modernisation of buildings with individual heating in each apartment.

Moreover, additional HUF 150 000 per apartment may be granted for the replacement of gas boilers with condensing boilers in residential buildings with individual heating in each apartment; however, the financing available under the tender, cannot be more than 50 % of eligible expenses.

Financing is available for complex and energy-saving renovation projects, considering that complex renovation is required in order to achieve the highest possible saving in energy.

The work elements eligible for financing must be fully completed and the supported development projects must result in homogeneously renovated building structures, such as:

- all frontal surfaces affected by thermal insulation,
- complete thermal insulation and damp proofing of roofs,
- complete thermal insulation of the ceiling of unheated basement sections,
- replacement of external windows in the complete apartment and heated common areas,

In the case of interventions affecting the building envelope, cost-optimal requirements in effect from 1 January 2015 must be fulfilled.

The household appliances replacement programme and the heating modernisation programme are intended to be continued

Environment-friendly product rating system



In Hungary, the environmental product rating scheme, the environment-friendly trademark was created in 1993 by the former Ministry of Environment in order to influence consumers' purchasing decisions by environmental considerations. Another goal of the environment-friendly rating scheme is to encourage producers and distributors to develop, manufacture and put on the market products and implement processes with lower material and energy input and less polluting to the environment. Strengthening the awareness of responsibility toward the environment is important in the case of both consumers and producers.

As the first Hungarian public-benefit company, since 1 January 1994, the Környezetbarát Termék Nonprofit Kft. has been operating the distinctive compliance certification scheme of environment-friendly products on the basis of a government resolution.

That company is entrusted with the operation in Hungary of systems of institutions certifying compliance with the Hungarian and EU eco-labels, based on the relevant Hungarian decrees and EU legislation. All products and services need to comply with a specific system of requirements in order to be awarded the 'Environment-Friendly Product' label.

Programmes to support proposed energy efficiency and renewable energy projects during the 2014–2020 programming period

**Environment and Energy Efficiency Operational Programme (EEEOP)**

PRIORITY	MEASURE	ELIGIBLE ACTIVITIES	POTENTIAL RECIPIENTS
<p align="center">EEEOP</p> <p>Priority 5: Increasing energy efficiency, use of renewable energy sources</p>	<p>Promoting the generation of green electricity based on distributed energy resources, not linked to buildings, in distribution networks (5.1.)</p>	<ul style="list-style-type: none"> <li>• establishing power plants generating electricity or cogenerating thermal energy and electricity, capable of feeding electricity based on renewable energy sources directly into the grid. The following renewable technologies are eligible: Biomass (including all biodegradable organic substances); Biogas generation and utilisation; Use of geothermal energy; Solar energy utilisation; Hydroelectric power plants below 10 MWe, and cross-flow and floating turbines installed in riverbeds and typically of a capacity of a few times 100 kWe;</li> <li>• electricity storage systems and other tools facilitating the regulation of the network;</li> <li>• preparation of renewable energy projects.</li> </ul>	<p align="center">business associations</p>
	<p>Energy modernisation of buildings through the combination of renewable energy sources (5.2.)</p>	<ul style="list-style-type: none"> <li>• energy efficiency and renewable energy-related modernisation projects on residential buildings, buildings of central budgetary bodies and, in the CHR, of local governments, public buildings owned by local governments and buildings of non-profit organisations carrying out public functions</li> <li>• within the CHR, the energy-related renovation of and utilisation of renewable energy in municipal buildings used by institutions providing public services,</li> <li>• within the CHR, energy efficiency-increasing projects on residential buildings owned by local governments</li> </ul> <p>Only in the case of buildings meeting the conditions listed above:</p> <ul style="list-style-type: none"> <li>• improving the thermal characteristics of buildings, reducing thermal loss, utilising renewable energy sources (in particular by installing solar panels and solar collectors and utilising biomass, geothermal energy and heat pumps)</li> <li>• modernisation of institutional heating, cooling and domestic hot water systems,</li> <li>• modernising lighting systems within buildings in order to reduce energy consumption,</li> <li>• in the public sector: promoting ‘soft’ energy management devices to reduce energy consumption through monitoring and continuously controlling energy consumption (purchasing metering and controlling equipment and training, instruction and environmental quality assurance required for the use of such devices)</li> <li>• before 2019, in the case of central budgetary bodies, the construction of new nearly zero-energy buildings in the form of pilot projects,</li> <li>• project preparation.</li> </ul>	<p align="center">households central budgetary bodies, non-profit organisations carrying out public functions (except local governments), churches, business associations in majority public ownership, local governments in the CHR, business associations in the majority ownership of local governments in the CHR</p>

<p>EEEOP</p> <p>Priority 5: Increasing energy efficiency, use of renewable energy sources</p>	<p>Energy development and renewable conversion of district heating and heat supply systems (5.3.)</p>	<ul style="list-style-type: none"> <li>establishing new renewable energy-based district heating-generation plants, modernising existing obsolete and low-efficiency generation plants and increasing their energy efficiency;</li> <li>replacement of distribution systems and primary pipe networks, heat insulation of overground pipes and modernising such pipes by placing them underground, renovation and separation of thermal centres, installation of control and telemechanical systems, connecting new consumers, development of district cooling systems (heat-driven heat pumps), and installing new cooperation and market-expanding primary pipelines</li> </ul>	<ul style="list-style-type: none"> <li>district heating providers</li> <li>district heating-generation companies</li> </ul>
	<p>Awareness-raising programmes (5.4.)</p>	<ul style="list-style-type: none"> <li>focusing on programmes to mobilise students and families with children, drawing attention to the benefits of energy and climate-conscious behaviour</li> </ul>	<ul style="list-style-type: none"> <li>NGOs,</li> <li>churches,</li> <li>local governments,</li> <li>educational institutions,</li> <li>central budgetary bodies</li> </ul>

**Table 7: Planned energy efficiency programmes under the Environmental and Energy Efficiency Operational Programme**

Regional and Urban Development Operational Programme (RUDOP)

PRIORITY	MEASURE	ELIGIBLE ACTIVITIES	POTENTIAL RECIPIENTS
<p>RUDOP</p> <p>Priority 3: Shift toward a low carbon dioxide-emission economy, particularly in urban areas</p>	<p>Increasing energy efficiency and the share of renewable energies in local governments</p>	<ul style="list-style-type: none"> <li>energy-related rehabilitation of municipal buildings, institutions and infrastructure and improving the heat insulation of buildings,</li> <li>energy-related modernisation of municipal buildings, institutions and infrastructure and utilising renewable energy sources,</li> <li>implementing energy supply controlled by the local government, in line with local conditions and focusing on the exploitation of renewable energy sources in the framework of complex development programmes, supporting the drawing up of Sustainable Energy Action Plans (SEAP) by local governments</li> </ul>	<ul style="list-style-type: none"> <li>municipal budgetary management and budgetary bodies,</li> <li>businesses in the majority ownership of local governments,</li> <li>institutions carrying out operational and other activities in municipal buildings,</li> <li>in the case of awareness-raising campaigns, NGOs in addition to the above;</li> <li>in the case of renewable energy projects for the strengthening of relations between cities and rural areas and fitting into the local development strategy, CLLD organisations.</li> </ul>

<p>TOP</p> <p>Priority 6: Sustainable urban development in cities with county rights</p>	<p>Increasing energy efficiency and the share of renewable energies in local governments</p>	<ul style="list-style-type: none"> <li>• energy-related rehabilitation of municipal buildings, institutions and infrastructure and improving the heat insulation of buildings</li> <li>• energy-related modernisation of municipal buildings, institutions and infrastructure and utilising renewable energy sources</li> <li>• implementing energy supply controlled by the local government, in line with local conditions and focusing on the exploitation of renewable energy sources in the framework of complex development programmes</li> <li>• supporting the drawing up of Sustainable Energy Action Plans (SEAP) by local governments</li> </ul>	<ul style="list-style-type: none"> <li>- municipal governments of cities with county rights,</li> <li>- businesses in the majority ownership of local governments in cities with county rights,</li> <li>- institutions carrying out operational and other activities in municipal buildings,</li> <li>- in the case of awareness-raising campaigns, NGOs in addition to the above;</li> <li>- in the case of renewable energy projects for the strengthening of relations between cities and rural areas and fitting</li> </ul> <p>into the local development strategy, CLLD organisations.</p>
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**Table 8: Planned energy efficiency programmes under the Regional and Urban Development Operational Programme**

Competitive Central Hungary Operational Programme (CCHOP)

PRIORITY	MEASURE	ELIGIBLE ACTIVITIES	POTENTIAL RECIPIENTS
<p>CCHOP</p> <p>Priority 5: Supporting energy efficiency, smart energy use and the use of renewable energies</p>	<p>Supporting development projects by businesses in order to increase energy efficiency and the share of renewable energies.</p>	<ul style="list-style-type: none"> <li>- improvement of thermal characteristics and reducing thermal loss in buildings,</li> <li>- utilising renewable energy sources (in particular by installing solar panels and solar collectors and utilising biomass, geothermal energy and heat pumps),</li> <li>- modernisation of heating, cooling and domestic hot water systems,</li> <li>- modernising indoor lighting systems,</li> <li>- satisfying all or some of the direct heat and/or electricity requirements of economic/production processes by increasing the share of renewable energy sources (eligible projects include solar panels, solar collectors, biomass, hydroelectric energy and the utilisation of waste heat generated during production),</li> <li>- modernisation of existing low energy-efficiency technological (production) tools,</li> <li>- in the Central Hungary Region, supporting projects by businesses in order to increase energy efficiency and the share of renewable energies, through non-refundable grants and combined financial instruments</li> <li>- for businesses based in the Central Hungary Region, supporting projects targeting Measure 1 under the 5<sup>th</sup> priority of the EEEOP through financial means</li> </ul>	<ul style="list-style-type: none"> <li>- business associations in the Central Hungary Region</li> </ul>
<p>CCHOP</p> <p>Priority 5: Supporting energy efficiency, smart energy use and the use of renewable energies</p>	<p>Improving the external financing opportunities of projects designed to increase energy efficiency and the share of renewable energies in the Central Hungary Region</p>	<ul style="list-style-type: none"> <li>- Supporting modernisation projects of residential buildings under Measure 5.2 of the EEEOP in order to improve energy efficiency and the utilisation of renewable energy sources through financial means in the Central Hungary Region</li> <li>- Supporting modernisation projects of district heating and heat supply systems under Measure 5.3 of the EEEOP in order to improve energy efficiency and the utilisation of renewable energy sources through financial means in the Central Hungary Region</li> </ul>	<ul style="list-style-type: none"> <li>- Financial institutions (The final recipients are households. Restricted to financial institutions providing at least one of the following services: granting credit and loans, financial leasing, sureties and bank guarantees),</li> <li>- other leasing companies,</li> <li>- capital fund managers (financial intermediaries)</li> </ul>

**Table 9: Planned energy efficiency programmes under the Competitive Central Hungary Operational Programme**

Economic Development and Innovation Operational Programme (EDIOP)

PRIORITY	MEASURE	ELIGIBLE ACTIVITIES	POTENTIAL RECIPIENTS
EDIOP Priority 4: Energy	Supporting development projects by businesses in order to increase energy efficiency and the utilisation of renewable energies	<ul style="list-style-type: none"> <li>- Energy modernisation of buildings, utilisation of renewable energy sources</li> <li>- Energy modernisation of the economic/production process, utilisation of renewable energy sources</li> </ul>	<ul style="list-style-type: none"> <li>- for SMEs</li> </ul>
EDIOP Priority 8: Financial instruments	4(b) investment priority	<ul style="list-style-type: none"> <li>- supporting development projects under the 4th priority of the EDIOP and measure 5.1 of the EEEOP through financial means</li> </ul>	<ul style="list-style-type: none"> <li>- Financial institutions (restricted to financial institutions providing at least one of the following services: granting credit and loans, financial leasing, sureties and bank guarantees), capital fund managers.</li> </ul>
	4(c) investment priority	<ul style="list-style-type: none"> <li>- supporting development projects under measures 5.2 and 5.3 of the EEEOP through financial means</li> </ul>	<ul style="list-style-type: none"> <li>- Financial institutions (the final recipients are public or private-law organisations, district heating providers and district heat-generation companies) (restricted to financial institutions providing at least one of the following services: granting credit and loans, financial leasing, sureties and bank guarantees), capital fund managers.</li> </ul>

**Table 10: Planned energy efficiency programmes under the Economic Development and Innovation Operational Programme**

## Human Resources Development Operational Programme (HRDOP)

PRIORITY	MEASURE	ELIGIBLE ACTIVITIES	POTENTIAL RECIPIENTS
HRDOP I./1.,2.,3.,4.,5		- Energy efficiency improvements as a compulsory element of construction projects originally intended to achieve other purposes in addition to energy efficiency	- in the case of institutional development projects eligible for financing under the HRDOP only

**Table 11: Planned energy efficiency programmes under the Human Resources Development Operational Programme**

## Rural Development Programme (RDP)

PRIORITY	MEASURE	ELIGIBLE ACTIVITIES	POTENTIAL RECIPIENTS
RDP	5B	- Development and renovation projects of agricultural buildings and establishments in order to improve energy efficiency and the share of renewable energy sources	- businesses, entrepreneurs
VP	5C	- Renewable energy projects within agricultural holdings	- businesses, entrepreneurs

**Table 12: Planned energy efficiency programmes under the Rural Development Operational Programme**

### **3.2.3 Nearly zero-energy buildings national strategy**

(Article 9(1) and (3) of Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings)

Article 9 of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy efficiency of buildings provides that Member States shall draw up national plans for increasing the number of nearly zero-energy buildings.

**The National Plan for Nearly Zero-Energy Buildings is set out in Annex A to the Energy Efficiency National Action Plan.**



## 3.3 Energy efficiency in public bodies

### 3.3.1 Central government buildings

(EED Article 5)

In the meaning of Article 5 of the EED, each Member State shall ensure that, as from 1 January 2014, 3 % of the total floor area of heated and/or cooled buildings owned and occupied by the central government is renovated each year to meet at least the minimum energy performance requirements that it has set in application of Article 4 of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on energy efficiency. Until 8 July 2015, that obligation applies to public buildings of a total useful floor area over 500 m<sup>2</sup>, whereas following that date, it applies to public buildings of a total useful floor area over 250 m<sup>2</sup> that, on 1 January each year, do not meet the national minimum energy performance requirements set in application of Article 4 of Directive 2010/31/EU.

According to Article 5(2) of Directive 2010/31/EU, Member States were required to calculate cost-optimal levels of minimum energy performance requirements using the comparative methodology framework established by the European Commission, and compare the results of this calculation with the minimum energy performance requirements in force. ‘Cost-optimal level’ means the energy performance level which leads to the lowest total cost during the estimated economic lifecycle (including establishment, maintenance and energy costs). The cost-optimal level of buildings and the scope and phases of implementing requirements were set out by a Government Resolution<sup>34</sup>. For public financing and tender financing of the construction of new buildings and renovation of buildings, the cost-optimal requirements have been applicable since 1 January 2015. The requirements are provided for in detail by Decree No 7/2006 of 25 May 2006 of the Minister without Portfolio determining the energy characteristics of buildings.

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<sup>34</sup> Government Resolution No 1246/2013 of 30 April 2013 on the energy efficiency requirements of buildings and on reaching the cost-optimal energy efficiency level according to Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy efficiency of buildings

The obligation under Article 5 of the EED is set out in the bill on energy efficiency, which entrusts the Government with its implementation. The law refers to Decree No 7/2006 of 25 May 2006 of the Minister without Portfolio, referred to above, when it provides that the government buildings concerned shall undergo an energy renovation 'meeting at least the minimum energy requirements provided for by legislation'. According to Section 6 to Government Decree No 122/2015 of 26 May 2015 implementing the Act on energy efficiency, buildings with the lowest energy performance characteristics must be given priority while fulfilling the renovation obligation.

Given the extreme importance of the available funds being used efficiently in connection with the renovation of public buildings, efforts must be made in order to achieve that projects costs should be recovered in the medium term and arrangements must be made for the economical operation and utilisation of buildings.

In order to identify the buildings to be renovated, the term 'central government' was defined on the basis of Commission guidelines to the EED. On that basis, in addition to ministries, the central government also includes bodies that are directly dependent of ministries in terms of supervision and financing, i.e. are not completely autonomous. According to Article (17) of the Preamble to the Directive, the renovation obligation applies to administrative organisational units with national competence.

Taking such definitions into consideration, in Hungary, on the basis of Act XLIII of 2010 on central administrative bodies and the legal status of members of the Government and Under-Secretaries of State and Annex 1 to Government Decree No 152/2014 of 6 June 2014 on the duties and competences of members of the Government, those buildings of organisational units of ministries, government offices, central offices and national security services with national competence, registered offices of law-enforcement bodies and military organisations with national competence and Budapest and county government offices that fail to meet the minimum requirements set out above are subject to the renovation obligation.

The following are not government buildings subject to mandatory renovation:

- (a) buildings used as places of worship and for religious activities,
- (b) buildings officially protected as part of a designated environment, or because of their special architectural or historical merit, in so far as compliance with certain minimum energy performance requirements would unacceptably alter their character or appearance,

(c) buildings owned by the armed forces or central government and serving national defence purposes.

Special attention must be paid to listed buildings and buildings that, while not being officially protected, define the look of major Hungarian cities. Such buildings were typically built during the 19<sup>th</sup> and early 20<sup>th</sup> centuries, often decorated with ornamental plaster-work or having a stone or clinker-clad façade, whose building envelope cannot be subsequently insulated using traditional insulation technologies as it would cause unacceptable damage to their architectural merit. In the case of such buildings, modernisation must take into consideration the architectural and historical merit of the building.

As most public buildings used by the central government have an ornamental façade, these buildings can be renovated taking into account their characteristics and the available technical solutions. This is often possible only partially, by using custom structures and at a higher specific investment cost. At the same time, insulation can be applied in internal courtyards and on ceilings between heated and non-heated spaces and the energy-efficient modernisation of mechanical, electrical and plumbing systems is also feasible in most cases.

**For the list of central government buildings subject to the obligation under Article 5 of the EED and the data of the relevant floor areas, please see Annex B to the NEEAP.**

Taking into account the special development needs and characteristics of specific industries, the government has a broad discretion in terms of scheduling renovations. The government decree implementing the law on energy efficiency sets up a priority between projects, i.e. priority is given to buildings with the lowest energy performance characteristics, whereas the regulation allows for settlement between years of the implementation period.

Once records of buildings subject to the renovation obligation have been established, the cost of required renovations can be estimated in the light of the respective floor areas. Roughly HUF 6 billion has been allocated under the EEEOP for the financing needs of renovations of public institutions for a three-year period starting in 2015, HUF 2 billion to be spent each year. Own financing to supplement the above funds must be allocated for in the central budget.

### **3.3.2 Buildings of other public bodies**

(EED Article 5)

On the basis of Article 5(7) of the EED, Member States shall encourage public bodies, including at regional and local level, to adopt an energy efficiency plan, put in place an energy management system as part of the implementation of their plan, use energy service companies and energy performance contracting to finance renovations and implement plans. Public bodies will be encouraged by the Hungarian Energy and Public Utility Regulatory Authority publishing information on the above opportunities and the benefits of their application on the energy efficiency website set up in the meaning of the bill on energy efficiency.

With a view to keeping record of the energy parameters of public buildings in public ownership, a National Building Energy System ('NBES') database has been set up, into which institutions controlled by the central government have been able to upload building energy data of their buildings since May 2013. A technical helpdesk service is available in order to ensure that the relevant forms are completed correctly. The uploading and finalisation of the NBES is currently in progress. The NBES can be accessed by clicking <http://neer.emi.hu>. When completing the form, clients are required to enter the data of the institution, data of real properties related to the institution and data of the buildings on such properties. When data are entered, in addition to the basic data of institutions, data concerning building energy and the architecture and energy consumption of buildings are also requested. The forms completed by institutions are reviewed by experts. The database need to be upgraded in order to select additional public buildings of the government that are not subject to Article 5 of the EED (e.g. buildings of hospitals, welfare institutions, educational institutions, law-enforcement bodies etc.) which should undergo energy modernisation. The National Building Energy Strategy has also assessed the public building stock in terms of the different use of buildings of various functions, assigning specific modernisation costs to specific types of the existing stock of buildings with a view to performing the modernisation works corresponding to cost-optimal requirements.

To date, Hungary has not set out an obligation to draw up an energy efficiency action plan or programme concerning public buildings and public bodies.

Financing for the energy modernisation of public buildings in the custody of administrative bodies other than central government bodies (buildings of healthcare institutions, law-enforcement bodies, educational institutions, welfare institutions in church or public maintenance etc.) is available under the Environmental and Energy Efficiency Operational Programme (for details of specific measures, please see section 3.2.2.2).

#### Increasing energy efficiency and the share of renewable energies in local governments

Financing for the modernisation of municipal buildings is available in the framework of measures under the Regional and Urban Development Operational Programme (RUDOP) (for details of specific measures, please see section 3.2.2.2).

In the framework of the energy efficiency rehabilitation of municipal buildings, institutions and infrastructure and the improvement of the heat insulation of buildings, the rehabilitation of municipal buildings and infrastructure, including in particular the energy rehabilitation of municipal institutions has become feasible.

These improvements are supplemented by resident awareness-raising campaigns, related to these interventions under the EEEOP, focusing on the improvement of sustainable energy consumption behaviour.

Under the intervention, any rehabilitation or restoration initiatives to improve energy supply are eligible for financing resulting in significant savings in energy consumption by municipal infrastructure.

Financing programmes related to building energy improvements are based on system of objectives and tools of the National Building Energy Strategy (BENS), taking into consideration the renovation alternatives outlined in the Strategy. On that basis, cost efficiency is treated as a basic condition under the measure, which means that, at the end of the modernisation process, buildings will be compliant with the cost-optimal level under Directive 2010/31/EU.

As part of projects for the energy modernisation of municipal buildings, the modernisation of indoor lighting systems (e.g. the installation of smart lighting systems) is eligible for financing. The renovation of street lighting systems is not eligible as an individual intervention. Moreover, as part of projects to improve energy efficiency in municipal buildings, solutions to measure the energy consumption of and arrange for the smart control of municipal infrastructure are eligible for financing.

Where there is reasonable demand and cost efficiency is ensured, it is recommended to carry out interventions to increase the share of renewable energy by complex renovation projects accompanied by improvements in order to increase energy efficiency. However, development projects to increase the share of renewable energy are eligible on their right. (In cases where the heat demand of a building is being resolved, where the project concerns increasing the share of renewable energy, prior to the start of the project, the building concerned must satisfy the current energy requirements).

The installation of solar panels on municipal buildings (and other municipal solutions suitable for electricity generation) is supported by the programme for public purposes, primarily in order to satisfy the own electricity demands of buildings concerned.

Under the intervention, all initiatives to improve energy supply through a shift between energy sources are eligible for financing, which help reduce local governments' dependence on fossil fuels and their emissions of greenhouse gases, increase the share of renewable energies in municipal energy consumption and thus result in significant savings in the energy expenses of municipal infrastructure and buildings.

Implementing energy supply controlled by the local government, in line with local conditions and focusing on the exploitation of renewable energy sources in the framework of complex development programmes.

From the point of view of mitigating the effects of climate change and the energy dependence of urban regions, smaller complex regional energy programmes in order to exploit regional energy potentials, including in particular renewable energy sources and to achieve autonomous energy supply on both individual and community level are of key importance. Such systems make use of local raw materials as renewable energy sources, thus providing environment-friendly and independent energy supply (primarily heat and even electricity), which is sustainable in the long term.

The intervention aims to support complex projects of regional and local importance yet requiring smaller-scale local coordination and coordination between municipalities for the generation and local consumption of energy from renewable energy sources to satisfy own energy needs (for the common good) (e.g. financing the renovation and implementation of systems generating renewable energy for local supply, including renewable energy-based district heating plants, and the construction of solar parks). The development projects may generate local production processes, thus indirectly contributing to the creation of new jobs.

#### Supporting the drawing up of Sustainable Energy Action Plans (SEAP) by local governments

Local governments play a crucial role in mitigating the effects of climate change, in particular if one considers the fact that 80 % of energy consumption and CO<sub>2</sub> emission is related to urban activities. Following the adoption, in 2008, of the climate and energy package of the European Union, the Association of Mayors supports efforts by local governments to implement sustainable energy policies and mobilises local and regional stakeholders with a view to fulfilling Union targets.

Local governments' Sustainable Energy Action Plans (SEAPs) set out specific measures and projects of key importance. In addition to saving energy, SEAPs may attain several other achievements, including the creation of specialised jobs not requiring movement and of stable jobs; a healthier environment and quality of life; improved economic competitiveness and greater energy independence. Such energy programmes may set a model to other local governments, assisting their participation.

Moreover, through the use of material and energy-saving technologies, SEAPs provide an opportunity to re-industrialise the country and to develop animal husbandry and the related food industry sectors. Under the SEAPs, local governments assume a voluntary commitment to improve energy efficiency and increase the share of renewable energy sources in order to enable Hungary to achieve an overall 20 % reduction in CO<sub>2</sub> emissions, the target set by the European Union by 2020. A SEAP has currently been adopted by 24 cities in Hungary.<sup>35</sup>

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<sup>35</sup> Source: On 29 May 2015 [http://www.covenantofmayors.eu/actions/sustainable-energy-action-plans\\_en.html?city=Search+for+a+Sustainable+Energy+Action+Plan...&country\\_seap=hu&co2=&date\\_of\\_approval=&accepted=](http://www.covenantofmayors.eu/actions/sustainable-energy-action-plans_en.html?city=Search+for+a+Sustainable+Energy+Action+Plan...&country_seap=hu&co2=&date_of_approval=&accepted=)

Conformity between the Sustainable Energy Action Plans (SEAP) and the Integrated Urban Development Strategy (IUDS) must be ensured. The proactive role of local governments must be strengthened in energy efficiency measures related to the built environment (coordination, provision of communication platforms, preparation of ESCO solutions).

Energy conservation and energy efficiency measures by local governments may be supported by setting up a national network of energy engineers. In addition to measures resulting in energy savings and audits of municipal companies, by employing energy experts, it would be possible to gather data generated by smart systems and to explore regional specificities.

### **3.3.3 Purchasing by public bodies**

(EED Article 6)

Section 6 of the EED on procurements by public bodies provides that central governments should purchase only products, services and buildings with high energy-efficiency performance, insofar as that is consistent with cost-effectiveness, economic feasibility, wider sustainability, technical suitability, as well as sufficient competition. The obligation applies to purchase contracts by public bodies of a value greater than the thresholds laid down in Article 7 of Directive 2004/18/EC. Moreover, Hungary must, among other things, encourage public bodies on both regional and local levels to follow the example of the central government by purchasing only products, services and buildings with high energy-efficiency performance.

The provisions of Article 6 of the EED were transposed primarily by Government Resolution No 1849/2014 of 30 December 2014 on energy-efficient procurement taking effect on 1 January 2015.

In the Government Resolution, Hungary stated that, in their purchases whose estimated value is equal to or higher than the public procurement threshold specified by European Union legislation, ministries, government offices, central offices, the Directorate-General for Public Procurement and Supply, the Military National Security Service, law-enforcement bodies with national competence and army organisations shall only purchase products, services and buildings with high energy-efficiency performance.



As far as specific products, services and buildings are concerned, additional energy efficiency requirements are provided for by the Annex to the Government Resolution, which is identical with Annex III to the EED. Exceptions to the above include the Military National Security Service and law enforcement bodies and army organisations with national competence, where the application of the rules would be in conflict with the nature and primary objective of the activities of such organisations.

In order to enable the monitoring of implementation, the Resolution requires all ministers to ensure that the energy efficiency parameters of all purchases, the fact that an existing product or building has been replaced or a new purchase has been made and, where known, the amount of annual energy saved through the purchase should be documented in writing. The level of savings achieved through the energy efficiency criteria applied in public procurement must be quantified in order to draw up the annual reports under Article 24(1) of the EED, in which Member States report on their progress towards achieving national energy efficiency targets. The organisations required to implement energy-efficient purchases make available to the MEKH all of their documentations concerning their energy-efficient purchases carried out in the preceding year.

As part of the implementation of the duty under Article 6(3) of the EED, when drawing up government programmes, in particular those affecting local governments, ministers are required to develop measures to encourage contracting entities on regional and local (and thus, indirectly, central) levels to purchase products, services and buildings of a high energy-efficiency performance and to assess the possibility of long-term energy performance contracting, potentially resulting in long-term energy savings.

In the future, the implementation of energy-efficient purchases will be facilitated by a provision of the Government Resolution, providing that, for information, by 31 May each year, the Minister for National Development shall publish the list of products specified by implementing measures adopted on the basis of Community legislation and the Union legislation setting out specific technical parameters.

Increasing energy efficiency can be achieved, among other things, through green public procurement and by sharing best practices. According to a Communication from the Commission 'Public procurement for a better environment' (COM (2008) 400 final), green public procurement is '...a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured'. In Hungary, the rules of public procurement are provided for in Act CVIII of 2011 on public procurement. Section 182(1)(20) of the law empowers the Government to issue decrees to lay down detailed rules concerning environmental, sustainability and energy efficiency requirements applicable to all phases of public procurement and mandatory cases and methods of enforcing environmental, sustainability and energy efficiency considerations in public procurement with regard to budgetary bodies controlled or supervised and public foundations set up by the Government and business organisations in public ownership.

A number of aids and information materials have been published on its website by the Public Procurement Authority for bodies drawing up public procurement tenders.

## **3.4 Other end use energy efficiency measures including in industry and transport**

### **3.4.1 Industry<sup>36</sup>**

Industry, which includes the mining and quarrying, the manufacturing and the electricity, gas and steam supply sectors, is the most significant sector of the national economy. In 2013, the output of the three sectors together accounted for 24.9 % of gross Hungarian added value.

Following a slight decline in 2012, in 2013, the growth of industrial production was restored. Industrial output increased by 1.4 %, due primarily to the outstanding performance of the automotive industry, the main driver of industrial production in Hungary.

Of the national economy sectors of industry, the 2.0 % growth in 2013 in manufacturing, which accounts for about 94 % (as opposed to a decline of 1.7 % in the previous year), was in direct proportion to growth in exports.

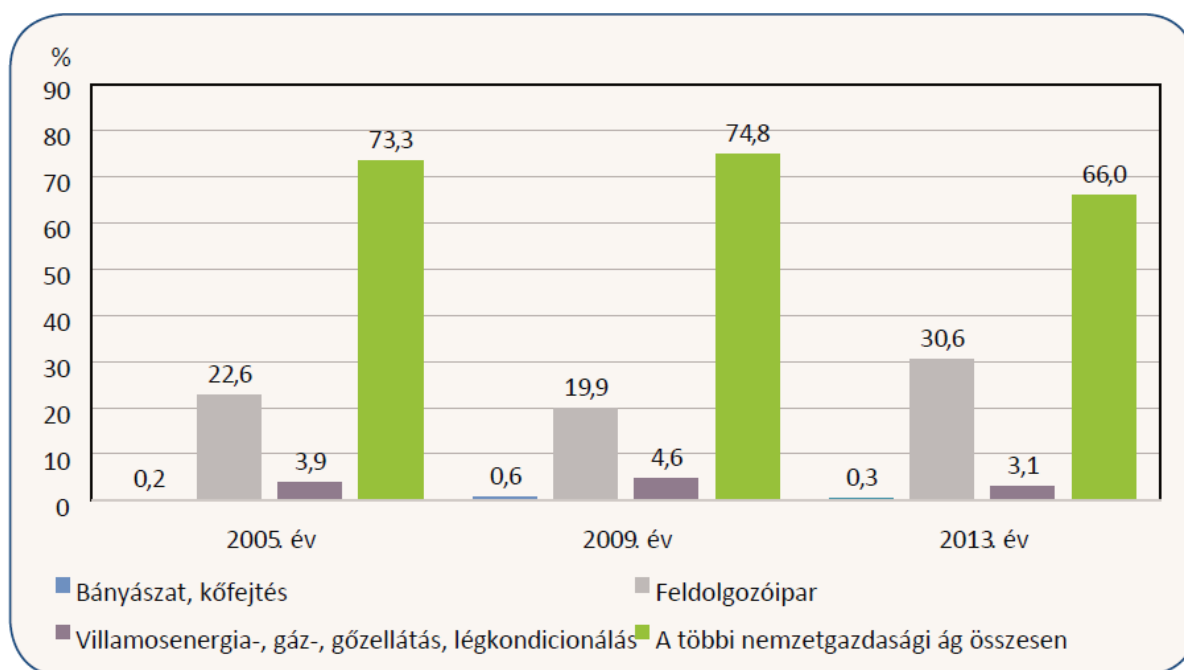
Investments in industry increased by 3.4 % in 2013 compared to the previous year, due primarily to investments in manufacturing, which accounted for 90.0 % of total investments in industry. In 2013, industrial producers' prices increased by 0.7 % against the previous year. The share of workers employed in industry (within the competitive sector) increased from 34.2 % in 2012 to 34.4 % in 2013 within the national economy.

In industry, investments amounted to HUF 1 537.8 billion in 2013, 3.4 % more than a year earlier on a comparative price basis. Investments as a whole increased by 7.2 % within the national economy.

In 2013, of the industrial sectors of the national economy, in the energy sector, investments failed to increase despite the low basis of the previous year (38.6 % decline in 2012). There was a decline of 8.5 % in electricity, gas and steam supply and air conditioning.

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<sup>36</sup> Source of data in this chapter: KSH

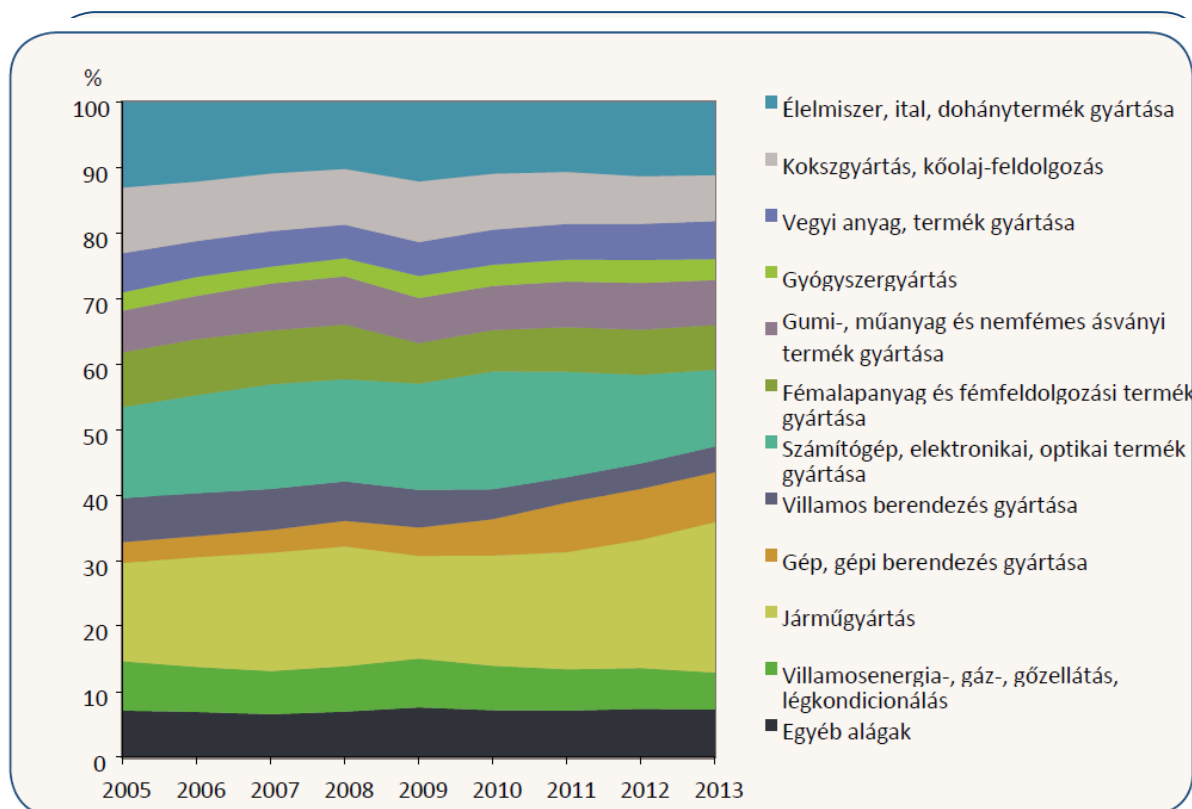


2005. év	2005
2009. év	2009
2013. év	2013
Bányászat, kőfejtés	Mining and quarrying
Feldolgozóipar	Manufacturing
Villamosenergia-, gáz-, gőzellátás, légkondicionálás	Electricity, gas and steam supply and air-conditioning
A többi nemzetgazdasági ág összesen	All other national economy sectors together

**Figure 7: Ratio of investments in industry**

*Source: Report on industrial output in 2013, Central Statistical Office, July 2014*

For the third successive year, there has been an accelerating decline in the output of the energy industry (electricity, gas and steam supply and air-conditioning). In 2011, 2012 and 2013, output was 1.7 %, 3.4 % and 7.7 % lower, respectively, than in the previous year. The three main reasons for the decline are the fall in natural gas demand among gas power plants due to the decline in production, lower energy demand due to energy-efficiency modernisation, and weather conditions due to the sector's dependency on climatic conditions. On the basis of data from the National Meteorology Service, in 2013, the weather was milder on average during the months of the heating season than in the previous year. Of the three sub-sectors of energy industry, the output of energy generation and supply declined to the highest extent, by a significant 9.8 %, whereas the output of gas supply was only slightly (0.4 %) lower than a year earlier. The output of the third sub-sector, steam supply and air-conditioning, decreased by 4.6 %.



Élelmiszer, ital, dohánytermék gyártása	Food industry, beverages and tobacco products
Kokszgyártás, kőolaj-feldolgozás	Coke manufacturing and petroleum processing
Vegyí anyag, termék gyártása	Production of chemical substances and products
Gyógyszergyártás	Pharmaceutical production
Gumi-, műanyag és nemfémes ásványi termék gyártása	Production of rubber, plastic and non-metallic mineral products
Fémalapanyag és fémfeldolgozási termék gyártása	Metallurgy raw materials and metal processing
Számítógép, elektronikai, optikai termék gyártása	Production of computers, electronic and optical products
Villamos berendezés gyártása	Production of electric appliances
Gép, gépi berendezés gyártása	Machinery and mechanical equipment manufacturing
Járműgyártás	Vehicle manufacturing
Villamosenergia-, gáz-, gőzellátás, légkondicionálás	Electricity, gas and steam supply and air-conditioning
Egyéb alágak	Other sub-sectors

**Figure 8: Distribution of the production value of industry by major sub-sectors, 2005-2013**

*Source: Report on industrial output in 2013, Central Statistical Office, July 2014*

The overall energy savings potential of Hungarian industry can be observed on the basis of the MURE model describing all European Union Member States. In the model, the energy savings potential of industry is broken down into three parts. 'Heat consumption' savings include potentials generated by the renovation of heat generation and distribution equipment, insulation of the building envelope and projects related to the utilisation of waste heat. Savings in 'industrial motors and lighting' include motors in the broader sense, such as pumps and compressed air systems. Savings in 'technological processes' may include savings due to work organisation and shifts between technologies. Savings have also been calculated according to low and high-intensity policies and technological potentials.

On the basis of the study, the energy savings potential in heat consumption is 29 % in 2015 and 28 % in 2020 in the case of low-intensity support, whereas the motors and lighting potential is more than double that amount: 62 % and 64 % respectively, on a total savings basis. The level of savings in technological processes is low: 8 % and 9 % respectively.

According to the MURE model, in the case of low support intensity, the chemical industry has the highest savings potential: 30 % in 2015 and 28 % in 2020, followed by the engineering industry with 24 % and 25 % and the food industry with 18 % and 19 % respectively.

*3.4.1.1. Main policy measures in connection with energy efficiency in industry and other business sectors (agriculture, trade, services and other sectors)*

**Energy efficiency development projects implemented with EU financing during the 2007–2013 financial period**

**Table 13: Energy efficiency development projects implemented with EU financing during the 2007–2013 financial period**

EEOP 5 <sup>th</sup> priority						Energy sources saved through energy efficiency (GJ/year)	
total	units	contracted amount	financing paid (total invoiced payments)	EU financing (85 %)	domestic financing (15 %)	target value, total	actual value, total
micro & small enterprises	197	3 292 999 357	3 292 831 356	2 799 049 453	493 949 904	246 856.68	151 686.79
medium-sized enterprises	77	4 516 317 467	4 500 369 358	3 838 869 847	677 447 620	174 210.65	41 779.58

<b>2009</b>	<b>units</b>	<b>contracted amount</b>	<b>financing paid (total invoiced payments)</b>	<b>EU financing (85 %)</b>	<b>domestic financing (15 %)</b>	<b>target value, total</b>	<b>actual value, total</b>
micro & small enterprises	47	384 233 940	384 233 939	326 598 849	57 635 091	88 532.18	85 856.54
medium-sized enterprises	0						
<b>2010</b>	<b>units</b>	<b>contracted amount</b>	<b>financing paid (total invoiced payments)</b>	<b>EU financing (85 %)</b>	<b>domestic financing (15 %)</b>	<b>target value, total</b>	<b>actual value, total</b>
micro & small enterprises	34	414 790 126	414 790 126	352 571 607	62 218 519	30 999.27	31 453.89
medium-sized enterprises	3	153 804 554	153 804 554	130 733 871	23 070 683	411.16	449.41



<b>2011</b>	<b>units</b>	<b>contracted amount</b>	<b>financing paid (total invoiced payments)</b>	<b>EU financing (85 %)</b>	<b>domestic financing (15 %)</b>	<b>target value, total</b>	<b>actual value, total</b>
micro & small enterprises	43	801 247 765	801 247 765	681 060 600	120 187 165	70 497.15	24 221.69
medium-sized enterprises	14	923 631 113	924 378 667	785 086 446	138 544 667	46 581.04	14 410.17
<b>2012</b>	<b>units</b>	<b>contracted amount</b>	<b>financing paid (total invoiced payments)</b>	<b>EU financing (85 %)</b>	<b>domestic financing (15 %)</b>	<b>target value, total</b>	<b>actual value, total</b>
micro & small enterprises	49	854 369 547	854 369 547	726 214 115	128 155 432	31 755.64	8 938.64
medium-sized enterprises	36	1 779 139 909	1 779 139 922	1 512 268 923	266 870 986	94 236.98	26 920.00

<b>2013</b>	<b>units</b>	<b>contracted amount</b>	<b>financing paid (total invoiced payments)</b>	<b>EU financing (85 %)</b>	<b>domestic financing (15 %)</b>	<b>target value, total</b>	<b>actual value, total</b>
micro & small enterprises	21	736 302 752	736 302 752	726 214 115	128 155 432	21 235.61	1 216.03
medium-sized enterprises	22	1 560 578 301	1 557 866 963	1 372 520 772	242 209 548	32 981.47	0.00
<b>2014</b>	<b>units</b>	<b>contracted amount</b>	<b>financing paid (total invoiced payments)</b>	<b>EU financing (85 %)</b>	<b>domestic financing (15 %)</b>	<b>target value, total</b>	<b>actual value, total</b>
micro & small enterprises	3	102 055 227	101 887 227	86 746 943	86 604 143	3 836.83	0.00
medium-sized enterprises	2	99 163 590	85 179 252	84 289 052	72 402 364	0.00	0.00

Source: MND

3.4.1.2 *Implementing measures under ‘Hungary’s 2<sup>nd</sup> National Energy Efficiency Action Plan until 2016, with an outlook to 2020’, submitted in 2011*

**Table 14: Measures under ‘Hungary’s 2<sup>nd</sup> National Energy Efficiency Action Plan until 2016, with an outlook to 2020’, submitted in 2011**

<b>Action: District heating efficiency sub-programme: improving the efficiency of energy transportation and distribution</b>		
<b>Objective and scope of measure</b>	<b>Tools to achieve target</b>	
	<b>Investment tools</b>	<b>Horizontal tools</b>
Improving primary side interventions in district heating systems	<ul style="list-style-type: none"> <li>• <u>Renovating district heating systems in order to improve the competitiveness of district heating services.</u></li> </ul> <p>Implementing primary side conversions are of primary importance, including modernising heat supply pipelines and primary heat reception and distribution centres, while modern measurement and data collection and regulatory processes will be implemented in the spirit of energy efficiency.</p>	

Measure: Reducing the energy consumption of businesses		
Objective and scope of measure	Tools to achieve target	
	Investment tools	Horizontal tools
Reducing the energy consumption of businesses, minimising energy loss and increasing energy efficiency and competitiveness.	<ul style="list-style-type: none"> <li>• <u>Technological modernisation of SMEs</u> (e.g. utilisation of heat loss, increasing the efficiency of electric motors, preferential interest loans)</li> </ul> <p>Reducing losses of technological energy consumption (industrial furnaces and other industrial heat-powered equipment, fans, pumps, material handling etc.) and achieving energy-efficient heat utilisation (flue gas, flash steam, condensing water etc.).</p> <p>Through NSzP/EEOP schemes, businesses can carry out building energy development projects based on combined traditional and renewable energy sources:</p>	<ul style="list-style-type: none"> <li>• <u>Large energy consumers to employ energy engineers:</u> By improving the quality of energy management, large energy consumers may normally achieve significant savings in energy consumption. Employing energy engineers with adequate qualifications is an indispensable condition of the above.</li> <li>• <u>Compulsory energy consumption report to be submitted by large consumers:</u></li> </ul>

Objective and scope of measure	Tools to achieve target	
	Investment tools	Horizontal tools
	<ul style="list-style-type: none"> <li>• <u>Energy-efficient renovation of industrial buildings</u></li> <li>• <u>Energy-efficient renovation of agricultural buildings</u></li> <li>• Supplying agricultural energy consumption based on renewable energy sources (biomass boilers) (in the framework of the New Hungary Rural Development Programme)</li> <li>• <u>Energy-efficient renovation of buildings of other business purposes (services, trade) (NSzP financing, preferential loans)</u></li> </ul>	<p>A significant part of large energy consumer companies submit a compulsory annual report on their energy consumption for statistical purposes under the National Statistical Data Collection Program (OSAP) provided for in Government Decree No 257/2010 of 9 November 2010 (energy balance sheet of the industrial sector). During the development of the data collection system, efforts must be made in order to clarify and broaden energy conservation and energy efficiency-related information.</p> <ul style="list-style-type: none"> <li>• <u>Voluntary agreements – auditing and energy conservation:</u> In order to achieve the energy conservation goals under NSzP programmes, a monitoring scheme must be set up through the conclusion of voluntary agreements and audits to verify implementation processes from time to time. The objective is to achieve the measurability of energy efficiency in industry, standardise the audit and monitoring schemes to improve the</li> </ul>

<b>Objective and scope of measure</b>	<b>Tools to achieve target</b>	
	<b>Investment tools</b>	<b>Horizontal tools</b>
		<p>efficiency of energy consumption by industrial companies, set up a motivating regulatory environment and acknowledgement scheme and concluding agreements for long-term voluntary commitments, based on international models.</p>

### **3.4.1.3. *Continuing and planned measures***

Under the Economic Development and Innovation Operational Programme, promoting the gaining ground of low carbon dioxide emissions production is envisaged by the measures under thematic objective no 4.

Reducing emissions is a fundamental environmental protection duty, which includes improving the energy efficiency of businesses and public bodies and increasing the share of renewable energies. Considering Hungary's lag in terms of energy efficiency and the excessive energy intensity of machinery and equipment used for the renovation of buildings and in industrial production, promoting production and construction technologies ensuring low emissions is the primary condition of ensuring sustainable development and reducing the country's dependence on external energy sources.

Improving the competitiveness of the business sector through the overall reduction of direct energy costs by increasing energy efficiency and the share of renewable energy sources

Interventions envisaged under the specific objective help reduce primary energy consumption and increase the volume of energy generated by renewable energy sources within the total gross energy consumption.

Key objectives under the Rural Development Programme include rationalising and reducing the energy consumption of horticultural facilities. Technological modernisation, the modernisation of building technical equipment and systems and the utilisation of renewable energy sources are the proposed measures in order to achieve those goals. Other key objectives include improving the energy efficiency of granaries, grain dryers and animal husbandry sectors as well as improving the resource efficiency of food processing establishments.

**The proposed measures are described in Section 3.2.2.2, in Tables 9, 10 and 12.**

The Virtual Power Plant Programme was launched on 7 March 2011 in order that, in accordance with its EU commitments, by 2020, Hungary will have ‘built’ a virtual power plant out of certified savings, of a capacity equivalent to that of a 200 MW fossil fuel power plant. There has been unprecedented collaboration in the energy efficiency field in Hungary to support the Programme and the Competition. Members of the Advisory Panel include distinguished representatives of the political, engineering/academic and non-governmental sectors. The programme will continue during the forthcoming years.

Parties interested in the competition may join at different levels.

On the first, ‘Do It Yourself’ level, anyone can complete a self-assessment questionnaire without registration and free of charge in order to assess their energy efficiency situation and to develop their energy efficiency strategy based on the assessment. The questionnaire includes 41 questions in 5 major topics, at 4 different development levels. The assessment focuses on fields such as the integration of energy efficiency into the organisational management system, informed decision-making in energy management, targets and action plans, providing sufficient resources and the quantification and demonstration of results.

As a definite indication of government support, in 2012, the cost-free self-assessment questionnaire of the Virtual Power Plant Programme was made a compulsory item of the system of requirements under the EU tender GOP-2012-2.1.1./B ‘Complex business technology development for micro, small and medium-sized enterprises’. In order to reinforce that effort, under the KMOP-2013-1.2.1./B tender, published in 2013 in order to achieve similar goals, 3 extra points are earned by applicants having completed the cost-free self-assessment questionnaire. As a result of the cooperation, a valuable database of thousands of samples is being built in order to gain an insight into Hungary’s energy efficiency situation from the point of view of SMEs participating in EU tenders.

Level two, ‘Set Targets’, is the level of potential recipients of the Energy Conscious Business label. On that level, no past achievements are required. Anyone can join who regard energy efficiency an important priority. In order to use the Energy Conscious Business label, once the current energy efficiency situation of the business has been assessed, the company is only required to assume relevant yet realistic commitments to reduce energy consumption and/or increase energy efficiency.



Following the initial administrative measures, Accredited Consultants will provide assistance in the smooth implementation of the tender, i.e. carrying out the self-assessment and assuming commitments regardless of the company's location. In 2012 and 2013 60 companies were awarded the label.

Level three, 'Demonstrate Your Achievements', is the level of holders of the Energy Efficient Business Award. More than a simple 'level', it is an award, which indicates that the conditions of accession are more stringent than for the previous levels. One of the most important objectives of the Virtual Power Plant Programme is to collect Hungarian (and international) best practices in energy efficiency, convert them into know-how ready to be shared and make it accessible for anyone interested. In accordance with the above, if an organisation applies for the Energy Efficient Business Award, a documentation consisting of a 1-page success story and a 3 to 5-page technical material is drawn up in collaboration with our technical assessment team concerning a previously implemented successful energy efficiency project of the company. Moreover, the calculation methodology unanimously adopted by our Advisory Panel is used to calculate the 'power plant equivalent' of the savings achieved, in other words, the number of KWs 'fed into' the virtual power by the organisation concerned, i.e. its contribution to the construction of the virtual power plant. The Expert Panel Committee will decide on awarding the title on the basis of the above facts. To date, 10 organisations have been awarded the Energy Efficient Business Award, including T-Systems Magyarország Zrt., MÁV Vasjármű Járújavitó és Gyártó Kft., the local government of Ráckeve etc. It must be noted that the levels in the Competition do not set out an absolute scale. Applicants are required to attain relevant savings and achievements relative to their earlier energy performance in order to be recognised.

Level four, 'Help Others Get Ahead', is the level of Energy Efficient Mentor Businesses. In addition to committing themselves to feed their achievements into the virtual power plant and share their best practices, model companies undertake to actively promote the Programme and the Competition among their partners and all interested Hungarian companies and to support organisations in achieving their respective energy efficiency targets. Our Mentor Businesses include the KÉSZ Holding, MAVIR, COTHEC and AUDI HUNGARIA MOTOR Kft. as a key Mentor Company.

In 2013, the Competition was made available to institutions as well as the industrial sector, whereas awards are given to professionals playing an outstanding role in the field of energy efficiency, in the following categories: Energy Advisor of the Year, Renewable Energy Developer of the Year, Energy Engineer/Energy Manager of the Year and Young Energy Expert of the Year.

For details of the programme and results, please consult the website <http://virtualiseromu.hu/>.

### **3.4.2. Energy efficiency measures in transport**

In the past two decades, following changes in the development of the environmental performance of vehicles, the real challenge for transport today is to reduce energy consumption and meet climate protection requirements. Hungary's commitment under the EU2020 Programme to reduce energy consumption by more than 10 % and to fulfil the requirements under Directive 2009/28/EC on the promotion of the use of energy from renewable sources<sup>37</sup>, the energy efficiency Directives (Directives 2006/32/EC and 2012/27/EU) and Directive 2003/30/EC on biofuels<sup>38</sup> pose a substantial challenge also in the transport field.

Deploying the network of required refuelling points may play a key role in promoting alternative transport modes. Its implementation on Community level is based on Directive 2014/94/EU of the European Parliament and of the Council on the deployment of alternative fuels infrastructure. That Directive sets out minimum requirement vis-à-vis each Member State for the deployment of infrastructure refuelling stations for electric, natural gas (CNG, LNG) and hydrogen-powered vehicles, which will, in all probability, significantly contribute to such environment-friendly transport technologies gaining ground within the region.

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<sup>37</sup> Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

<sup>38</sup> Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport

In accordance with the above, the targets of the Climate Change National Strategy (CCNS) also include that Hungary should also prepare for an increase in the use of alternative fuels and the setting up of the required infrastructure conditions, which primarily consists of developing the legislative framework and, to a smaller extent, introducing other incentives. The framework must, in accordance with anticipated European Union commitments, cover the following:

- assessment and replacement of legislation, since no legislation currently exists in Hungary for various alternative transport solutions;
- building, safety (mainly as far as indoor refuelling is concerned: hazard category and fire protection), commercial and traffic legislation concerning the deployment of refuelling infrastructure for electric, natural gas and, later, hydrogen-powered cars, and the available financing;
- licensing and roadworthiness examination of vehicles powered by alternative fuels, the financing of and economic incentives for their purchase;
- consumer grants and information on measures to compensate the higher price of alternative fuel vehicles and relevant access, parking and other traffic preferences;
- support to alternative fuels-related R&D in Hungary;
- financial and institutional conditions to ensure the implementation of the adopted plan.

It is a significant challenge to all European Union Member States, including Hungary, and, at the same time, can lead to a significant step forward, that Directive 2009/28/EC (Renewable Directive) provides that each Member State shall ensure that the share of energy from renewable sources in transport in 2020 is at least 10 % of the final energy consumption in transport in that Member State.

The same is provided for in Hungary's Renewable Energy Utilisation Action Plan (REUAP), adopted by the Government in December 2010, stating that in accordance with its natural conditions, Hungary will significantly increase the use of biofuels, i.e. biofuels will play a crucial role in the 10 % renewable commitment in transport.

The relevant rules will be tightened slightly by the new Directive (ILUC Directive) to be published in 2015, which provides for a restriction in the production of first-generation (crop-based) biofuels. That brings about changes in terms of the use of biofuels as described in the relevant Hungarian strategy to the extent that the share of first-generation biofuels should not exceed 7 % of final energy consumption in transport in 2020. Importantly, however, it does not result in a conceptual change in the Hungarian biofuel policy. Nevertheless, in addition to first-generation biofuels currently significantly contributing to productivity in agriculture, increasing attention must be paid to promoting less mature technologies, i.e. advanced biofuels (non-crop-based biofuels) and other environment-friendly solutions such as hybrid or all electric vehicles. It must be noted that the new, and environmentally more sustainable, system or rules requires significant resources from Member States between 2015 and 2020 in order to be able to meet national biofuel-related commitments.

In 2013, two-thirds of the total freight transport output was implemented by road, whereas rail, pipeline and water transport accounted for 18 %, 11 % and 4 %, respectively. In 2013, the output of road and rail transport increased by 4 % each. Until the outbreak of the crisis, the share of road transport steadily increased at the expense of other transportation modes. Its share in 2007 (66 %) was 19 percentage points higher than in 2001. Since 2007, the share of road transport has remained the same (around two thirds). While the output of rail transport increased for the fourth successive year in 2013, the output of that year was still lower than in 2008. The output of water and pipeline transportation have been fluctuating respectively since 2009 and 2010. In 2013, the output of water and pipeline transportation was respectively 2.9 % and 1.9 % lower than in 2012.

In 2013, the average transportation distance was 208 km, i.e. 5 km longer than in 2012. Of the modes of transportation, road transport saw the biggest difference between average distances in domestic and international deliveries. In road transport, the average distance was 70 km within the country, whereas the average distance of cross-border consignments was 717 km<sup>39</sup>.

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<sup>39</sup> Source of data: KSH

**The Transport Infrastructure Development National Strategy was adopted by the Government by Government Decree No 1486/2014 of 28 August 2014.** Under the ‘reducing negative environmental impacts and enforcing climate change considerations’ objective of the new transport strategy, the sustainable management of resources, increasing energy efficiency and reducing the share of non-renewable energy sources are given priority. The various energy efficiency measures will be implemented as the additional impacts of the development of transport.

The Transport Energy Efficiency Improvement Action Plan (TEEIAP) is currently being developed on the basis of the Transport Infrastructure Development National Strategy.

While in terms of reducing energy consumption in transport, reducing transport capacities is the most efficient solution, in the opinion of Hungary, that statement is open to discussion as it is contrary to the powerful increase in the mobility needs of citizens, for the satisfaction of which a level of service proportionate to the load-bearing capacity of society and public administration must be provided.

In passenger transport, measures to reduce the volume of transport needs concern the following areas and the following means:

- in regional, urban and territorial development, taking the effects of transport into consideration (proximity of home and workplace, mixed use of space, decentralisation of public administration);
- creation of car-free urban zones and pedestrian zones, parking ticket schemes;
- improving the efficiency of transport through information systems and market incentives (GPS, vacant parking spaces etc.);
- supporting teleworking, tele-education, e-administration and e-commerce;
- encouraging car-pooling and car-sharing solutions;
- development and support of non-motorised (e.g. bicycle, pedestrian) transport,

- using road tolls enforcing at least the use of higher service-level infrastructures (freeways and motorways) in proportion with performance and gradually in proportion with external expenses,
- changing the ratio between the constant and variable (rolling) costs of vehicle use and increasing the share of usage-related costs.

While reducing transport needs, however, it must be taken into consideration that economic development and the improvement of the financial situation of citizens will increase the need to travel, which in turn increases the need for both individual and community transport. The proximity of the home and workplace cannot be ensured even today, as a number of employers employing lots of workers are now compelled to hire workers from almost the most distant places in the country. Their travel between their home and workplace generates increasing needs for transport, primarily in community transport. In the case of urban sprawls, the need for travel is further strengthened by transport between residential areas, away from the centre, closer to nature and therefore offering a higher quality of life and workplaces in the city centre. In our opinion, without disputing the need to make efforts in order to rationalise mobility needs, it follows from the above that existing conditions, circumstances and trends need to be taken into consideration on the assessment of transport needs.

Influencing transport/transportation needs	Influencing the modal split (rail transport development)	Developing community transport systems	Improving the fuel efficiency of vehicle stock
Cycle path development	Railway electrification, network modernisation	P+R systems	Increasing the energy efficiency of the existing vehicle stock
Traffic-calmed zones		Bus replacement programme	
Applying road tolls	Purchasing new energy-efficient rail vehicles	Developing urban tram transport	Eco-driving
Transport campaigns		Promoting community transport	Scrapping programme
Teleworking			Promoting energy efficient cars and alternative drives
Promoting car-pooling and car-sharing	Campaign to promote rail transport		

**Table 15: TEEIAP measures**

*Source: Draft TEEIAP*

Reducing and curbing energy consumption in transport and transportation by reducing demands:

- Cycle path development;
- Creating traffic-calmed neighbourhoods;
- Maintenance and expansion of the toll road system;
- Environment-friendly transport campaigns (Mobility Week, Car-Free Day, Cycle to Work);
- Encouraging teleworking.

*3.4.2.1. Implementation of main policy measures proposed by the 2<sup>nd</sup> National Energy Efficiency Action Plan in order to improve energy efficiency in transport*

Development and promotion of rail transport

- railway electrification, network modernisation (e.g. eliminating speed restrictions causing energy loss due to deceleration and re-acceleration);
- purchasing new energy-efficient vehicles (e.g. new motor trains recovering braking energy);
- campaign to promote rail transport.

The primary purpose of improving and supporting rail transport is to ensure that the transport system should satisfy requirements and be safe and competitive. The operation of rail transport and increasing its performance has secondary impacts, which are far from being negligible today, such as energy savings and other environmental benefits, available through influencing the division of labour.

From that respect, significant projects include vehicle purchases by MÁV-START Zrt. and GYSEV Zrt., in the framework of which these two companies purchased 42+6 modern Stadler Flirt motor cars, received and put into operation on a continuous basis between autumn 2014 and September 2015. An opportunity to purchase additional 21 electric motor trains has recently opened up for MÁV-START Zrt. These modern vehicles will be put into circulation on suburban lines around Budapest by early 2017.

The role and weight of the division of labour is illustrated nicely by Table 16. The data reveal that, if the specific energy consumption of rail passenger transport is assumed to be 1, the equivalent values of road and air transport are respectively  $\approx 2.4$  and  $\approx 15$ . In goods transport, again compared to rail transport, the specific energy consumption values of road and air transport are respectively 12 and more than 40. The extremely favourable specific consumption data of water transport are true of traffic along the Rhine-Main. In navigation along the Danube, the very limited depth due to parameters of the waterway does not allow the capacity of boats to be fully exploited, significantly weakening the energy characteristics of Danube navigation. Similar proportions are revealed by the comparison of energy efficiency of individual and community transport. The fuel consumption per passenger kilometre of passenger cars is about 2.4 times higher than that of passenger transport by bus, whereas a similar proportion is observed with regard to rail transport in urban sprawls.

	Transport sub-sector	Means of transport	Type of drive and conditions of operation	Energy consumption <sup>1</sup> MJ/ukm, MJ/tkm	Average energy consumption <sup>2</sup> MJ/ukm, MJ/tkm
Passenger transport	Road	motorcycle		1.05	1.51
		passenger vehicle	petrol	2.39	
			Diesel	1.98	
			battery	0.88	
		bus	scheduled	0.94	
			contracted	0.88	
	Rail	Diesel traction	short distance <50 km	1.10	0.62
			long-distance >50 km	0.90	
		electric traction	short distance <50 km	0.52	
			long-distance >50 km	0.27	
Air transport				9.8	9.80
Goods transport	Road	light truck	petrol	9.53	2.90
		light truck	diesel	8.49	
		heavy truck		1.93	
	Rail		Diesel	0.40	0.24
			electric	0.14	
	Inland water transport			0.20	0.20
	Air transport			10.16	10.16

**Table 16: Specific energy consumption of transport sub-sectors and means of transport**

*Source: Draft TEEIAP*



A key factor in the development of transport is strengthening the role of rail transport, in which, in addition to the energy efficiency aspect, other energy-related considerations also play a role, such as reducing the petroleum dependency and increasing the security of supply and, consequently, of operation.

Various existing travel and tariff allowances available to students, pensioners, groups of travellers, families and specific disadvantaged persons and groups function as incentives to use rail transport and urban community transport modes. Improving the conditions of travel, reducing travel time and modern information tools may also promote the use of community transport.

#### Incentives for the purchase of environmentally friendly cars

The tax items under Act CX of 2003 on the vehicle registration tax provide an incentive to buy more modern cars and cars with a smaller piston displacement. There is a particularly high tax allowance for purchasing Battery Electric (BEV tax = 0) and Plug-in Hybrid Electric (PHEV tax = HUF 76 000/vehicle) vehicles.

#### Cycle path development

During the 2007–2013 period, approximately HUF 60 billion was invested in bicycle transport-related projects. In the 2010–2014 government cycle, the construction of 23.8 km and 508 km of cycle paths were financed from domestic and EU sources respectively. As transport-related bicycle development projects primarily satisfy local and regional demand, development trends are mostly determined by local and county governments. Since Hungary still does not have a regular bicycle traffic count, no measured data concerning the share of bicycle transport are currently available. Consequently, such data are based on estimates or periodic surveys. It follows from the above that there is a substantial potential for increasing energy efficiency by changing the division of labour in transport, even if one considers that not all transport jobs can be economically carried out by rail and that all uses of cars cannot be replaced by community transport in urban traffic.

## Developing community transport systems

### P + R system for energy-efficient passenger transport

Park-and-ride facilities currently operate mainly in Budapest and its primary area, in zones and municipalities with a high number of residents who need to commute a long distance to work or who commute on a daily basis from the suburbs of Budapest. Only a smaller part of these car parks are modern, guarded parking lots, whereas most of them are open spaces designated as parking lots. The P+R system is used by roughly 1.0 % of car trips from and 1.5 % of car trips to Budapest.

According to estimates, about 200 000 motorists arrive each day in the capital from the suburbs (approximately 400 000 commuters crossing the city limits/day), while nearly the same number of locals use cars to move around in the city.

In 2010, P+R facilities were built under a large-scale project in 13 municipalities in Pest County. **The total cost of the project amounted to HUF 624 million and altogether 851 P+R and 540 B+R facilities were built.**

In 2013, there are about 4 800–5 000 P+R slots in and around Budapest, including 3 380 registered parking spaces in Budapest. The rate of utilisation of P+R facilities is about 70-80 %.

### Operating a bicycle community transport system

MOL Bubi, a rentable community bicycle system, has been operating in Budapest since September 2014. 1 100 bicycles were made available at 76 points under its first phase. They are located within the Grand Boulevard and in the City Park in Pest, in Víziváros and the South Buda university quarters in Buda as well as on Margaret Island.

The programme was co-financed under the Central Hungary Operational Programme. Similar community bike systems were put into operation in Szeged and Esztergom, and one is currently in progress in Győr.

### Bus replacement programme

The stock of buses currently used for scheduled public service in Hungary (approximately 7 600 buses) is obsolete to a varying degree and needs to be replaced. Within the stock of buses, a distinction must be made between buses designed for local and long-distance services, which have different requirements (e.g. frequent stops and starts on local lines).

#### *Obsolescence indicators:*

- vehicles are near or have reached the limit of their physical lifespan;
- the environmental parameters of vehicles do not meet current requirements and legitimate (Community) expectations;
- the energy efficiency of vehicles fails to meet a reasonably expected level.

In the first case, the obsolescence factor is (directly) manifested in costs through steadily increasing repair/maintenance costs, in the second case, it is observed in terms of quantifiable (indirect) external impacts, whereas in the third case, it manifests itself (directly again) in terms of increasing energy/fuel costs.

The main criteria set out in legislation concerning the purchasing of buses also focus on the energy efficiency of vehicles, the reduction of CO<sub>2</sub> emissions and the accessibility of vehicles to disabled persons.

Under the bus replacement programme, the replacement of the bus fleet of Volán companies running two-thirds of long-distance buses in Hungary, with lines touching 99.9 % of the country's municipalities as well as operating local community bus services in a number of municipalities, is financed in the framework of the Community Transport Financing Programme of the Hungarian Development Bank. The amount allocated to the financing of the scheme has been increased to HUF 150 billion. Under the financing scheme, 295 new buses and 26 overhauled used buses were purchased in 2013. In urban community transport, in 2013 and 2014, 159 and 167 new buses were put into operation in Budapest and its suburbs. Under the 2014 GIS tender, Miskolc intends to purchase 75 CNG buses. The tender, expected to be implemented in 2015, is currently being assessed.

The two main marginal conditions of the bus replacement programme is to reduce the average age of vehicles to app. 10 years and to remove buses older than 20 years from public services. Therefore, the programme is intended to be continued. In order to fulfil the above conditions, 800 to 1200 buses will need to be purchased in the short term (until the end of 2016), while subsequently, 400 to 600 buses must be purchased annually according to a proposal under the TEEIAP.

### Introducing road tolls

In freight transport, requirements are essentially determined by the transportation-intensity of the economy. Without prejudicing the competitiveness of economy, measures are required in order to curb demand in the following fields:

- capacity-based infrastructure usage charges (e.g. road tolls, congestion charges), to reflect external costs of transport;
- improving the utilisation of freight vehicles, logistics development and support;
- reducing 'irrational transports', by enforcing the real costs of transport, among other things.

In total, 6 513 km of Hungarian roads are affected by Act LXVII of 2013 on a system of charges for the use of dual carriageways, freeways and main roads in proportion with the distance covered, having entered into force on 1 July 2013, which reduces energy consumption through rearranging traffic and rationalising transportation needs. One of the intended goals of the electronic road toll (ERT) introduced in the second half of 2013 was to reduce noise impacts, environmental pollution and the number of road accidents. Adjusted to correspond to the extent of pollution, the tariffs eliminate the unjustified use of motorways. As a result of the ERT scheme, short-distance goods transport will no longer be interested in evading motorways. Since, as a result of the ERT scheme, the use of short road sections has also become fair and proportionate, these can increase more quickly and easily; businesses are becoming interested in the responsible use of roads as the number of idle runs is reduced due to the increase in the costs of transportation. While the data concerning the utilisation and idle kilometres of trucks confirm that their efficiency has improved, the impact cannot be accurately quantified due the economic crisis effects in recent years.

### 3.4.2.2. *Planned measures in order to improve energy efficiency in transport*<sup>40</sup>

Some of the proposed transport measures is the continuation of programmes commenced in earlier years or the maintenance of the tax and road toll systems.

Enforcing energy efficiency in the reconstruction of the stock of buses (Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles)

According to the proposed measure under the TEEIAP, the purchasing of 800 new (and, to a smaller extent, used) buses a year is envisaged in the framework of the bus reconstruction programme, including 600 articulated and 400 non-articulated buses. The project intended to make community transport more attractive may contribute to a desirable change to the modal split.

Moreover, the TEEIAP recommends that energy efficiency should be given priority in public procurement tenders (on ordering service contracts). While this is provided for by legislation, determining the weight of the relevant assessment criterion is still in the discretion of the contracting entity. A favourable change could be attained by prescribing mandatory levels and assessment weighting.

As far as new buses are concerned, any significant saving in energy can only be achieved by supporting (prescribing) the purchasing of buses of the highest energy efficiency indicators. Based on experiences according to the relevant literature and expert estimates, the reduction in fuel consumption of energy efficiency-optimised vehicles is 5 %. That calculation of energy savings is based on the difference between the fuel consumption of buses of average (BAU) and optimal energy efficiency. The number of buses, annual distances run and other initial data are based on public service contracts and statistical data provided by public service providers.

The least reliable data include the potential energy savings of specific alternatives, which depend on a number of other factors in addition to the vehicle (traffic, height and climatic conditions, distance between stops, capacity utilisation etc.), while a combination of individually assessed options does not constitute a simple summary. (See the section on 'Potential measures in order to increase the energy efficiency of buses and their percentage potentials', of which the measures concerning traditional vehicles may possibly be taken into consideration. The level of annual savings available by 800 clean buses is 0.063 PJ, whereas the cumulated effect is 0.315 PJ.)

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<sup>40</sup> Measures under the draft TEEIAP

## Supporting e-mobility

Two directions of development are proposed. The first is to promote the increase in hybrid electric drives, which are still slow to gain ground (currently there are about 60 HEV buses in operation). The other is e-mobility development under the Jedlik Ányos Plan. Depending on the estimated financing available, the following targets can be set until 2020:

<b>Year</b>	<b>2015</b>	<b>2020</b>
<b>Number of battery electric cars</b>		
Passenger cars	192	11 463
Small trucks	137	2 372
Lorries	0	101
Buses	0	96
Motorcycles	0	140
<b>Plug-in Hybrid electronic vehicles</b>		
Passenger cars	2 884	42 315
Small trucks	549	4 423
Lorries	0	253
<b>Total number of electric road vehicles</b>		
Passenger cars	3 076	53 778
Small trucks	687	6 796
Lorries	0	355
Buses	0	96
Motorcycles	0	140

**Table 17: Increase in the use of electric vehicles**  
(Source: draft of the Jedlik Ányos Plan)

Estimated savings are calculated on the basis of the difference between the consumption of traditional internal combustion vehicles and EVs. The estimated value of final energy savings is 0.72 to 1.0 PJ/year in 2020.

The Jedlik Ányos Plan (JAP) aims to encourage the use of alternative-drive vehicles and the establishment of the related infrastructure. The main areas of the JAP are as follows:

- Support research, development and innovation (R&D&I) to promote e-mobility and domestic production,
- Develop technical infrastructure of international quality for testing high-capacity (300–400 V, 200 kW) batteries and fuel cells. Train experts and technicians who may represent added value including on international level in carrying out research and development jobs.
- Develop the e-mobility infrastructure, which has a significant industry development potential, and facilitate project financing,
- Getting involved in the operation of international and EU organisations (e.g. European Green Vehicles Initiatives),
- Review and expand legal and taxation conditions to support e-mobility,
- Assess the role of community transport in e-mobility, options for its application and facilitate financing.
- Defining model projects and facilitating the financing of such projects.

However, in community bus transport, in particular long-distance (national, regional and suburban) community bus transport, as long as electric vehicles fail to approximate the running parameters of and are much more expensive than the current Diesel buses. Moreover, in the light of conditions and areas where these buses currently operate and will probably continue to operate for a relatively long time, the buses used for long-distance service should be replaced with traditional yet modern (Euro VI) buses as soon as possible and to the greatest extent possible, which will represent a significant step toward the protection of environment and reducing energy consumption while also improving the level of service to passengers.

## Road tolls

Road tolls are charges levied on vehicles of a maximum authorised mass over 3.5 tonnes for the use of limited-access highways and certain main roads, in proportion with the distance covered and depending on the number of axles and the environmental classification of the vehicle. The charge is equivalent to 10 to 15 % of transport rates per kilometre, which represents sufficient incentive to reduce the number of vehicle kilometres run. Moreover, pay-as-you-drive road charges influence the way traffic operates, reducing energy demand in transport by creating more favourable traffic conditions.

The means of reduction include reducing idle runs, better utilisation of loading capacities and various logistic solutions (route optimisation, combined transportation, diversion to rail transport).

The road toll results in final energy savings of about 2.15 PJ, whose cumulated amount is 13.4 PJ by 2020. The calculation is based on the traffic diversion data of planning materials and the price flexibility data of freight transport. A study has been drawn up for the assessment of impacts.<sup>41</sup>

## Developing bicycle transport

In the framework of the National Transport Strategy, a complex development plan has been drawn up in order to promote bicycle transport, whose main objectives are as follows:

- increase the share of bicycle transport in the division of labour in transport
- develop bicycle tourism, increase the number of cycling tourists
- ensure the conditions of safe cycling, reduce the number of bicycle accidents
- develop recreational cycling and bicycle sports.

The development plan has assigned quantified values to the development and operation of networks in specific areas. Developing bicycle transport is a nation-wide objective.

The development of cycling in Budapest is a special area. In that respect, the Budapest Transport System Development Plan declares that ‘by 2020, the target for the development of bicycle transport is to achieve a 10 % share of cycling in all movements’. Proposed improvements can be financed under the Regional and Urban Development Operational Programme.

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<sup>41</sup> Deloitte: Financial and national economy impacts of introducing a pay-as-you-drive electronic road toll system, June 2010



On a national level, estimated final energy savings from the development of bicycle transport will amount to 5 PJ/year in 2020, whereas cumulated savings between 2014 and 2020 will reach 20.14 PJ.

### Rail and road community transport development programmes under the National Transport Strategy

The National Transport Strategy and the Integrated Transport Development Operational Programme, which is based on the former, envisage significant development in rail and bus transport, to be financed under the Integrated Transport Development Operational Programme (ITDOP). In rail transport, the development will include converting main railway lines into double-track lines, development of suburban trains, the electrification of tracks, the development of train control and safety systems and the purchasing of modern motor cars, engines and railway cars. In the scope of developing community transport, the Strategy envisages in particular the development of bus transport in addition to the vehicle stock, the installation of disabled-friendly bus bays, stops and turns and smart passenger information and passenger transport systems, which should in turn help increase the transport capacity.

In the NTS developments to increase the output of community transport are classified into four categories, of which projects whose implementation is a 'priority' or is 'eligible for financing following adequate preparation' appear to be realistically viable.

By 2020, such development projects will result in an increase in the overall output of bus transport by  $10.32 \cdot 10^6$  passenger kilometres compared to the BAU scenario and an increase in the output of rail transport by  $620 \cdot 10^6$  passenger kilometres, which would, in the absence of development, be performed by cars.

The proposed measures are based on the National Transport Strategy (NTS) strategic document; financing is paid in the framework of the Integrated Transport Development Operational Programme:

Priority 3: Regional accessibility of road and transport safety,

Priority 4: Suburban and regional rail accessibility and energy efficiency,

Priority 5: Sustainable urban transport development projects.

Estimated final energy savings amount to 1.0 PJ/year in 2020.

#### Instruction and promotion of eco driving techniques

A relatively cheaper yet highly effective means to increase the energy efficiency of road transport is the promotion of energy-conscious and environment and climate-friendly driving techniques. Two factors are required in order to efficiently promote techniques collectively called eco driving: 1. skills sharing; 2. influencing driver behaviour so they apply the skills acquired in practice.

On the basis of certified measurements, the use of eco driving techniques may result in up to 8-10 % savings in fuel consumption. The extensive use of eco driving techniques could lead to energy savings on a level that could only be achieved through investments of billions of Forints in other fields.

Eco driving (mostly its theory) is already a compulsory part of the regular training syllabus for professional truck and bus drivers. While achievements could also be attained through the instruction of drivers holding a C or D category licence, the current energy efficiency action plan should be limited to the training and influencing of drivers with a B category licence.

The task to be tackled is to include the instruction of the theory and practice of eco-driving in driving lessons, to offer the opportunity of training (e.g. in combination with transport safety training) for regular drivers in the framework of information and pilot projects and to carry out practical mobilising demonstrations in connection with other transport-related environmental campaigns.

The calculation is based on the fact that where eco driving is part of the driving lessons, the share of persons obtaining a driving licence who are able to properly apply eco driving skills will increase from 45 % to 65 %, which will in turn result in savings of 8 % on average, while a further 55 %–35 % of drivers are assumed to apply eco driving techniques on an occasional basis or improperly, achieving an average fuel saving of 2 %. Starting in 2017, promotional campaigns, events and an eco-driving competence centre to be set up will increase the share of occasional application of eco driving techniques from 5 % to 15 %, resulting in an average saving of 1.5 %. The number of drivers concerned, the average number of kilometres driven by them and the average fuel consumption of passenger cars and vans are based on KSH data and KTI research materials.

Estimated value of savings: 0.912 PJ/year

### **3.5 Promotion of efficient heating and cooling**

(EED Article 14)

Article 14(1) of the Directive provides that Member States shall carry out a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling. The cost-benefit analysis must be submitted by 31 December 2015. The primary purpose of analysis is to prepare the adoption of policies which encourage the due taking into account of the potential of using efficient heating and cooling systems, in particular those using high-efficiency co-generation.

The policy findings and proposals for measures of Article 14(2), (4) and (11) of the EED with regard to efficient district heating/cooling will be defined in the District Heating Action Plan, which is currently subjected to administrative consultations.

Paragraph (4) provides that where the assessment referred to in paragraph (1) and the analysis referred to in paragraph (3) identify a potential for the application of high-efficiency cogeneration and/or efficient district heating and cooling whose benefits exceed the costs, Member States shall take adequate measures for efficient heating and cooling infrastructure to be developed. Professionally justifiable policies can only be developed once the comprehensive assessment and cost-benefit analysis referred to in paragraphs (1) and (3) have been completed.

On the basis of paragraph (5), in addition to a comprehensive cost-benefit analysis, institutional-level cost-benefit analyses must also be drawn up on the following occasions:

- (a) with regard to new thermal electricity generation installations, concerning the operation of the installation as a high-efficiency cogeneration installation;
- (b) with regard to existing thermal electricity generation installations, concerning the conversion of the installation into a high-efficiency cogeneration installation;

(c) where an industrial installation generating waste heat at a useful temperature level is planned or substantially refurbished, concerning the utilisation of waste heat;

(d) where a new district heating and cooling network is planned or where a new energy production installation with a total thermal input exceeding 20 MW is planned in an existing district heating or cooling network or an existing such installation is to be substantially refurbished, concerning the utilisation of waste heat from nearby industrial installations.

The requirements of the cost-benefit analysis will be set out in a decree by the Hungarian Energy and Public Utility Regulatory Authority, which decree will also provide for the rules of approving cost-benefit analyses and exemptions from the procedure.

### **3.5.1. Comprehensive assessment of efficient district heating/cooling and the direction of development**

In the district heating sector, increasing the share of renewable energy sources and the energy utilisation of non-recyclable wastes, establishing new district heating systems

Based on the District Heating Development Action Plan (DHDAP) and Hungary's Renewable Energy Utilisation Action Plan 2010–2020 (NAP), renewable energy targets are based primarily on a significant increase in the utilisation for district heating of biomass and geothermal energy and, to a smaller extent, of heat generated by waste incineration.

The forecast of the DHDAP, which takes current trends into account, is more moderate than estimates in the NAP regarding district heating. According to MEKH data, in 2012, renewable energy sources accounted for 3.6 PJ in district heating. According to the forecast of the DHDAP, that indicator will increase by more than 3.5-fold, to 12.96 PJ by 2020.

Biomass utilisation in Hungary is heavily reliant on the utilisation of firewood for energy. Part of the firewood is used for generating electricity, whereas the rest is used for heat energy in the district heating system and individual heating.

The total area under forest management in Hungary is 2 063 500 ha, of which genuine forests occupy 1 943 500 ha. The rate of forestation is 20.8 % (NFCSO data as at 1 January 2015).

The total live wood stock of Hungarian forests is about 370 million m<sup>3</sup>, whereas the annual growth of forests amounts to nearly 13 million m<sup>3</sup> wood. However, taking the requirements of sustainable forest management into consideration, the amount of annual logging is only about 7 to 7.5 million m<sup>3</sup> wood, which means that the live wood stock of forests is increasing continuously. That is due to the continuous growth of the forest area, a strict system of planning and supervision by forestry authorities and forest management based on the principle of sustainability.

More than half of the total green electricity and over 60 % of bioenergy used for district heating are generated by Hungarian forest wood.

In order to satisfy the increasing demand for renewable energy, an estimated 7.8 to 8 million tonnes of biomass a year will be required by 2020. Nearly 50 % of that amount is available in public and private forests in Hungary. While the geographical location of wood suitable for energy uses allows it being used at short transportation distances, it requires significant technological and logistic improvements. The most efficient utilisation of firewood and other potential energy products from Hungarian forests and afforestation could therefore be achieved by a system of decentralised heating plants.

In Hungary, forests are the biggest CO<sub>2</sub> sinks, absorbing 12 to 15 % of the country's carbon emissions. While the forestation rate of Hungary (21 %) is significantly lower than the EU average (40 %), the country has a significant afforestation potential (approximately 650 000 ha; National Afforestation Programme), whose utilisation, however, greatly depends on the situation of food production and the system of farmers' direct interests.

The draft District Heating Development Action Plan states that, in a European comparison, Hungary has an outstanding biomass-based green energy generation potential.

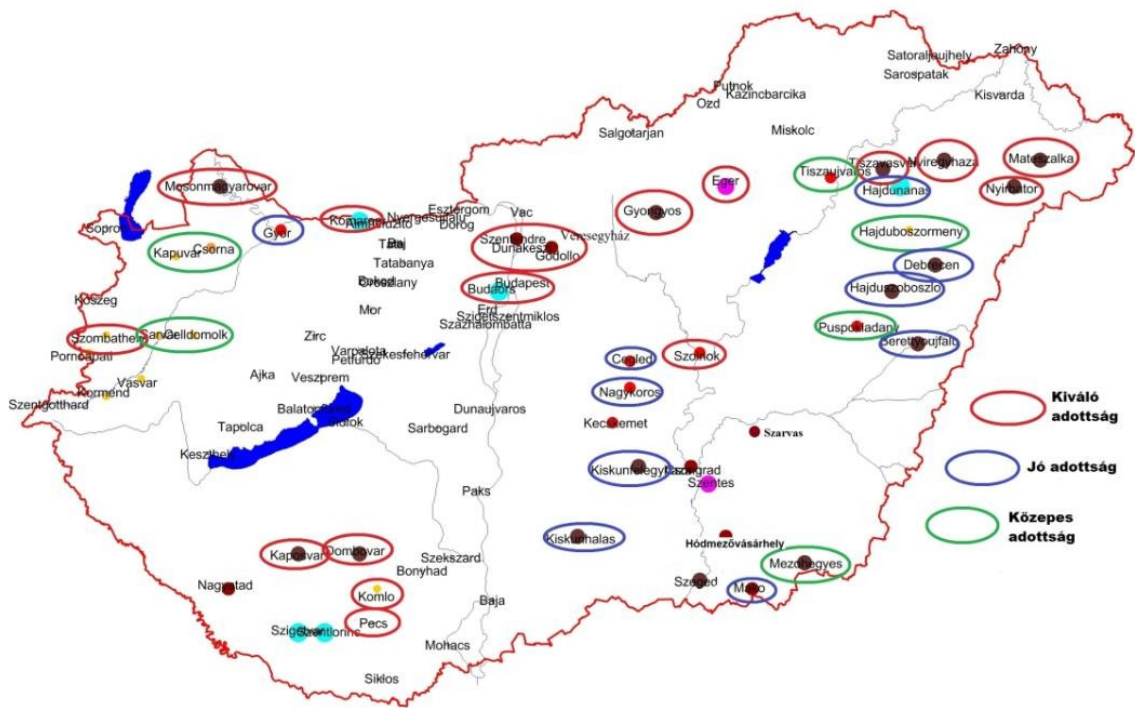
A new survey of the Hungarian geothermal energy potential was carried out using modern methods by the Institute of Geology and Geophysics during the preparation of the Energy Mineral Resource Utilisation and Management Action Plan in 2012 and 2013.

The possibility of increasing the share of geothermal energy in the development of district heating systems was analysed by the Ministry of National Development in cooperation with the Hungarian Geothermal Association and the Building Energy and Building Technical Systems Department of the Budapest University of Engineering. The DHDAP states that, despite Hungary's outstanding conditions, geothermal energy currently plays a relatively small role in district heating.

'Geothermal energy accounted for a meagre 0.5 % (283 TJ) of total energy sources used for district heat generation in 2012. In addition to the above, Hungary uses about 250 TJ of geothermal energy in non-service-type district heating supply.' [DHDAP]

The DHDAP declares that district heating supply should be developed in order to improve the competitiveness of district heating through systems capable of using geothermal energy wherever the geological conditions so allow. The main goal of geothermal development is to ensure that the highest possible amount of natural gas can be replaced by geothermal energy in existing and planned district heating systems and that it should reduce air pollution in cities. The DHDAP claims that the share of geothermal energy in district heating systems is currently very low and, realistically thinking, it will not play a decisive role in the future, despite the significant potential.

The draft DHDAP specifies that municipalities with a geothermal potential should assess the possibility of utilising geothermal energy in their district heating systems. Moreover, the study assesses municipalities which, while lacking a district heating system, have favourable geological conditions and a high heat demand density. While in such municipalities, connecting buildings onto a district heating system requires a longer time, their potentials need to be analysed.



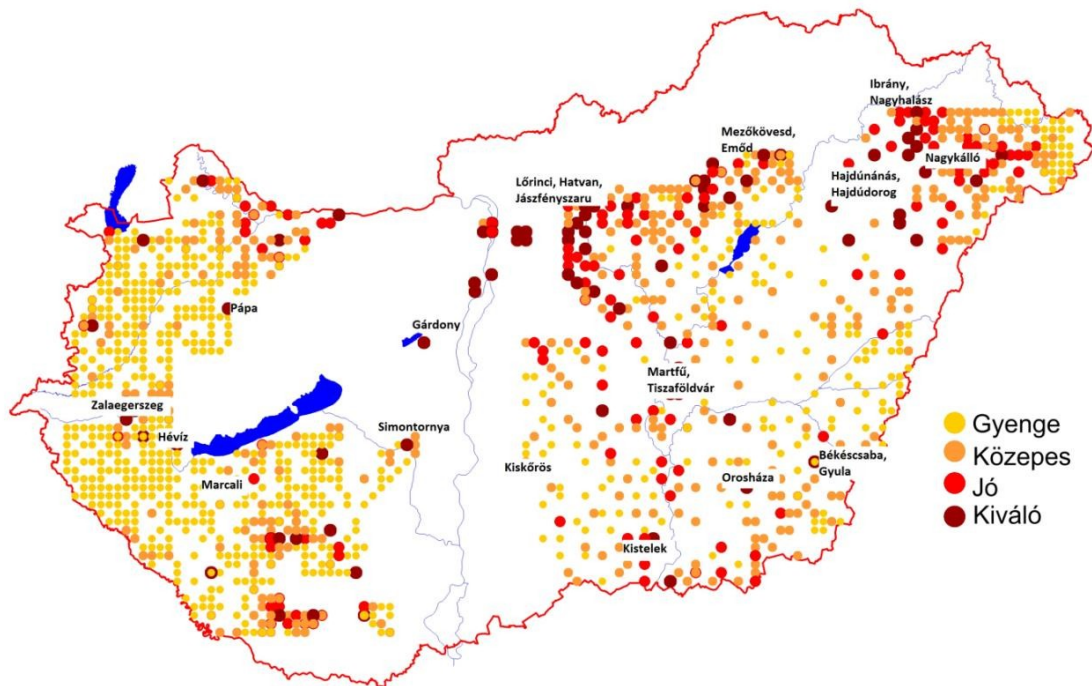
Kiváló adottság	Excellent conditions
Jó adottság	Good conditions
Közepes adottság	Average conditions

**Figure 10: Classification of municipalities with existing district heating systems according to geothermal conditions**

*Source: Hungarian Geothermal Association – Kontrakció Bt. (2012): Potentials of increasing the share of geothermal energy in district heating, Study for the District Heating Development Action Plan, MND supplement*

Figure 10 shows municipalities with district heating systems (including the names of settlements). Of these municipalities, the ones marked with a circle of different colours are the ones where heat demand density is high and the costs of boring geothermal wells are relatively low due to geological conditions yet geothermal energy has not yet been utilised. These municipalities include the following: Budapest, Budaörs, Szentendre, Gödöllő, Dunakeszi, Gyöngyös, Eger, Tiszavasvári, Nyíregyháza, Mátészalka, Nyírbátor, Hajdúszoboszló, Szolnok, Kaposvár, Dombóvár, Komló, Pécs, Szombathely, Mosonmagyaróvár and Komárom. Among others, these are the municipalities where some of the energy sources currently used in the district heating system (mostly imported natural gas) could be replaced by exploiting geothermal energy. The complete energy-efficient renovation of buildings supplied by district heating will enable geothermal wells of less high water temperature to be used for the heating of buildings. Geothermal energy can potentially also be used in the district heating system in municipalities without an existing district heating system yet. In order to economically implement such projects, however, it is necessary that local heat

demand density should be high and the costs of boring wells should be relatively low. In Hungary, a number of towns meet these criteria: Hatvan, Mezőkövesd, Martfű, Tiszaföldvár, Orosháza, Békéscsaba, Gyula, Kistelek, Zalaegerszeg and Pápa. This is shown in Figure 11.



Gyenge	Poor
Közepes	Average
Jó	Good
Kiváló	Excellent

**Figure 11: Municipalities with favourable geological conditions and high heat density, without an existing district heating system (including the names of settlements)**

*Source: Hungarian Geothermal Association – Kontrakció Bt. (2012): Potentials of increasing the share of geothermal energy in district heating, Study for the District Heating Development Action Plan, MND supplement*

Connecting buildings onto a district heating system in these municipalities will take longer. The first step of that process is to connect public bodies with high heat demand (hospitals, schools, nursery schools, town halls) and government bodies into the district heating system, introducing and promoting district heating in that way.



### Energy utilisation of non-recyclable wastes

Waste management is one of the biggest challenges of the 21<sup>st</sup> century. The waste management principles of earlier years have changed. Today, waste is considered as a source of materials and energy.

Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives and Act CLXXXV of 2012 on waste, transposing the provisions of the Directive in Hungarian legislation, are based on the system of waste hierarchy. That system lays down a priority order in carrying out specific waste management activities. According to the waste hierarchy, the best solution in waste management is to prevent the generation of waste. Where the above is not possible, waste must be re-used or recycled to the extent possible, whereas it may only be incinerated or dumped where no other alternative exists.

The DHDAP treats non-recyclable wastes getting through the upper layers of waste hierarchy as sources of energy. Non-recyclable wastes must be treated under controlled circumstances, in industrial-scale equipment and, where possible, by utilising the generated heat for energy (electricity and/or heat generation) in all cases.

The competitiveness of district heating services is significantly improved by the energy utilisation of waste as waste-based heat is one of the lowest-cost energy sources of district heating. Therefore, one of the targets under the DHDAP is to increase the share of heat generated by waste incineration in district heating. Apart from reducing the consumption of natural gas in district heating, it resolves the issue of waste management in accordance with the requirements of the waste hierarchy.

#### **3.5.2. Measures addressing efficient heating and cooling**

In terms of energy efficiency, district heating systems should be broken down to three parts, i.e. the efficiency of heat generation, heat transmission and heat utilisation systems. The goal of the DHDAP is to increase the energy efficiency of the complete district heating system.

That is conducive to attaining all three objectives of the National Energy Strategy (security of supply, decarbonisation and competitiveness). Under the DHDAP, the development tasks concerning specific parts of the district heating system are as follows.

#### Heat generation and cogeneration

While on the whole, the technical condition of cogeneration equipment is good and requires little development, heating plants must be modernised.

A feasibility potential assessment is being drawn up concerning the high-efficiency cogeneration potential and the utilisation of renewable energies and non-recyclable waste available for district heating/cooling purposes. If, on the basis of the feasibility potential assessment, there are locations where implementing the above seems possible, a cost-benefit analysis should be performed. Where the outcome of the cost-benefit assessment is positive, i.e. the benefits are higher than costs, the infrastructure is worth developing. However, with regard to the development of district heating/cooling infrastructure, it must be taken into consideration that heat from cogeneration that ensures primary energy savings should be suitable to be channelled into the district heating system, i.e. the district heating system and high-efficiency cogeneration should become mutually compatible.

Modernising the heat transmission system has a significant potential to save energy. In that context, possibilities include the replacement of primary transmission lines, reducing their diameter where appropriate, separating heating centres, the heat insulation of pipelines and/or moving overground pipelines underground and the installation of heat reservoirs. Similar projects include increasing the utilisation of heat sources by integrating and optimising heat districts.

The energy efficiency of the system using district heat is mostly determined by buildings owned by heat consumers. The highest energy savings potential was identified in that respect, i.e. buildings, by the National Energy Strategy. In buildings heated by district heating, in order to encourage increased energy savings, the controllability of heat consumption must be made possible and residential units must be equipped with calorimeters or cost allocators as soon as possible.

The District Heating Eco-Label, a voluntary environmental performance certificate of district heating systems, is a suitable tool to contribute, as a policy measure, to the achievement of the level of energy savings set in the Directive. The Hungarian District Heating Providers' Association (the 'MaTáSzSz') has developed the uniform voluntary environmental performance certification scheme of district heating systems and the form of certification (District Heating Eco-Label). The certificate would provide information concerning the efficiency of service providers and its use of renewable energy sources. It would offer an opportunity to provide additional information for the making of decisions in development tenders, encouraging the use of additional own financing and further development projects. So far, the government has not brought a decision on the introduction of the District Heating Eco-Label, which is currently used on a voluntary basis.

#### Increasing the social acceptance of district heating.

Today, district heating is perceived negatively by the population. Changing that perception is not an easy task, yet a number of rational arguments can be given in favour of developing district heating systems.

In addition to awareness-raising campaigns in order to increase the acceptance of district heating by the society (see Chapter 3.1.4. Consumer information programmes and training), it would also help popularise the district heating system if district cooling were added to the service. In fact, that may also have a favourable impact on the peak load of the electricity generation system. In summer, the increasing demand for air-conditioning increases the peak load (gross system load) of the electricity generation system. While at the beginning of the 2000s, the peak load of the electricity system in winter was substantially higher (by 960 MW) than peak load in summer, that difference almost disappeared (dropped to 175 MW) by 2012. With the increasing use of air-conditioning equipment, in a few years' time, summer peak load may even exceed the winter peak load. While that is not a problem in itself, the rate of utilisation of a system with smaller peak loads is higher, which may render the construction of peak-load electricity generation installations superfluous. While an increase in district cooling could restrain the increase in peak loads due to the above reason, it could also increase the convenience of the district heating service and thus the acceptance of district heating by society.

## Proposed measures: energy development and renewable conversion of district heating and heat supply systems

Apart from the energy efficiency modernisation of buildings, priority measures under the EEEOP programme for 2014–2020 include the primary side energy modernisation and the renewable conversion of district heating systems in Hungary and combinations of the above (primary energy modernisation and renewable conversion). The secondary side modernisation of district heating systems is planned to be carried out during the energy modernisation of buildings. Eligible projects also include the energy development of heat supply systems by public-law or private-law organisations.

In that context, among other things, it is planned to encourage the establishment of new renewable energy-based district heat generation installations, the modernisation of existing, obsolete and low-efficiency generation units, increasing their energy efficiency or their replacement and renewable conversion and the integration of new generation units into the district heating system. As an important criterion, however, the projects should not increase the level of air pollution or dust loading.

In the context of supporting development projects to reduce network losses, priority projects include the replacement of distribution systems and primary pipe networks, heat insulation of overground pipes and modernising such pipes by placing them underground, renovation and separation of thermal centres, installation of control and telemechanical systems, connecting new consumers, development of district cooling systems (heat-driven heat pumps), and installing new cooperation and market-expanding primary pipelines. In particular, emphasis is given to the efficiency-increasing integration of existing separate heat distribution systems.

Each of the above interventions will directly or indirectly increase energy efficiency and reduce greenhouse gas emissions. Implementing the projects will significantly improve the energy efficiency of district heating and the sustainable control of district heating tariffs.

### **3.6 Energy transformation, transmission, distribution, and demand response**

(EED Article 15)

#### **3.6.1 Energy efficiency criteria in network tariffs and regulation**

Article 15(1) of the EED provides that national energy regulatory authorities should pay due regard to energy efficiency regarding their decisions on the operation of the gas and electricity infrastructure and that network regulation and network tariffs fulfil the criteria in Annex XI. **The current practice of tariff regulation complies with Articles 1-3 of Annex XI as follows:**

<b>EED ANNEX XI</b>		
Energy efficiency criteria for energy network regulation and for electricity network tariffs		
<b>Section 1</b>	Sections 1(h), 3(30) and 158(2)(1) of Act LXXXVI of 2007 [Section 106 of Act XXIX of 2011]	Item I./2.48 of the Trade Regulation approved by a Decree of the MEKH
<b>Section 2</b>	Sections 8(1), 16(o), 18 and 25 of Act LXXXVI of 2007 [Section 38 of Act XXIX of 2011, Section 54(3)(a) of Act LVII on energy efficiency];  Sections 7 and 46 of the Decree implementing Act LXXXVI of 2007	There are no hampering factors.  Section 2.9.6 of MAVIR's Code of Operation
<b>Section 3</b>	Section 5(1) of Decree No 4/2011 of 31 January 2011 of the MND	

Article 15(3) of the EED provides that Member States may permit components of schemes and tariff structures with a social aim for net-bound energy transmission and distribution. While compliance is optional, Sections 64(1)-(8) and 65(1)-(6) of Act LXXXVI of 2007 set out provisions for the treatment of consumers who are socially deprived and require protection. Sections 65 and 66 of Act XL of 2008 also set out provisions for the treatment of socially deprived consumers.

Article 15(4) of the EED specifies three main duties as follows:

(a) Member States shall ensure the removal of those incentives in transmission and distribution tariffs that are detrimental to the overall efficiency (including energy efficiency) of the generation, transmission, distribution and supply of electricity. **As the use-of-system charges do not include incentives detrimental to the efficiency of energy supply, there is no need to adopt new legislation or amend or supplement the current legislation.**

(b) Moreover, Member States shall ensure the removal of those incentives that might hamper participation of demand response in balancing markets and ancillary services procurement. Sections 142(6) and 159(1)(13) of Act LXXXVI of 2007 and Section 11(1) to (5) of Decree No 4/2013 of 16 October 2013 of the MEKH **fulfil the requirement** without amendment.

(c) Member States shall ensure that network operators are encouraged through incentives to improve efficiency in infrastructure design and operation.

Section 5(1)(c) and (2) of Decree No 64/2013 of 30 October 2013 of the Minister for National Development on the framework of the price regulation of electricity use-of-system charges and Section 5(1) and (2) of Decree No 64/2013 of 30 October 2013 of the Minister for National Development fulfil that requirement without amendment.

Article 15(5) of the Directive provides that Member States shall ensure that transmission system operators and distribution system operators:

(a) guarantee the transmission and distribution of electricity from high-efficiency cogeneration;

(b) provide priority or guaranteed access to the grid of electricity from high-efficiency cogeneration;

(c) when dispatching electricity generating installations, provide priority dispatch of electricity from high efficiency cogeneration. **There is no need to adopt new legislation or amend an existing provision** as the current legislation ensures priority access to renewable energy sources. The installation of household renewable energy generating equipment is not subject to a permit and is governed by the provisions of the contract to be concluded with the service provider.

Article 15(6) provides that high-efficiency cogeneration operators should be able to offer balancing services and other operational services at the level of transmission system operators or distribution system operators and that such services should be part of a services bidding process which is transparent and open to scrutiny. According to Section 20(1) to (3) of Act LXXXVI of 2007, the capacities and electricity required in order to ensure the provision of systems services, the replacement of transmission network losses and the balance of electricity with priority access to the grid shall be purchased by transmission system operators publicly, in a manner accessible to any Hungarian or foreign electricity generators or traders or users with suitable equipment.

Terms and conditions of purchasing electricity required in order to ensure the provision of systems services and the replacement of transmission network losses must be made public prior to the publication of calls for tenders, in a manner specified by separate legislation. According to Section 67(b) of Act LXXXVI of 2007, in consultation with the licensees and, through their representative interest organisations, with users, transmission system operators shall develop trade regulations setting out the main rules of electricity trade, the minimum requirements of the collection, processing and sharing of settlement/measurement data, cross-border transmission of electricity and systems services. It is provided for in Section 7(1) to (3), (6) and (8) of Government Decree No 273/2007 of 19 October 2007 implementing Act LXXXVI of 2007 on electricity, which comply with the requirements of the EED.

Another requirement set out in Article 15(6) is that reduced connection and use-of-system charges should be applied in order to encourage high-efficiency cogeneration to be sited close to areas of demand. The Hungarian legislation complies with the relevant provision of the EED.

While the provision of Article 15(7), which provides that Member States may allow producers of electricity from high-efficiency cogeneration wishing to be connected to the grid to issue a call for tender for the connection work is optional, the current Hungarian legislation complies with that requirement.

The first task set out in Article 15(8) provides that national energy regulatory authorities should encourage demand-side resources. Sections 1(h), 158(2), 3(30), 8(1), 16(o), 18 and 25 of Act LXXXVI of 2007, Sections 7 and 46 of Government Decree No 273/2007 of 19 October 2007 and the Trade Regulation (TR) of the Hungarian electricity system, approved by the MEKH, provide for demand-side regulatory measures in accordance with the relevant legislation.

The provisions of Article 15(9) (Member States shall consider including information on energy efficiency levels of installations undertaking the combustion of fuels with a total rated thermal input of 50 MW or more) are optional.

The National Environmental Protection and Nature Conservation Chief Inspectorate has a database concerning such installations, enabling the calculation of monthly values of efficiency. Such efficiency values can be compared with the efficiency values of best available technologies. Information of that nature is available.

### **3.6.2 Facilitate and promote demand response<sup>42</sup>**

(EED Section 3 of Annex XI, Section 3.6 of Part 2 of Annex XIV)

Use-of-system tariffs must be cost-reflective of cost-savings in networks achieved through demand-side and demand-response measures, distributed generation and other energy efficiency measures, including savings from lowering the cost of network investment and a more optimal operation of the network. In order to improve the integrability of renewable systems, it is a priority to ensure sustainable long-term system stability.

The existing practice of tariff regulation complied with some of the conditions specified in Section 1 of Annex XI since, where the cost of network operation is reduced, it results in the lowering of recognised costs of the licensee concerned, which serves as the basis for the calculation of tariffs. The same applies to investments, i.e. the lowering of required additional investment costs leads to a lowering of (the increase in) the regulatory asset value, which will in turn affect the recognised depreciation and equity costs the calculation of the tariff is based on.

Currently, there are virtually no specific written rules known to licensees and, therefore, the tariff regulation is unable to provide incentive to network licensees (in order to achieve various objectives). A single specific requirement is specified in Section 5(2) of Decree No 64/2013 of 30 October 2013 of the Minister for National Development on the framework of the price regulation of electricity use-of-system charges, which provides that ‘in order to minimise risks from changes in volume, the tariffs during the 2<sup>nd</sup> and 4<sup>th</sup> years of the tariff regulation cycle shall be determined on the basis of actual volume data of the year two years preceding the year concerned by the tariff determination’. If that rule is consistently observed, it is suitable to ensure that network licensees are not interested in the increase in electricity consumption, at least for a period over 12 months.

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<sup>42</sup> Source: Hungarian Energy and Public Utility Regulatory Authority (MEKH)



Of the tariffs referred to in Section 3 of Annex XI, related to Article 15 of the EED, examples of time-of-use tariffs exist in Hungary (in terms of both the universal service and the use of the system). One of the obstacles to other, more complex tariffs is of a technical nature. A significant part of meters currently used in Hungary is not suitable for the measurement of electricity consumption by time of use, whereas a simultaneous mass replacement of meters would probably be contrary to the requirement of financial rationality, referred to in Article 9(1) of the EED.

The current legislation provides for no restrictions to traders in electricity agreeing with their customers on the tariffs applied.

Proposed action: Supporting smart systems

In the framework of measure 1 under the 5<sup>th</sup> priority of EEEOP (supporting renewable-based electricity generation), the programme intends to support the system side of the distribution of renewable-based electricity. As far as building energy programmes are concerned, the use of smart systems is encouraged by measure 2 of the 5<sup>th</sup> priority of EEEOP by promoting the use of energy management tools by the public sector. On a complementary basis, solutions within building energy programmes in order to measure the energy consumption of and arrange for the smart control of municipal infrastructure are also supported under the Regional and Urban Development Operational Programme. On the basis of the above, the supporting of smart network tools, i.e. the development of smart networks is also enabled by the EEEOP (and, on an additional basis, the RUDOP). Additional items of these projects (demand response) may be supported under a coordinated programme by resources of the Green Economy Financing Scheme, thus increasing energy efficiency and helping achieve the regional development targets concerning smart networks in the DRS energy priority area.

### **3.6.3 Energy efficiency in network design and regulation**

(EED Article 15(2), Annex XIV Part 2, Section 3.5)

Article 15(2) of the EED provides for two main duties of the Member States. In particular, they shall ensure that

(a) an assessment is undertaken of the energy efficiency potential of their gas and electricity infrastructure;

(b) specific measures and investments are identified for the introduction of cost-effective energy efficiency improvements in the network infrastructure, with a timetable for their introduction.

**An assessment is currently being drawn up, including the specification of energy efficiency improvements and their schedule.**

## **ANNEXES**

### **ANNEX A**

#### **National Plan to encourage the construction of Nearly Zero-Energy Buildings**

THE PRIME MINISTER'S OFFICE

**National Plan for Nearly Zero-Energy Buildings**

**August 2015**

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The National Plan of Requirements of Nearly Zero-Energy Buildings is part of the 3<sup>rd</sup> National Energy Efficiency Action Plan

## **1. Relationship with European Union legislation**

This Draft has been drawn up in accordance with Article 9(3) of Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings.

## **2. Provisional targets**

The version in effect since 1 January 2015 of Decree No 7/2006 of 24 May 2006 of the Minister without Portfolio determining the energy characteristics of buildings ('Energy Decree') applies required cost-optimal energy values in projects with domestic or EU financing or financing from the central budget in order to achieve energy savings. As the first step of the preparation to introduce the system of requirements concerning nearly zero-energy (NZE) buildings, the cost-optimal requirement under Annex 5 to the Energy Decree was put into effect. The requirements concern thermal transmittance factors of the building envelope, the specific heat loss factor and the combined energy characteristic.

The cost-optimal level will be applied on a mandatory basis starting from two dates, according to the following schedule:

From 1 January 2015:

- in minor renovations of existing buildings, financed from EU funds using state aid, for the renovated structure,
- in constructions of new buildings or major renovations of existing buildings, financed from EU funds using state aid,

From 1 January 2018:

- in general, in minor renovations of existing buildings, for the renovated structure,
- in general, in constructions of new buildings or major renovations of existing buildings,

Introducing the cost-optimal level of requirements will help prepare for the level of requirement for NZE buildings of higher than cost-optimal energy efficiency after 2018 and 2020.

## **3. Required future amendments and additions to rules**

Requirements for NZE buildings must preferably be published as soon as possible by way of a decree. Moreover, the definition under Section 2(6a) must be amended, where the requirement must not be linked to the cost-optimal level of requirement. Therefore, the following definition should be used:

**‘(6a) nearly zero-energy building: a building that meets the requirements specified in Annex ....;’**

The forthcoming Annex to the Energy Decree (‘NZE Annex’) must be proclaimed with the same conditions. The draft of that document is attached hereto for information as Appendix 1.

Additional provisions may need to be added to Government Decree No 176/2008 of 30 June 2008 on the certification of the energy characteristics of buildings (‘Certification Decree’) in order to ensure that the NZE label is indicated in building energy certificates. Consequently, adjusting the classification system to NZE requirements should be considered.

#### **4. Appropriation for the review of calculation methodology due to the requirement concerning nearly zero-energy buildings**

A review must be carried out in accordance with the first and sixth sub-paragraphs of Articles 9 and 4(1) of the Directive. The review must be carried out in accordance with Commission Delegated Regulation (EU) No 244/2012 supplementing Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings by establishing a comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements (‘Cost-Optimal Regulation’).

The review of requirements for nearly zero-energy buildings (‘NZE requirements’) should primarily concern new buildings. For the cost-benefit analysis, a minimum of 4 new buildings of a significantly different size (i.e. significantly different A/V factor) type buildings must be considered in each category. Moreover, in certain cases, the assessment of renovations of existing buildings should also include NZE requirements. Buildings not intended for longer stay should be assessed as a separate category. The review should be based on the macroeconomic assessment specified in the Cost-Optimal Regulation with a 3 % discount rate; of the packages of measures concerning the type buildings so identified, the higher energy-efficiency versions that are in the optimal range under the Cost-Optimal Regulation must be applied.

In the calculations, the share of renewable energy sources must be considered in accordance with Part IV of Appendix 1. Where appropriate, in order to simplify the calculations, the fulfilment of the renewable requirement under the Directive, i.e. a nearly zero-energy buildings means a building whose energy demand is covered to a very significant extent by energy from renewable sources, may be encouraged by more simple methods. For each version, the cost efficiency of the utilisation of biomass and monovalent heat pumps and, where appropriate, sun collectors or photoelectric power generators must be assessed.

In the packages of measures assessed, the volume of passive solar heat utilised must be separately checked. Where appropriate, the values in Table I.3 of Annex 3 to the Energy Decree must also be reviewed. Since in buildings built in accordance with NZE requirements, the heating season may be substantially shorter, the table may have to be supplemented. In order to revise the table, a dynamic simulation must be performed for the entire year on type buildings defined according to the previous paragraph. Moreover, high energy efficiency requirements necessitate a review of the internal heat gain and domestic hot water consumption values in Table VI of Annex 3 to the Energy Decree as well

as a review of the need for additional differentiation between such values (e.g. for multi-apartment buildings and detached houses or for apartments over a certain floor area). In addition to the above, the method internal heat gain is taken into account should also be reviewed.

The review must also include a verification of performance factors, in particular with regard to systems utilising renewable energy. In the light of practical experience, the potential need for further rules concerning building technical and automation systems (for example, rules coordinated with the EN 15232). Specifying heat insulation in building technical systems may also be reviewed.

On including packages of measures, U-factor requirements must be individually applied to each requirement concerning components included in the table attached (with all other components being the same), for a minimum of 5 different building elements whose thermal characteristics are evenly distributed. The required value of U-factors must be revised on the basis of the results of such calculations.

The methodology of calculating thermal bridges should also be reviewed, including in particular increased heat insulation thicknesses necessitated by the NZE requirements.

During the review, it should also be considered whether the uniform requirement concerning the building envelope can be specified in a more simple manner, including, for example, the more simple differentiation of the specific thermal loss factor: according to the heated volume, heated floor area, the number independent units of the building or the number of floors. Specifying requirements for the air-tightness of the building envelope should preferably also be considered.

The potential simplification of the methodology of taking into account the effect of natural illumination should also be reviewed when expressing the lighting energy demand of buildings.



## **5. Climatic data required for the review of calculation methodology**

The review must be based on the meteorology data of the locations listed below:

- mountainous areas of Budapest,
- urban districts of Budapest,
- suburbs around Budapest,
- a municipality on Lake Balaton,
- in or near Debrecen,
- in Pécs or Szeged or at a nearby location,
- in or near a municipality in West Hungary,
- in a Hungarian municipality located at a height of 300 m or more over the Baltic Sea.

The meteorological data must include dry air temperature and relative humidity data for each hour of the day over the past 25 years.

Also needed is a series of annual meteorological data, broken down by hours of the day, which enables the calculation of incoming solar energy, both direct and diffuse, at least for a location no higher than 150 m over the Baltic Sea within Budapest, and for a location no higher than 150 m over the Baltic Sea, at least 6 km from any towns and motorways. (Such data may include: aerosol concentration, lower cloud height, level of cloudiness etc.)

Preferably, various additional information is required, depending on soil moisture conditions and the hardness of the soil, as well as soil temperature data at various depths.

Climatic data play an important role in modern calculations concerning systems utilising renewable energy sources. Buildings whose dimensions are planned more accurately may help substantially reduce Hungary's energy dependency and the load on the environment. On the basis of up-to-date environmental data, solar thermal gain values may be reviewed in accordance with the previous chapter. The review may also include data used to calculate the risk of overheating in summer, cooling energy needs and the values of heating energy needs in winter. Soil temperature data enable a more accurate definition of data in Annex 3 to the Energy Decree and the application of a more accurate uniform method to calculate the share of renewable energy used by soil collectors.

## **6. Exemplary role of the public sector**

The Building Energy National Strategy ('BENS'), adopted by Government Resolution No 1073/2015 of 25 February 2015, includes a national plan to increase the number of nearly zero-energy buildings. While the renovation of existing buildings to NZE requirements is optional (i.e. in accordance with Articles 4 and 7 of the Directive, requirements for existing buildings must be at cost-optimal levels implemented by Annex 5 to the Energy Decree), the number of public buildings refurbished into NZE buildings must be reported to the Commission since Article 9(2) of the Directive provides that Member States shall take an exemplary role by refurbishing existing buildings into NZE buildings.

As far as existing buildings are concerned, determining the share of renewable energy sources plays an important role in accordance with the earlier definition of the Energy Decree, which was taken over by

the BENS and is also used as a basis for other legislation. Such norms must be maintained in order to maintain legal certainty.

## **7. Method of calculating the mandatory share of energy from renewable sources**

Through a former decision of the government, Chapter IV of Appendix 1 was defined in accordance with Section 2(6a) of the Energy Decree, which was supplemented with the draft of the required implementing rules.

The definition of the requirement concerning the share of renewable energy sources is also intended to ensure compliance with Article 9(3)(c) of the Directive and Article 13(4) of Directive 9/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

## **8. Incentives to encourage the implementation of nearly zero-energy buildings**

Financial incentives are specified in Operational Programmes as described in the following chapter.

Further issues to be considered include taxation issues related to buildings that fulfil NZE requirements, including the tax rates of products and services that are critical for energy efficiency.

Additional incentives and implementation guarantees must be developed and existing such incentives and guarantees must be reviewed on a continuous basis:

- improving legislation and the rules of procedure,
- programmes to improve efficiency,
- developing training, R&D and expert consultation systems, including the environmental skills development of designers, contractors and masters,
- developing data and information systems,

- increasing consumer awareness,
- improving stakeholder cooperation.

## 9. Potentials in the 2014–2020 period to increase the number of nearly zero-energy buildings

Article 9(3)(c) of the Directive provides that the national plan shall include information on incentives to increase the number of nearly zero-energy buildings. Operational programmes for the period 2014-2020 contribute to achieving the objective referred to above as follows.

The 4<sup>th</sup> priority (Energy) of **EDIOP** (Economic Development and Innovation Operational Programme) sets out the following measures:

- Supporting development projects by businesses in order to increase the share of energy derived from renewable sources and improve energy efficiency, including
  - solar energy
  - biomass (including biodegradable waste)
  - encouraging the use of geothermal energy and water power
- Modernisation projects of businesses to improve the energy efficiency of building and economic/production processes,
- Development projects relying on renewable energy sources (buildings or economic/production processes),
- Complex investment programmes (to improve efficiency including the use of energy from renewable sources).

Proposed calls in 2015 include the following:

Code of call	Title of call	Budget of call (HUF billion)	Method of inviting tenders	Envisaged date of publication of call
EDIOP-4-06.2018	Building energy development	6	standard	June
EDIOP-4.1.2	Building energy development combined with the utilisation of renewable energy sources	6	standard	June
EDIOP-4.1.3	Satisfying local heat and electricity demand with energy from renewable sources	6	standard	June

RUDOP, 3<sup>rd</sup> priority Shift toward a low carbon dioxide emission economy, particularly in urban areas (and measure 5 under the 6<sup>th</sup> priority, which is identical)

The measure entitled 'Increasing energy efficiency and the share of renewable energies in local governments' includes relevant interventions

### **9.1. Energy rehabilitation of municipal buildings, institutions and infrastructure and improving the heat insulation of buildings**

This aims to lower the total energy consumption of municipal buildings in accordance with the relevant EU Directives, thus reducing emissions of greenhouse gases.

Eligible projects include, among others, the overhaul of boiler-rooms, replacement of heat generators with modern, high-efficiency equipment, modernisation of heating systems and the building envelope, improvement of building heat insulation, including the improvement of thermal conditions and the lowering of thermal loss. These improvements are supplemented by resident awareness-raising campaigns, related to these interventions under the EEEOP, focusing on the improvement of sustainable energy consumption behaviour.

Under the intervention, any rehabilitation or restoration initiatives to improve energy supply are eligible for financing that result in significant savings in energy consumption by municipal infrastructure.

### **Energy-related modernisation of municipal buildings, institutions and infrastructure and utilising renewable energy sources**

Eligible projects include, among others, satisfying the heating energy demand of municipal buildings and the electricity requirements of municipal bodies with energy from renewable sources, e.g. utilising ambient heat, biomass or solar energy sources.

As part of projects for the energy modernisation of municipal buildings, the modernisation of indoor lighting systems (e.g. the installation of smart lighting systems) is eligible for financing. The renovation of street lighting systems is not eligible as an individual intervention. Moreover, as part of projects to improve energy efficiency in municipal buildings, solutions to measure the energy consumption of and arrange for the smart control of municipal infrastructure are eligible for financing.

Where there is reasonable demand and cost efficiency is ensured, it is recommended to carry out interventions to increase the share of renewable energy by complex renovation projects accompanied by improvements in order to increase energy efficiency. However, development projects to increase the share of renewable energy are eligible on their right.

The installation of solar panels on municipal buildings (and other municipal solutions suitable for electricity generation) is supported by the programme for the common good, primarily in order to satisfy the own electricity demands of buildings concerned.

Under the intervention, all initiatives to improve energy supply through a shift between energy sources are eligible for financing, which help reduce local governments' dependence on fossil fuels and their emissions of greenhouse gases, increase the share of renewable energies in municipal energy consumption and thus result in significant savings in the energy expenses of municipal infrastructure and buildings.

## **9.2. Implementing energy supply controlled by the local government, in line with local conditions and focusing on the exploitation of renewable energy sources in the framework of complex development programmes.**

From the point of view of mitigating the effects of climate change and the energy dependence of urban regions, smaller complex regional energy programmes in order to exploit regional energy potentials, including in particular renewable energy sources and to achieve autonomous energy supply on both individual and community level are of key importance. Such systems make use of local raw materials as renewable energy sources, thus providing environment-friendly and independent energy supply (primarily heat and even electricity), which is sustainable in the long term. The intervention aims to support complex projects of regional and local importance yet requiring smaller-scale local coordination and coordination between municipalities for the generation and local consumption of energy from renewable energy sources to satisfy own energy needs (for the common good) (e.g. financing the renovation and implementation of systems generating renewable energy for local supply, including renewable energy-based district heating plants, the use of geothermal energy and the construction of solar parks). The development projects may generate local production processes, thus indirectly contributing to the creation of new jobs.

The installation of solar panels and the construction of solar parks (and other municipal power plants suitable for electricity generation) is supported by the programme for the common good, primarily in order to satisfy own electricity demands.

The 5<sup>th</sup> priority of EEEOP (Environment and Energy Efficiency Operational Programme) 'Increasing energy efficiency and use of renewable energy sources' includes the following national specific objectives:

### **9.3. Article 4(a)(i) of the Cohesion Fund Regulation: promoting the production and distribution of energy derived from renewable sources in connection with investment priorities:**

#### **Increasing the share of energy from renewable sources, including**

- increasing the generation of renewable energy sources and enabling their integration to larger-scale networks: promoting the generation of green electricity based on distributed energy resources, not linked to buildings, in distribution networks (construction of plants powered by biomass, biogas, geothermal energy, solar energy and water power, **which feed the energy generated directly into the grid**)

- encouraging the installation of decentralised energy-producing units, thus supporting the shift towards a diversified energy network and the installation of electricity storage facilities with a view to facilitating the development of related infrastructure

These measures will enable to achieve a balance between the energy consumption and generation of buildings, i.e. the **net energy demand of buildings may be close to zero**.

#### **9.4. Article 4(a)(iii) of the Cohesion Fund Regulation: supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including in public buildings, and in the housing sector, in connection with investment priorities**

Increasing energy efficiency and the share of energy from renewable sources, including

- **Improving the energy efficiency of residential buildings and public buildings**
  - the modernisation of residential buildings, public buildings owned by central budgetary bodies and, in economically more advanced regions, by local governments, and the buildings of non-profit organisations carrying out public functions for the common good in order to improve energy efficiency while also increasing the share of energy from renewable sources (projects to improve the thermal conditions of buildings, lower thermal loss, the utilisation of renewable energy sources, including in particular the installation of solar panels and solar collectors, the utilisation of biomass and geothermal energy and the application of heat pumps, the modernisation of heating, cooling and domestic hot water systems of institutions and the modernisation of indoor lighting systems in order to reduce the energy consumption of buildings).
- **Energy modernisation of buildings, combined with the utilisation of energy from renewable sources**
  - increasing energy efficiency through the monitoring and continuous control of energy consumption. Activities eligible under the measure include purchasing technical and technological equipment (metering and controlling equipment) and the relevant education, training and instruction and environmental quality assurance. International experience suggests that the application of energy management systems may result in energy savings up to 10 to 15 % in public buildings.
  - Moreover, within the framework of the measure, in accordance with provisions of the Directive, before 2019 only, it is also intended to financially support the **construction of new nearly zero-energy buildings for central budgetary bodies, in the form of pilot projects**. The energy efficiency and renewable energy level of the buildings concerned would be higher than the cost-optimal level specified in the Directive.

**The following calls<sup>43</sup> are envisaged under the 5<sup>th</sup> priority of EEEOP in 2015:**

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<sup>43</sup> According to the 'Proposal on the adoption of the 2015 Annual Development Budget of the Environmental and Energy Efficiency Operational Programme (EEEOP)', submitted to the GCND in April 2015

<b>Code of call</b>	<b>Title of call</b>	<b>Budget of call (HUF billion)</b>	<b>Envisaged date of publication of call</b>
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Budapest	Government Office of Budapest	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Pest County	Pest County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Bács-Kiskun County	Bács-Kiskun County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Baranya County	Baranya County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Békés County	Békés County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Borsod-Abaúj-Zemplén County	Borsod-Abaúj-Zemplén County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Csongrád County	Csongrád County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Fejér County	Fejér County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Győr-Moson-Sopron County	Győr-Moson-Sopron County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Hajdú-Bihar County	Hajdú-Bihar County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Heves County	Heves County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Jász-Nagykun-Szolnok County	Jász-Nagykun-Szolnok County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Komárom-Esztergom County	Komárom-Esztergom County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Nógrád County	Nógrád County Government Office	1 000 000 000

EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Somogy County	Somogy County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Szabolcs-Szatmár-Bereg County	Szabolcs-Szatmár-Bereg County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Tolna County	Tolna County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Vas County	Vas County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Veszprém County	Veszprém County Government Office	1 000 000 000
EEEEOP-5.2.0.	Energy development of buildings of the Government Office of Zala County	Zala County Government Office	1 000 000 000
EEEEOP-5.3.0.	Energy development of buildings of the Ministry of Defence	Ministry of Defence	2 400 000 000
EEEEOP-5.3.0.	Energy development of buildings of the Special Service for National Security	Special Service for National Security	600 000 000
EEEEOP-5.3.0.	Energy development of buildings of the Military Service for National Security	Military Service for National Security	406 400 000
EEEEOP-5.4.0.	Energy development of buildings of law courts and the public prosecutor's office	Chief Prosecutor's Office and National Judicial Office and their consortium	2 000 000 000
EEEEOP-5.5.0.	Building energy development of educational institutions in the custody of the Ministry of Human Resources	Ministry of Human Resources	2 000 000 000
EEEEOP-5.5.0.	Building energy development of educational institutions in the custody of the Klebersberg Institution Maintenance Centre	Klebersberg Institution Maintenance Centre	2 000 000 000
EEEEOP-5.5.0.	Building energy development of educational institutions in the custody of the Ministry of Agriculture	Ministry of Agriculture	2 000 000 000



EEEEOP-5.6.0.	Building energy development of healthcare institutions in the custody of the Ministry of Human Resources	Ministry of Human Resources	6 000 000 000
EEEEOP-5.8.0.	Building energy modernisation at the Buda hospital of the Order of the Hospitallers of Saint John of God	Buda hospital of the Order of the Hospitallers of Saint John of God Non-Profit Public-Benefit Limited Liability Company	152 400 000
EEEEOP-5.8.0.	Building energy modernisation at the BETHESDA Children's Hospital of the Hungarian Presbyterian Church	BETHESDA Children's Hospital of the Hungarian Presbyterian Church	342 900 000
EEEEOP-5.8.0.	Building energy modernisation at the Charity Hospital of the Association of Jewish Communities in Hungary	Charity Hospital of the Association of Jewish Communities in Hungary	279 400 000
EEEEOP-5.8.0.	Building energy modernisation at the Saint Francis Hospital	Saint Francis Hospital of Budapest	228 600 000
EEEEOP-5.8.0.	Building energy modernisation at the Health Centre of the Hungarian Defence Forces (Military Hospital)	Health Centre of the Hungarian Defence Forces	887 000 000
EEEEOP-5.12.0.	H-1121 Budapest, Művész út 5-7. – Művész Kindergarten and Nursery, energy modernisation	Budapest District XII Local Government	201 135 238
EEEEOP-5.12.0.	Energy modernisation of Town Hall buildings	Municipal Government of Budapest	5 000 000 000
EEEEOP-5.12.0.	Energy Modernisation of the Palatinus Swimming Pool	Municipal Government of Budapest	1 300 000 000

## 1. Appendix – Draft system of requirements for nearly zero-energy buildings

The draft below could enter into force as the forthcoming Annex to Decree No 7/2006 of 24 April 2006 of the Minister without Portfolio.

### *Level of requirements for nearly-zero energy buildings*

#### **I. Requirements for thermal transmittance factors of the building envelope, doors and windows**

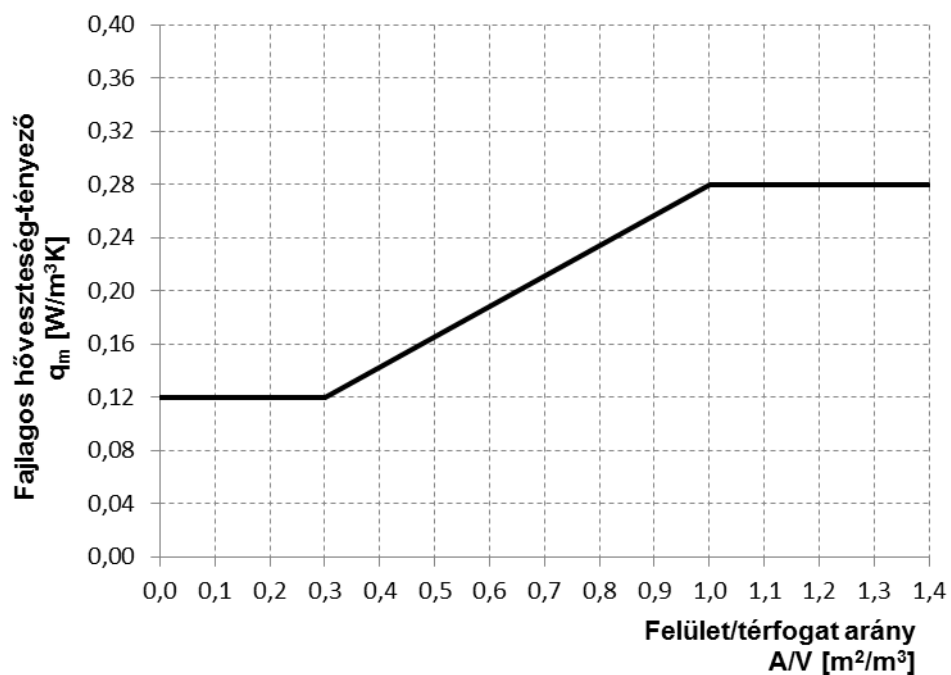
Nearly zero-energy buildings shall fulfil the requirements laid down in Annex 5, Part I. In the case of voluntary conversions of existing buildings in order to achieve a nearly zero-energy certificate, the requirement shall only concern structures affected by renovation.

#### **II. Required values of the specific heat loss coefficient**

1. With the exception of items 2 and 3, the highest permissible value of specific heat loss coefficient shall be calculated using the following relation as a function of the ratio between the size of the cooling area of the building (A) and the air volume of heated spaces (V):

$A/V \leq 0.3$	$q_m = 0.12$	[W/m <sup>3</sup> K]
$0.3 \leq A/V \leq 1.0$	$q_m = 0.05143 + 0.2296 (A/V)$	[W/m <sup>3</sup> K]
$A/V \geq 1.0$	$q_m = 0.28$	[W/m <sup>3</sup> K]

The values specified by the above relation can also be found in Figure 1.



Fajlagos hővesztés-tényező	Specific heat loss coefficient
Felület-/térfogatarány	Area/volume ratio

Figure 1 Required value of the specific heat loss coefficient.

2. The requirements specified in this section need not be applied by themselves to agricultural, industrial and workshop buildings without a room intended for longer stay.
3. Where, according to its specific heat accumulating mass, the building is heavy, it is sufficient to fulfil the requirement under Annex 5 Part II in order for it to qualify as a nearly zero-energy building.

### III. Required values of the aggregated energy characteristic

1. Normally, the required values of the aggregated energy characteristic shall be determined in accordance with Table 1

*Table 1. Normal required values of the aggregated energy characteristic*

Item	1. Function	2. EP Required value of aggregated energy characteristic (kWh/m <sup>2</sup> a)
1.	Residential and accommodation-type buildings (excluding lighting energy demand)	100
2.	Offices and commercial buildings of a floor area up to 1 000 m <sup>2</sup> (including lighting energy demand) <sup>(1)</sup>	90
3.	Educational buildings and buildings typically including lecture halls or exhibition space (including lighting energy demand)	85

<sup>(1)</sup> It is permitted to increase the floor area of rooms of the building that are cooled in accordance with Annex 1 Part V by an additional 10 kWh/m<sup>2</sup> in proportion with the cooled floor area.

#### 2. Buildings used for other functions

2.1. For buildings or building sections of a function different from the ones specified in item 1, the required value of the aggregated energy characteristic shall be determined on the basis of the building and building technical reference system as follows:

2.1.1. the value of specific heat loss coefficient is the required value specified in Part II as a function of the ratio between the size of the cooling area of the building or building section in question (A) and the air volume of heated spaces (V) (the requirements defined therein shall be applicable for the expression of the required value of the aggregated energy characteristic in agricultural, industrial and workshop buildings without a room intended for longer-term stay and in buildings that qualify as heavy buildings according to their specific heat accumulating mass);

2.1.2. climatic data are the data specified in Annex 3;

2.1.3. consumer requirements and the data derived from the former, i.e. number of air changes, internal heat load, lighting, net energy demand of domestic hot water supply, shall be determined on the basis of the manner the building is used (number and activities of users, technology etc.) in accordance with the relevant legislation and standards or, in their absence, with the design programme; the correction factor for periodical operation of the building shall be  $\sigma = 0.9$ .

2.2. The gross energy demand satisfying such needs shall be calculated on the basis of the data of the building technical system as described below:

2.2.1. the location of the heat generator of the heating system (inside or outside the heated space) shall be taken into account according to the actual conditions,

2.2.2. the assumed energy source is natural gas,

2.2.3. heat is generated by a condensing boiler,

2.2.4. the system is regulated by a thermostatic valve with 1 K valve proportionality band,

2.2.5. the heating system has no storage unit,

2.2.6. pipe tracks correspond to the actual tracks (i.e. the distribution pipe is located inside or outside the heated space),

2.2.7. the calculation of the heat loss of pipes shall be based on the loss at the 55/45 °C temperature gradient,

2.2.8. the pump has rpm control and the temperature gradient of the heating water is 10 K,

2.2.9. for hot water supply, heat is generated by a natural gas-combustion condensing boiler,

2.2.10. pipe tracks correspond to the actual tracks,

2.2.11. a circulation system is installed where the floor area is larger than 500 m<sup>2</sup>,

2.2.12. the location of storage is a fixed condition (i.e. inside or outside the heated space),

2.2.13. the storage is indirectly heated,

2.2.14. the thickness of heat insulation in the ventilation shaft is 20 mm, whereas its track shall be taken into account according to the actual conditions.

2.3. The energy demand of mechanical cooling shall be calculated in accordance with Annex 2.

2.4. The required value shall be the specific gross energy demand so determined reduced by 10 kWh/m<sup>2</sup>.

#### IV. Minimum share of energy from renewable sources

1. Compared to the calibrated value of the aggregated energy characteristic, at least 25 % of the energy demand of the building shall be supplied by renewable energy generated within the building or on or near the property. In buildings with other functions, specified in item 2 of Part III, the required minimum share of energy from renewable sources need not be more than 25 kWh/m<sup>2</sup>/year. The minimum ratio of renewable energy shall be determined using the following formula:

$$E_{\text{sus min}} = 0.25 \cdot E_{\text{P calibrated}}$$

where

$E_{\text{sus min}}$ : minimum ratio of renewable energy

$E_{\text{P calibrated}}$ : the aggregated energy characteristic of the building, determined in accordance with Annex 2, Part XII

2. Assuring the share of primary energy from renewable sources as specified in item 1 does not affect the required value of the aggregated energy characteristic (renewable primary energy consumption is not taken into account for the calibrated value of the aggregated energy characteristic in accordance with Table V.1. of Annex 3).

3. According to item 1, energy generated nearby shall include the energy generated

3.1. if the energy-generating installation was installed, authorised and put into operation in order to supply the energy-consuming building in question, simultaneously with such building,

3.2. if it is supplied by a district heating or cooling system using only energy sources listed in Table IV.1 apart from the electricity used to transmit energy, and the district heating or cooling system is unsuitable for the utilisation of any other types of energy sources.

4. For the calculation of the share of primary energy from renewable sources as specified in item 1, the energy sources used shall be taken into consideration with the renewable primary energy conversion factors specified in Table IV.1.

Table IV.1. Renewable primary energy conversion factors to take into account the share of energy from renewable sources (Table V.1 of Annex 3 shall be used for EP calibration)

Item	1. Energy	2.e <sub>sus</sub>
1.	electricity from the national grid	0.1
2.	renewable: firewood, biomass, energy generated directly or indirectly from biomass, energy from biogases, wooden pellets, agripellets	1.0
3.	renewable: solar, wind, hydropower, geothermal, geothermic, hydrothermal aerothermal energy	1.0

4.1. The volume of heat used for heating the building shall be taken into account during the heating season, between 15 October and 15 April at most.

4.2. In addition to solar energy converted by mechanical and electric equipment, the effective ratio of solar heat gain on illuminated surfaces and other passive heat-accumulating surfaces (e.g. Trombe walls, mass walls, transparent heat insulation etc.), calculated on the basis of the heat-accumulating mass and replacing heating in indoor spaces, may also be taken into account.

4.3. Heat absorbed from the environment typically through heat pumping or by different methods (geothermal, hydrothermal or aerothermal energy) shall be taken into account where it is derived from natural sources. Heat leaving the building or generated in the building shall not be taken into account with the exception of the heat of water discharged from other buildings into the public sewer system. The volume of heat used for cooling the building shall be taken into account during the cooling season, between 15 April and 15 October at most.

## ANNEX B

### Buildings of central government administrative bodies of national competence, to be renovated on the basis of Article 5

The buildings of central government administrative bodies of national competence, to be renovated in accordance with **Article 5 of Directive 2012/27/EU of the European Parliament and of the Council** on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC are defined in **Section 1(24) of Act LVII of 2015 on energy efficiency**. Exceptions are listed in Section 8(3) of the law.

The list does not include buildings of central government bodies which are not in public ownership but are rented, and buildings that are officially protected as part of a designated environment or because of their special architectural or historical merit, in so far as compliance with certain minimum energy performance requirements would unacceptably alter their character or appearance.

The energy characteristics of buildings listed above are below the current minimum requirements.

The total heated floor area of the buildings is 488 505.9 m<sup>2</sup>.

Item	Institution	Address of building / premises
1.	Ministry of the Interior	H-1051 Budapest, József Attila utca 2-4. Széchenyi tér 3-4 Mérleg utca 1-3.
2.	Ministry of the Interior	H-1051 Budapest, Nádor u. 2. József Attila utca 6.
3.	Ministry of the Interior	H-1051 Budapest, Nádor u. 4. Mérleg utca 5.
4.	Ministry of Human Resources	H-1055 Budapest, Szalay u. 10-14.
5.	Office of Education	



6.	Ministry of Human Resources	H-1054 Budapest, Báthory u. 10.
7.	Ministry of Human Resources	H-1051 Budapest, Arany J. 6-8. (Akadémia u. 5.) office building
8.	Ministry of Human Resources	H-1054 Budapest, Hold u. 1.
9.	Ministry of Defence	H-1055 Budapest, Balaton utca 7-11.
10.	MD Defence Office	
11.	Ministry of Justice and The Prime Minister's Office	H-1054 Budapest, Báthory u. 12.
12.	Ministry of Justice and The Prime Minister's Office	H-1055 Budapest, Kossuth Lajos tér 4. Akadémia u. 20.
13.	Ministry of Justice and The Prime Minister's Office	H-1055 Budapest, Akadémia u. 18. Zoltán u. 2-4. Széchenyi rkp. 9.
14.	The Prime Minister's Office	H-1055 Budapest, Arany J. u. 25.
15.	The Prime Minister's Office	H-1077 Budapest Wesselényi utca 20-22.
16.	The Prime Minister's Office	H-6000 Kecskemét Ipoly u. 1/a
17.	Ministry of National Development	H-1011 Budapest, Fő utca 44-50 H-1011 Budapest, Iskola u. 27.
18.	Ministry of National Development	H-1011 Budapest, Iskola u. 8.
19.	Ministry of National Development/MFAT, MI	H-1024 Budapest, Szilágyi E. fasor 11./b
20.	Central Statistical Office	H-1024 Budapest, Keleti Károly utca 18/b.

21.		H-1024 Budapest, Fényes Elek utca 14–18.
22.	Central Statistical Office	H-1024 Budapest, Petrezselyem utca 7–9.
23.		H-1024 Budapest Buday L. u. 3
24.	National Communications Office	H-1055 Budapest, Bihari János u. 5.
25.	Office for the Protection of the Constitution	H-1055 Budapest, Falk Miksa u. 9-11.
26.	National Disaster Management Directorate of the Ministry of Interior	H-1149 Budapest, Mogyoródi út 43.
27.	Office of Immigration and Nationality	H-1117 Budapest, Budafoki út 60.
28.	National Headquarters of Law Enforcement	H-1054 Budapest, Steindl Imre u. 8.
29.	Central Office for Administrative and	H-1133 Budapest, Visegrádi u. 110.
30.	Electronic Public Services	H-1094 Budapest, Balázs Béla utca 35.
31.		H-1097 Budapest, Vaskapu u. 30.
32.		H-1148 Budapest, Róna u. 54-56.

33.	Special Service for National Security	H-1022 Budapest, Törökvész út 32-34.
34.	Coordination Centre Against Organised Crime	
35.	National Defence Service	H-1101 Budapest, Kerepesi út 47-49.
36.	National Police Headquarters	H-1139 Budapest, Teve utca 4-6.
37.	National Police Headquarters	H-1078 Budapest, István u. 23-25.
38.	Counter-Terrorism Centre	H-1101 Budapest, Zách u. 4.
39.	Health Registration and Training Centre	H-1085 Budapest, Horánszky u.15.
40.		H-1085 Budapest, Horánszky u. 24.
41.		H-1051 Budapest, Zrínyi utca 3.
42.	Human Resources Funds Manager	H-1054, Budapest, , Báthory utca 10.
43.		V. kerület Alkotmány utca 25.
44.	National Healthcare Service Centre	H-1125 Budapest, Diós árok 3.

45.	National Office for Rehabilitation and Welfare	H-1071 Budapest Damjanich u. 48.
46.		H-1036 Budapest Lajos u. 160-162.
47.	National Health Insurance Fund	H-1139 Budapest, Váci út 73/A
48.	Office of the Chief Medical Officer	H-1097 Budapest, Albert Flórián út 2-6. H-1096 Budapest Nagyváradi tér 2.  12 buildings
49.		H-1097 Budapest Albert Flórián út 3/a.
50.		H-1221 Budapest Anna u. 5.  9 buildings
51.		H-1113 Budapest Diószegi u. 64.
52.		Directorate General for Welfare and Child Protection
53.	National Institute of Pharmacy and Nutrition	H-1051 Budapest, Zrínyi utca 3.
54.	Institute of Geodesy, Cartography and Remote Sensing	H-1149 Budapest, Bosnyák tér 5.

55.	National Food Chain Safety Office	H-1024 Budapest, Keleti Károly u. 24.
56.		H-1143 Budapest, Tábornok u. 2.
57.		H-1118 Budapest, Budaörsi út 141-145.
58.		H-1095 Budapest, IX., Mester utca 81
59.		H-1107 Budapest, X., Szállás u. 8.
60.		H-1144 Budapest XIV., Remény utca 42.
61.		H-1024 Budapest, Kis Rókus u. 15/a.
62.		H-1023 Budapest, Frankel Leó utca 42-44
63.	Military National Security Service	H-1111 Budapest, Bartók Béla út 24-26.
64.	MD Administrative Office	H-1135 Budapest, XIII., Lehel utca 35-37.
65.	Hungarian Intellectual Property Office	H-1054 Budapest, Garibaldi u. 2.
66.	Balassi Institute	H-1016 Budapest, Somlói út 51.

67.	Institute for Foreign Affairs and Trade	H-1016 Budapest, Bérc utca 13-15.
68.	Directorate-General for Audit of European Funds	
69.	Hungarian Trade Licensing Office	H-1124 Budapest, Németvölgyi út 37-39. several buildings
70.		1089 Budapest, Bláthy Ottó u. 3-5.
71.	NAV Central Office, NAV Central Office Audit Department / Customs and Revenues Audit Office	H-1054 Budapest, V. ker., Széchenyi utca 2.
72.	NAV Central Office, Customs Department, NAV Central Office, Police and Central Emergency Department NAV Central Office, Excise Officers Human Administration Department, NAV Central Office, Department for Environmental Protection and Environmental Management	H-1095 Budapest, IX. ker., Mester utca 7.
73.	NAV Central Office, Excise Duties Department	H-1064 Budapest, VI. ker., Rózsa utca 107.
74.	NAV Criminal Directorate General, NAV Central Investigation Department, NAV Financial Information Department,	H-1033 Budapest, III. ker., Huszti út 42-44.
75.	NAV [National Tax and Customs Administration]	H-1122 Budapest, XII. ker., Béla király út 42.
76.	NAV Central Office, Customs Legal and Administration Department NAV Central Office, International Department	H-1089 Budapest, VIII. ker., Delej út 20.
77.	NAV Information Technology Institute	H-1023 Budapest, II. ker., Lajos utca 17-21.
		H-1023 Budapest, Lukács u. 5.

78.	NAV Central Office Risk Management and Risk Analysis Department	H-1063 Budapest, VI. ker., Szív utca 53.
79.	NAV Goods and Exhibit Management Office	H-1211 Budapest, XXI. ker., Petróleum utca 4.
80.	Hungarian Office for Mining and Geology	H-1145 Budapest, Columbus u. 17- 23.
81.	National Transport Authority	H-1085 Budapest, Baross utca 76.
82.		H-1082 Budapest, Vajdahunyad u. 45.
83.	KEF [Directorate-General for Public Procurement and Supply]	H-1133 Budapest, Hegedűs Gy. u. 79-81.
84.	KKM [Ministry of Foreign Affairs and Trade]	H-1027 Budapest, Nagy I. tér 4. Buildings D; E; F Medve u. 11.
85.	KKM [Ministry of Foreign Affairs and Trade]	H-1027 Budapest, Gyorskocsi u. 46.
86.	KKM [Ministry of Foreign Affairs and Trade]	H-1027 Budapest, Bem rakpart 47.
87.	KKM [Ministry of Foreign Affairs and Trade]	H-1027 Budapest, Bem rakpart 48-I.
88.	KKM [Ministry of Foreign Affairs and Trade]	H-1027 Budapest, Bem rakpart 48.
89.	Ministry of National Economy	H-1055 Budapest V. Honvéd utca 13-15.