

## **National Energy Efficiency Action Plan IV**

For the European Commission, pursuant to Sections 3 and 4 of Act LVII of 2015 on Energy Efficiency as well as Article 24(2) of Directive 2012/27/EU on Energy Efficiency

**November 2017**

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## 1 Introduction

The National Energy Efficiency Action Plan IV must be prepared pursuant to Article 24(2) of Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency (hereinafter: Energy Efficiency Directive), amending Directives 2009/125/EC and 2010/30/EU on energy efficiency and repealing Directives 2004/8/EC and 2006/32/EC. The National Energy Efficiency Action Plan is a summary document including measures aimed at improving the country's energy efficiency encompassing every sector and their achieved and expected results, as well as the conditions for implementing the relevant measures. An action plan concerning implementation of the National Energy Efficiency Action Plan as well as any of its modifications must be submitted to the European Commission (hereinafter: Commission) every three years. During preparation, we have taken into account Commission Implementing Decision 2013/242/EU establishing a template for National Energy Efficiency Action Plans under Directive 2012/27/EU of the European Parliament and of the Council.

The requirements of the directive were introduced by Act LVII of 2015 on energy efficiency (hereinafter: Energy Efficiency Act) as well as Government Decree No 122/2015 of 26 May 2015 implementing the Energy Efficiency Act (Implementing Decree). The provisions of the Energy Efficiency Directive regarding the preparation and mandatory content of the relevant action plan have been transposed into domestic legislation.

**The National Energy Efficiency Action Plan III (hereinafter: Action Plan III) was adopted by the Government by Government Decision No 1601/2015 of 8 September 2015. The present document - in view of the relatively short time elapsed - is a review, supplement and amendment (as needed) of Action Plan III prepared in 2015.**

At present, a debate on the draft Proposal for a Regulation on the Governance of the Energy Union<sup>1</sup> is underway. If it is adopted, the contents of the National Energy Efficiency Action Plans will be processed in the framework of the Integrated National Energy and Climate Plan (hereinafter: INECP). Under Article 9(1) of the current draft of the Proposal for a Regulation on the Governance of the Energy Union, the draft INECP must be submitted to the Commission before 1 January 2018 for consultation and the final draft must be submitted before 1 January 2019. Preparation of the INECP has been started.

Based on the above, energy consumption trends are assessed and energy efficiency objectives are comprehensively reviewed during development of the integrated national energy and climate plan.

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<sup>1</sup> Proposal for a Regulation of the European Parliament and of the Council on the Governance of the Energy Union, amending Directive 94/22/EC, Directive 98/70/EC, Directive 2009/31/EC, Regulation (EC) No 663/2009, Regulation (EC) No 715/2009, Directive 2009/73/EC, Council Directive 2009/119/EC, Directive 2010/31/EU, Directive 2012/27/EU, Directive 2013/30/EU and Council Directive (EU) 2015/652 and repealing Regulation (EU) No 525/2013 COM(2016)759final/2  
Available at: [http://eur-lex.europa.eu/legal-content/HU/TXT/DOC/?uri=CELEX:52016PC0759R\(01\)&from=EN](http://eur-lex.europa.eu/legal-content/HU/TXT/DOC/?uri=CELEX:52016PC0759R(01)&from=EN)

## 2 Overview of national energy efficiency targets and savings

### 2.1 National 2020 energy efficiency targets

Hungary's energy policy is summarised in the National Energy Strategy adopted by Parliamentary Decision No 77/2011 of 14 October 2011. The main findings of the National Energy Strategy are described in Action Plan III, so they are not discussed in this action plan.

By its Decision No 5/2015 of 20 March 2015, the Parliament has decided that the Government is responsible for regular review of the Energy Strategy energy use forecast, which must be decided every two years in a government decision. In accordance with this Parliamentary Decision, the Government adopted Government Decision No 1160/2015 of 20 March 2015 on updating the energy use forecasts of the National Energy Strategy.

According to Parliamentary Decision No 5/2015 of 20 March 2015, the values of the forecast specified in the relevant government decision must be considered as authoritative in the course of energy planning. In the course of review of Government Decision No 1160/2015 of 20 March 2015 in 2017, the energy consumption paths were reviewed and corrected as necessary. This will also serve as a basis for the objectives of the Integrated National Climate and Energy Plan for energy efficiency.

Action Plan III has specified the energy efficiency targets in Government Decision 1160/2015 of 20 March 2015 on updating the energy use forecasts of the National Energy Strategy on the basis of an energy consumption forecast for 2020. In view of the fact that a new prognosis has not yet been adopted, the energy efficiency targets in Energy Efficiency Action Plan IV will not change in comparison with the specifications of Action Plan III.

**Based on this, the primary energy consumption target for 2020 is: 1009 PJ** (according to the 'joint effort' path). The final energy consumption target is 693 PJ.

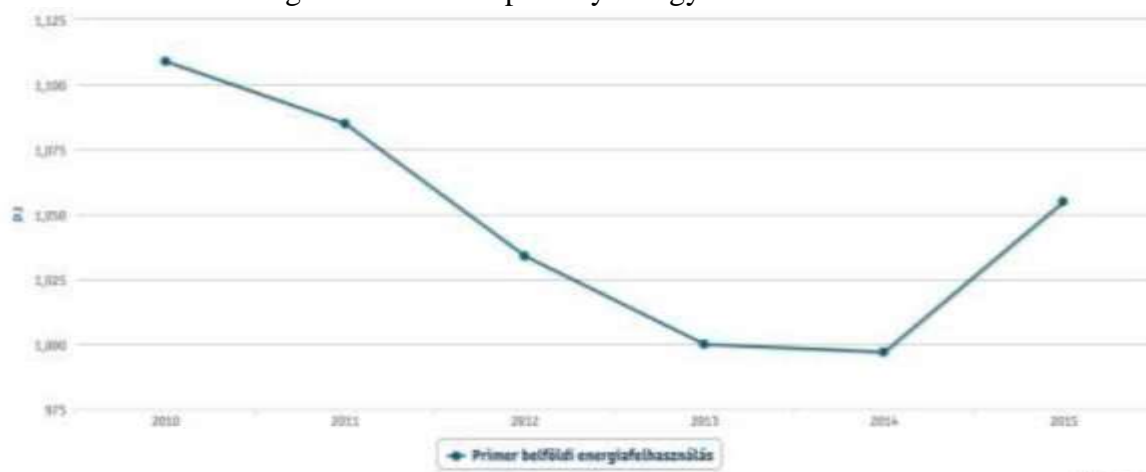
In line with the energy savings target for 2020, **the difference in primary energy use is 92 PJ** according to the 'Sitting idly' and 'Joint effort' scenarios, whereas the following has been chosen as a basis for our energy consumption undertakings: **73 PJ calculated in terms of final energy consumption.**

## 2.2 Development of energy consumption

In order to comply with Commission Regulation 431/2014/EU,<sup>2</sup> statistical data collection on households was placed on a broader basis by the Central Statistical Office (hereinafter: CSO) and it has also expanded the scope of data collection to further areas. In addition, aggregated statistical data on sectoral energy consumption have been retroactively reviewed and corrected.

In addition to energy efficiency measures, the development of domestic primary energy measures changes as a cumulative result of many other factors (weather, number of workdays and holidays, structure of the economy, etc.). This fact and evaluation of the impacts of the economic crisis makes it difficult to assess energy consumption trends. The increase in energy consumption over the last two years was also affected by the relatively favourable oil prices and the economic recovery. However, in some sectors, increasing energy consumption requires further investigation and analysis.

Figure 1 Domestic primary energy use 2010-2015



Source: Hungarian Energy and Public Utility Regulatory Authority (hereinafter: HEPURA)

<sup>2</sup> Commission Regulation (EU) No 431/2014 of 24 April 2014 amending Regulation (EC) No 1099/2008 of the European Parliament and of the Council on energy statistics, as regards the implementation of annual statistics on energy consumption in households (OJ L 131, 1.5.2014, p. 1).

## 2.3 Energy savings per sector since 2013

Table 1 Energy savings per sector

<b>Sector/Branch/Action groups</b>	<b>Final use for energy purposes 2013 (TJ)</b>	<b>Final use for energy purposes 2015 (TJ)</b>	<b>Estimated savings achieved 2013-2015* (TJ)</b>
Industry	162,406	177,341	7,660
Transport	151,667	182,288	-
Household	259,998	249,384	4,482
Commerce and public services	97,849	91,478	15,136
Agriculture, forestry and fishing	21,375	24,186	-
<b>Total</b>	<b>693,295</b>	<b>724,677</b>	<b>27,278</b>

Source: HEPURA

\*Favourable differences and changes shown in the statistical energy balance in accordance with the EUROSTAT methodology

## 2.4 Calculation methodology for final energy savings between 2013 and 2015 according to Annex XIV Part 2 Point 2(b) of the Energy Efficiency Directive

The final sectoral energy savings figures described in Chapter 2.3 have been established by the Hungarian Energy and Public Utility Regulatory Authority (hereinafter: HEPURA). The calculation used the indicators specified in the Commission document entitled 'Recommendations on Measurement and Verification Methods in the framework of the Directive 2006/32/EC on Energy End-Use Efficiency and Energy Services' in a top-down' view.

For calculation of the relevant indicators, the most recent, non-final energy statistics data published by EUROSTAT were used, except for solid biomass where revised data were taken into account due to the extent of the revision.

For individual sectors, the following indicators have been specified:

### 2.4.1 Industry: P14 indicator without ETS correction

The use levels of Industry broken down into energy statistics sub-sectors were also projected to the industrial production volume data from EUROSTAT of the same subsectors - i.e. the indicator takes into account changes in economic performance through the change in industrial production volume. Organisations subject to ETS were not separated during calculations.

The contribution of individual sectors to savings varied widely.

### **2.4.2 Transport: Indicators M5 (P8 and P9), P10, P11, and M7**

Energy savings have been projected for road, rail and water transport performance data from the CSO. For road, calculations were performed on the basis of a technical division based on a changing vehicle fleet and transport performance. For rail transport, the share of passenger and freight transport within rail energy use has been estimated.

For road transport, on the basis of current energy statistics, a highly significant increase exceeding 23 PJ can be detected using both the simplified M5 as well as the P8 and P9 indicators.

The current fuel consumption data of energy statistics for 2013 are extremely low in the time series and therefore, compared to the fuel sales data of the National Tax and Customs Administration (hereinafter: NTCA), a ca. 9.5 PJ higher fuel consumption can be estimated. Thus, the difference is only ca. 13 PJ. The performance data of residential traffic could be estimated from an OECD data source, according to which a 5.36 % increase can be estimated for the passenger-km performance of passenger cars between 2013 and 2015.

### **2.4.3 Household: M1 and M2 indicators**

The methodology separates the use of electricity and the use of other energy sources, with the latter corrected for temperature - i.e. the weather effects were taken into account in calculating household savings. Consumption has been projected for the housing stock data from CSO.

A progressive decline in household energy consumption can be observed, which is primarily attributed by analysts to the continued increase in efficiency of household appliances and lighting devices and therefore their lower energy consumption. Further causes that can be highlighted are more energy conscious operation and the results of energy efficiency measures.

The amount of renewable energy sources (primarily biomass) used for heating in households has been modified in energy consumption statistics. Previous data collection did not give an accurate picture of the quantity used; however, based on the more detailed household statistics survey of 2016, the use of renewable energy sources for heating in 2015 was determined more accurately - moreover, the amount of energy consumption also had to be amended retroactively for 5 years.



Table 2 Final energy consumption of households per intended use in 2015

Description	Heating (TJ)	Refrigeration (TJ)	Domestic hot water (TJ)	Cooking (TJ)	Lighting and electrical appliances (TJ)	Total (TJ)
Electricity	1,435	271	12,454	1,486	23,374	<b>39,020</b>
District heating	14,558	0	5,043	0	0	<b>19,601</b>
Natural gas	89,316	0	12,105	8,158	0	<b>109,579</b>
Coal and coal products	3,964	0	0	0	0	<b>3,964</b>
Petroleum products	358	0	353	1,821	0	<b>2,532</b>
Renewables	72,883	0	1,421	21	0	<b>74,325</b>
<b>Total</b>	<b>182,514</b>	<b>271</b>	<b>31,376</b>	<b>11,487</b>	<b>23,374</b>	<b>249,021</b>

Source: *HEPURA*

#### 2.4.4 Trade and public services: M3 and M4 indicators

For the trade and public services sector, the M3 and M4 indicators were calculated cumulatively, projected to the aggregate employment data from EUROSTAT, and, similarly to the Residential figures, the non-electricity consumption was corrected by the average annual temperature.

Most of the savings, ca. 14 PJ come from energy products outside electricity (M3) and the indicator is greatly improved by significant increase in employment (10 % between 2013-2015).

#### 2.4.5 Agriculture, forestry and fishing: M8 indicator

For agriculture, energy consumption was projected to the added value taken from EUROSTAT according to the M8 indicator.

Savings were calculated on the basis of added value, a ca. 0.5 PJ increase was detectable because the increase in energy consumption exceeded its added value.

### 3 Policy measures to implement the Energy Efficiency Directive

#### 3.1 Horizontal measures

##### 3.1.1 Energy efficiency obligation schemes and alternative policy measures (Article 7, Annex XIV, Part 2 point 3.2 of the EED)

Hungary wants to decrease the required final energy consumption by alternative policy measures by 1.5 % annually at end consumers.

When calculating the relevant obligation, the average amount of energy sold per year to end users during the last three-year period preceding 1 January 2013 must be determined; the energy volume used in transport may then be ignored.

Table 3: Calculation of the obligation under Article 7, basic data

Year	2010 [PJ/a]	2011 [PJ/a]	2012 [PJ/a]	Base [PJ/a]
Final energy consumption <sup>3</sup>	726.384	731.008	688.834	715.408
Solar energy produced by households for their own use <sup>4</sup>	0.213	0.264	0.344	0.273
Heating energy produced by households for their own use from biomass <sup>5</sup>	11.7	13.6	15.56	13.62
Transport sector final energy consumption <sup>6</sup>	178.266	169.384	161.558	169.736
ETS industrial sector consumption <sup>7</sup>	78.216	91.245	87.696	85.719
Final energy consumption without the transport sector and own energy production	536.205	547.760	511.372	<b>531.779</b>

<sup>3</sup> total final energy provided to industry, transport, households, services and agriculture, HEPURA statistics

<sup>4</sup> HEPURA statistics

<sup>5</sup> MND estimate

<sup>6</sup> HEPURA statistics

<sup>7</sup> HEPURA statistics

The amount of energy can be reduced by the average amount of energy used in the ETS sector, and it is possible to introduce the obligation flexibly. However, the total reduction cannot be more than 25 % of the energy savings base.

**The 1.5 % obligation** amounts to **annual**  $531.779 * 0.015 = 7.976$  PJ of new final energy savings.

**Between 2014 and 2020 in total:**  $7 * 7.976 = 55.83$  PJ of new final energy savings.

In the period between 2014-2020, **the required cumulative energy savings**  $28 * 0.015 * 531.779 = 223.347$  PJ

This obligation **can be reduced due to gradual introduction according to the following table:**

Table 4 Energy savings to be achieved a result of energy efficiency policies - flexible implementation

Year	Projecti on basis (PJ)	Required annual savings (%)							New savings, by utilising the discount related to gradual introduction over time (PJ)	Total eligible energy costs in a given year (PJ)
2014	531.779	1 %							5.31779	5.31779
2015		1 %	1 %						5.31779	10.63558
2016		1 %	1 %	1.25%					6.64723	17.2828
2017		1 %	1 %	1.25%	1.25%				6.64723	23.9300
2018		1 %	1 %	1.25%	1.25%	1.5%			7.97668	31.9067
2019		1 %	1 %	1.25%	1.25%	1.5%	1.5%		7.97668	39.8833
2020		1 %	1 %	1.25%	1.25%	1.5%	1.5%	1.5%	7.97668	47.8600
<b>total:</b>									<b>47.8600</b>	<b>176.8162</b>

In addition, **the obligation can be further reduced** by a part or all of the energy volume used during industrial activities listed in Annex I of Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (hereinafter: ETS sector). The average final energy consumption of the ETS sector: 85.719, so by deduction of the complete ETS, the basis of the obligation would be 446.06 PJ, but in this case, with the gradual introduction, the cumulative final energy savings would not reach the maximum reducible value, so only a part of it can be taken into account.

The total reduction cannot be more than 25 % of the cumulative savings, so the following must be fulfilled:  $223.347 * 0.75 = 167.51025$  PJ

Thus, the relevant obligation is to be fulfilled according to Table 5:

Table 5 Energy savings to be achieved as a result of energy efficiency policies, when deducting part of the energy volume used in the ETS sector - flexible introduction

Year	Reduced projection base (PJ)	Required annual savings (%)							New savings, by utilising the discount related to gradual introduction over time (PJ)	Total eligible energy costs in a given year (PJ)
2014	503.7902	1 %							5.0379	5.0379
2015		1 %	1 %						5.0379	10.0761
2016		1 %	1 %	1.25%					6.2973	16.3734
2017		1 %	1 %	1.25%	1.25%				6.2973	22.6707
2018		1 %	1 %	1.25%	1.25%	1.5%			7.5568	30.2275
2019		1 %	1 %	1.25%	1.25%	1.5%	1.5%		7.5568	37.7843
2020		1 %	1 %	1.25%	1.25%	1.5%	1.5%	1.5%	7.5568	45.3411
<b>total:</b>								<b>45.3411</b>	<b>167.511</b>	

Part II of Annex 8 to the Implementing Decree includes the energy efficiency policies and implementing authorities required to achieve the energy savings provided for in Article 7:

Table 6: Energy efficiency policy measures approved for compliance with Article 7.

	A	B
	Policy measures	Executing authority
1	National energy efficiency programmes (from quota revenues, GEFS, GIS, budget sources, based on intergovernmental agreement, etc.)	Ministry of National Development
2	Primarily energy efficiency programmes implemented using operational programmes (KEOP, ROP, KMOP, KEHOP, TOP, VEKOP, GINOP)	the relevant organisation fulfilling the responsibilities of a governing authority
3	Primarily non-energy efficiency programmes implemented using operational programmes (TOP, VEKOP, EFOP, IKOP, KEHOP, VP)	the relevant organisation fulfilling the responsibilities of a governing authority
4	Housing support	Ministry of the National Economy
5	Energy rationalisation tender at the Ministry of the Interior	Ministry of the Interior
6	Swiss-Hungarian Cooperation Programme	Ministry of the Interior
7	Norwegian Financing Mechanism and EEA Financing Mechanism	Ministry of National Development
8	Energy efficiency investments of budgetary institutions [based on Government Decree No 232/2015 of 20 August 2015]	Ministry of National Development
9	Energy efficiency regulations for buildings	Prime Minister's Office
10	Investments improving energy efficiency on the basis of budget subsidy granted by special decision	as regards Section 14(1) point (b) of the Energy Efficiency Act: National Energy Network with the participation of the Prime Minister's Office

	A	B
	Policy measures	Executing authority
11	Within the scope of the Modern Cities Programme, measures to improve energy efficiency with budget support	as regards Section 14(1) point (b) of the Energy Efficiency Act: National Energy Network with the participation of the Prime Minister's Office
12	Promoting energy efficient use of public buildings	as regards Section 14(1) point (b) of the Energy Efficiency Act: National Energy Network
13	Operation of home savings scheme	Ministry of the National Economy
14	Employment of an energy specialist	HEPURA
15	Results of the operation of the National Energy Network	as regards Section 14(1) point (b) of the Energy Efficiency Act: National Energy Network
16	Improving energy efficiency in transport	Ministry of National Development
17	Corporate normative tax relief for energy efficiency measures	Ministry of the National Economy

### 3.1.1.1 *National energy efficiency programmes (primarily from quota revenues)*

In addition to engaging in greenhouse gas quota trading involving Kyoto units, Hungary also takes part in the European Union Emissions Trading Scheme (EU ETS). Between 2008 and 2013, revenues from the sales of Kyoto units of the country were used in the Green Investment Scheme (GIS), whereas from 2013, some of the revenues from the European Union's quota trading system (EU ETS) are used within the target managed in the chapters Green Economy Financing System (GEFS) as well as the Economic Greening System (EGS). The resources of these appropriations are available among others for grants, improving the energy efficiency in buildings, achieving energy savings, reducing GHG emissions and reducing energy dependence.

50 % of revenues from the new emissions trading scheme (EU ETS) launched in 2013 are part of the central budget, while the other 50 % will have to be used for green economy development purposes. According to this, 25 % can be used by the Ministry of National Development (GEFS), and another 25% by the Ministry of National Economy (through EGS).

Planning and implementation tasks related to certain tenders to be announced against the GEFS and EGS resources are carried out by the Ministry of National Development and the Ministry of

National Economy. Administrative tasks related to projects and tenders are fulfilled by a dedicated tender management organisation.

According to Decree No 16/2015 of 29 May 2015 of the Ministry of National Economy on the management and use of chapter managed appropriations, EGS can be used:

- for funding research and development and demonstration projects for reducing emissions and for adaptation to climate change;
- to improve energy production from renewable energy sources and to increase energy efficiency;
- to encourage a shift to low-emission and public forms of transport;
- to meet 50 % of the national offering for the Green Climate Fund;
- to create and operate the database and map showing the locations of installation of electric charging infrastructure;
- to construct and operate the payment, account settlement and control system related to the electric charging infrastructure;
- operating costs related to the electric charging infrastructure;
- expenditure on marketing and promotional activities related to electromobility and energy efficiency;
- to finance the development of studies, plans and concepts related to electromobility and energy efficiency.

With regard to the support of electromobility, the Jedlik Ányos Plan and its results are described in Chapter 3.1.1.16. EGS financed the organisation of the **eVerda car-free day** which was subsidised by the Ministry for National Economy: with an amount of HUF 11,728,064.

In 2016, EGS gave HUF 1 billion as support to Hungary's participation in certain environmental regimes and joint environmental measures with third countries. On 28 December 2016, the Ministry of National Economy granted a HUF 2.1 billion subsidy from EGS to establish an urban geothermal power plant.

The types of aid that may be provided and eligible actions that may be performed under the GEFS are regulated by Decree No 22/2017 of 29 June 2017 of the Minister for National Development on the management and use of appropriations treated under chapter headings and the management and use of certain centrally managed appropriations.

The GEFS resources will be used to provide tender programmes and grants that promote energy efficiency, the spread of renewable energy sources, and to implement activities promoting GHG emission reduction and adaptation to the effects of climate change, contributing to the implementation of objectives related to climate policy and green economy developments as well as removal of CO<sub>2</sub> by absorption and storage. GEFS ensures Hungary's participation in certain environmental regimes and in related joint international environmental measures with third parties.

The first GEFS-funded programme - the Warmth at Home Programme (WAH) - was announced in September 2014. Several sub-programmes have been announced under the WAH, and new sub-programmes are being announced continuously.

The main impact area of the current sub-programmes of the Warmth at Home Programme launched in 2014 is a complex energy efficiency renovation of private and public buildings because in Hungary, buildings are responsible for 40 % of annual energy consumption.

WAH Sub-programmes announced since September 2014:

- **Heating modernisation (Furnace Replacement) sub-programme** (GEFS-KAZ/14). Applications could be submitted during November and December 2014, source: HUF 1.25 billion.
- **Replacement of large household appliances (resulting in energy savings) sub-programme 2014 (Replacement of refrigerators)**, (HGCS-2014). Applications could be submitted between November 2014 and February 2015. The source of the sub-programme is HUF 0.798 billion.
- **Facade door and window replacement sub-programme** (GIS-NY/14). Applications could be submitted from November 2014 to January 2015, source: HUF 1.1 billion.
- **Subsidy for modernisation and renovation of condominiums resulting in energy savings** (GEFS/TH/2015). Applications could be submitted from the end of April to June 2015, the available resource amount is HUF 11.8 billion.
- **Replacement of large household appliances (washing machine) generating energy savings** (MGCS/2015). Applications could be submitted during November 2015: Source: HUF 1.9 billion.
- **Sub-programme for modernisation and renovation of detached houses resulting in energy savings** (GEFS/CSH/2016). Applications could be submitted during August and September 2016, source: HUF 5 billion
- **Sub-programme for replacement of large household appliances (refrigerators and freezers) resulting in energy savings** (HGCS/2016). Applications could be submitted between July and September 2016, source: HUF 1.5 billion
- **Sub-programme supporting modernisation of heating systems** (GEFS/KAZ/2017). Applications could be submitted from June to October 2017, source: HUF 3.5 billion.
- **Sub-programme for replacement of large household appliances (refrigerators or freezers, washing machines or washer-dryers)** (HGCS/2017). Applications could be submitted in August 2017: The available resource is HUF 0.6 billion.
- **Replacement of natural gas convectors** (GEFS-KONVEKTOR/2017). Applications could be submitted in September 2017: The available resource is HUF 1.5 billion.

The main effects of the GIS and the GEFS as well as EGS are a reduction in greenhouse gas emissions, energy costs and energy dependency. In addition, it is important that reducing emission of hazardous substances involves direct beneficial environmental impacts,



developments result in heat, energy, and cost savings for buildings, district heating systems or business enterprises, increasing renewable heat and energy production, reducing dust and PM<sub>10</sub> contamination. The green economy development programmes also have a direct impact on economic development and job creation in the areas concerned. For household appliance replacement programmes, there are sub-programmes specifically provided for retired persons and large families, thereby contributing to improving energy efficiency of households with lower incomes.

Table 7 Sub-programmes of the Warmth at Home Programme

Announced sub-programmes of the Warmth at Home Programme		Date of announcement	Corresponding funding	Applications for which a grant decision is in force	
1	Heating upgrades (Furnace replacement)(2014)	22/09/2014.	HUF 1,253,810,935	2,377 pcs	HUF 1,237,002,337
2	Replacement of large household appliances (replacement of refrigerators), generating energy savings (2014)	25/09/2014.	HUF 798,950,000	22,444 pcs	HUF 798,950,000
3	Replacement of façade windows (2014)	29/09/2014.	HUF 1,100,000,000	2,158 pcs	HUF 875,562,461
4	Aid for the upgrading and refurbishment of apartment blocks (2015)	23/02/2015.	HUF 11,801,847,290	430 pcs	HUF 11,489,819,257
5	Replacement of large household appliances (washing machines), generating energy savings (2015)	31/05/2015.	HUF 1,900,000,000	42,542 pcs	HUF 1,856,535,000
6	Refurbishment of individual homes, resulting in energy savings (2016)	07/04/2016.	HUF 5,000,000,000	2,918 pcs	HUF 4,940,553,000
7	Replacement of large household appliances (refrigerators), generating energy savings (2016)	31/05/2016.	HUF 1,500,000,000	44,624 pcs	HUF 1,534,350,000
8	Aid for upgrading the heating system (2017)*	09/03/2017.	HUF 3,500,000,000	2,960 pcs	HUF 1,523,532,722
9	Replacement of large household appliances, generating energy savings (2017) - replacement of refrigerators or washing machines -*	08/05/2017	HUF 600,000,000		
10	Replacement of gas convector heaters (2017)*	21/08/2017	HUF 1,500,000,000		
<b>Total:*</b>			<b>HUF 28,988,958,225</b>	<b>120,453 pcs</b>	<b>HUF 24,256,304,777</b>

\* The tenders are still being processed and reviewed.

With projects implemented so far, more than 65,000 tonnes of CO<sub>2</sub> emissions could be prevented per year. With the replacement of obsolete household appliances, up to HUF 20 thousand can be saved by families on their annual spending and with the upgrading of residential buildings; these savings amount to up to HUF 150 thousand. Some sub-programmes were explicitly announced for low-income social groups where energy efficiency investments often do not have enough resources. Such tender sub-programmes were primarily aimed at

enabling large families and retired people to replace old household appliances with modern, energy-saving equipment.

Details of using the tenders are included in the Tender Guidelines which are available on the website of the Ministry of National Development (<http://www.kormany.hu/hu/nemzeti-fejlesztési-miniszterium>) and NFSI Nemzeti Fejlesztési és Stratégiai Intézet Nonprofit Kft. in charge of tender management (<http://nfsi.hu>). Certain elements of the current data collection system make possible calculation and monitoring of actual energy saving data.

For tenders aimed at modernisation of buildings, applicants must submit the monitoring data sheet - the annual energy consumption data to the tender manager for 3 years after completion of the subsidised investment under data reporting obligation one a year. If consumption data exceed the data calculated in the documentation, an on-site audit can be ordered in which case competent experts will check whether the technical content included in the tender has been implemented and is in a suitable condition. Failure to report data may result in exclusion from tender options to be announced subsequently. The Sponsor may withdraw from the Sponsorship document and simultaneously with such withdrawal, withdraw support if monitoring data reporting is refused or not provided due to negligence.

Table 8 Energy savings between 2014 and 2016 as a result of investment implemented under the support of GIS and GEFS programmes:

6.

<b>Factual data</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
New energy savings (PJ/year)	0.13	0.26	0.21
Cumulative energy savings (PJ/year)	0.13	0.51	1.10

*Source: Statement of energy savings achieved as a result of policy measures - monitoring of measures under Article 7 of the Energy Efficiency Directive; Report; January 2017, Trenecon Kft.*

### *3.1.1.2 Primarily energy efficiency programmes implemented using operational programmes (KEOP, ROP, KMOP, KEHOP, TOP, VEKOP, GINOP)*

Among the projects of call for tenders related to the implementation of operational programmes, those are included in this policy for the implementation of which the primary objective is energy savings, energy efficiency and reducing the use of primary energy.

The results of investment projects implemented after 2014 resulting in energy savings partly originate from the results of projects implemented in 2014 related to tenders announced in the planning period 2007-2013, and on the other hand, from the results of the planning period 2014-2020. The calculation methodology must be handled along with the same principles but separately for the projects of two periods because the calls for tender and the tender conditions are not identical for individual periods.

Within the relevant policy, fulfilment of tenders aiming at energy savings can be measured with energy efficiency indicators, the value of which must be submitted to the Managing Authority upon conclusion of the project. Data is collected in a single monitoring database (EMIR; FAIR), from which energy efficiency indicator data can be retrieved. The sum of these data gives the amount of savings within the policy.

The amount of savings from energy efficiency investments implemented during the 2007-2013 planning period can be determined on the basis of electronic database data. Among the calls for tenders from the 2014-2020 planning period, savings values can be collected upon closing these investment projects, on a continuous basis during the planning period.

Resulting from the fact that on account of the calls for tender, the policy affects a number of specialist areas where energy savings are being achieved, so it is necessary to examine the possibility of overlap with other policies. For overlapping theme fields, the savings of relevant investments from OPs are taken into account for individual OPs.

Among calls for tenders taken into account in the case of the above operational programmes - in accordance with the provisions related to Article 7 of the Energy Efficiency Directive - those calls for tender are not included which support renewable energy production for a network and not for own use. According to the provisions of the Directive, the required energy savings are to be achieved at the end consumers, savings achieved in the energy conversion (hereinafter - transport and distribution) sector is not eligible to be accounted for, so those calls for tender have not been taken into account.

The objective of KEOP 6.2 calls for tenders is the promotion of sustainable lifestyles and consumption as well as awareness-raising. Energy efficiency is only one aspect of the latter and could be manifest in the projects only as a (demonstration) tool. In projects taken into account, the relevant project usually included building renovation, along with education and awareness-raising.

Energy savings from projects improving energy efficiency of buildings have been considered cumulatively by the end of 2020, whereas estimated energy savings from awareness-raising programmes have only been taken into account for a year.

Table 9 Energy savings from operational programmes primarily aimed at energy efficiency

<b>Factual data</b>	<b>2014</b>	<b>2015</b>
New energy savings (PJ/year)	1.0378	2.5175
Cumulative energy savings (PJ/year)	1.0378	4.0928

Source: by aggregating data reports of Managing Authorities MND

*3.1.1.3 Among operational programmes, those directly contributing to the change of energy use not related to the 4th thematic objective*

Only those calls for tenders can be taken into account among operational programmes where improvement of energy efficiency appears as a recognised goal and as an eligible cost, moreover, improved energy efficiency has been calculated by an energy expert certification party in the tender documentation.

For projects that could be considered between 2014 and 2016, those projects were implemented in significantly larger numbers for which energy efficiency was actually improved due to modernisation of the building or the building engineering system, but savings were not recorded in the project documentation and the EMIR system.

Those calls for tender where improvement of energy efficiency was not specifically indicated (along with the main objective of the tender) or it was not highlighted in the tender guidelines that the cost of improving energy efficiency was also eligible, were not taken into account.

Table 10 Calls for tenders that could result in improvements in energy efficiency for projects implemented after 1 January 2014:<sup>8</sup>

<b>Tender symbol</b>	<b>Tender name</b>
DAOP-4.1.3/A,B-11	Infrastructure development of basic social services and basic child welfare services
DDOP-3.1.3/D-11	Infrastructure development of basic social services and basic child welfare services
ÉAOP-4.1.3/A,B-11	Infrastructure development of basic social services and basic child welfare services
ÉMOP-4.2.1/A,B-11	Infrastructure development of basic social services and basic child welfare services
KMOP-4.5.2-11	Infrastructure development of basic social services and basic child welfare services

<sup>8</sup> Source: Statement of energy savings achieved as a result of policy measures - monitoring of measures under Article 7 of the Energy Efficiency Directive; Report; January 2017, Trenecon Kft.

<b>Tender symbol</b>	<b>Tender name</b>
NYDOP-5.1.1/B-11	Infrastructure development of basic social services and basic child welfare services
KMOP-2007-5.2.1/B	'Function-enhancing rehabilitation' - Development of settlement centres in Pest County - Integrated settlement development in Pest County
KMOP-2007-5.2.2/B	'Function-enhancing rehabilitation' - Budapest urban development programme - Development of district centres in Budapest
KDOP-3.1.1/C-11	Improving settlement images of small settlements
NYDOP-2010-5.3.1/A	Development of small and micro-regional educational networks and their centres
DAOP-4.2.1-11	Development of educational institutions
ÉAOP-4.1.1/A-11	Development of educational institutions
ÉMOP-4.3.1/A-11	Development of educational institutions
KMOP-4.6.1-11	Development of educational institutions
DAOP-2009-1.1.1 / A and C	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
DDOP-2009-1.1.1 / A, C and B	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
ÉMOP-1.1.1 / A and C	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
KDOP-2009-1.1.1 / A and B	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
KMOP-2009-1.5.3 / D and A	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
NYDOP-2009-1.3.1 / A, B and C	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
DAOP-1.1.1/A and C -11	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
DDOP-1.11/ A and C -11	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
ÉAOP-1.1.1/A and B -11	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
ÉMOP-1.1.1/A and C -11	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
KDOP-1.1.1/A and B -11	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
KMOP-1.5.3/D and A -11	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
NYDOP-1.3.1/A, B and C -11	Development of business infrastructure and investment development - support for industrial parks, industrial sites and incubators
DDOP - 3.1.3/G - 14	Development of basic health care
ÉAOP - 4.1.2/A - 11	Development of basic health care
ÉMOP - 4.1.1/A - 11	Development of basic health care
DAOP-2009-4.1.1/A	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
ÉAOP-2009-4.1.2/A	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of

<b>Tender symbol</b>	<b>Tender name</b>
	specialised basic and outpatient care
ÉAOP-2009-4.1.2/B	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
ÉMOP-2009-4.1.1/A	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
ÉMOP-2009-4.1.1/B	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
KDOP-2009-5.2.1/A	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
KDOP-2009-5.2.1/B	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
NYDOP-2009-5.2.1/A	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
NYDOP-2009-5.2.1/B	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
ÉAOP - 4.1.2/A - 12	Basic health care, development of health care houses and specialised outpatient care
ÉMOP - 4.1.1/A - 12	Basic health care, development of health care houses and specialised outpatient care
ÉMOP - 4.1.1/B - 12	Basic health care, development of health care houses and specialised outpatient care
NYDOP - 5.2.1/A - 12	Basic health care, development of health care houses and specialised outpatient care
DAOP-2007-4.2.1/2F	Development of the infrastructure of primary educational institutions and grammar schools
ÉAOP-2007-1.1.1.	Promotion of incubation
DAOP - 2009 - 5.1.2.D	For the call for tenders titled Integrated urban development in the most disadvantages small regions to be assisted by complex programmes
DAOP - 2007 - 5.1.2/B	Conservation and upgrading of the urban heritage
DAOP-5.1.2/A	Conservation and upgrading of the urban heritage
KMOP-2009-5.1.1/A	Rehabilitation of traditionally built urban areas and rehabilitation of housing estates built with industrial technology
KMOP-2009-5.1.1/C	Rehabilitation of traditionally built urban areas and rehabilitation of housing estates built with industrial technology
KMOP-2008-4.4.1/B	Modernisation of residential institutions
DAOP- 2009 - 1.1.1/A	Infrastructure development of industrial areas, industrial parks and incubator houses
DAOP- 2009 - 1.1.1./E	Site development
DDOP- 2009 - 1.1.1./D	Site development
ÉAOP- 2009 - 1.1.1./D	Site development
ÉMOP- 2009 - 1.1.1./F	Site development

<b>Tender symbol</b>	<b>Tender name</b>
KDOP- 2009 - 1.1.1./C	Site development
KMOP- 2009 - 1.5.3./C	Site development
NYDOP- 2009 - 1.3.1./D	Site development
DAOP- 2010 - 1.1.1./E	Site development
DDOP- 2010 - 1.1.1./D	Site development
ÉAOP- 2010 - 1.1.1./D	Site development
ÉMOP- 2010 - 1.1.1./F	Site development
KDOP- 2010 - 1.1.1./C	Site development
KMOP- 2010 - 1.5.3./C	Site development
NYDOP- 2010 - 1.3.1./D	Site development
DDOP-1.1.1/D -11	Site development
ÉAOP-1.1.1/D-11	Site development
ÉMOP-1.1.1/F -11	Site development
KDOP-1.1.1/C -11	Site development
KMOP-1.5.3/C -11	Site development
NYDOP-1.3.1/D -11	Site development
DDOP-1.1.1/D-12	Site development
DAOP-1.1.1/E-12	Site development
KDOP-1.1.1/C-12	Site development
ÉAOP-1.1.1/D-12	Site development
DDOP-1.1.1/D -14	Site development for territorial cohesion
DAOP-1.1.1/E and D-13	For the component titled Site development and establishment of industrial facilities for territorial cohesion
ÉMOP-1.1.1/F and B-13	For the component titled Site development and establishment of industrial facilities for territorial cohesion
KMOP-1.5.3/C and B-13	For the component titled Site development and establishment of industrial facilities for territorial cohesion
NYDOP-1.3.1/D and E-13	For the component titled Site development and establishment of industrial facilities for territorial cohesion
ÉAOP-1.1.1/D-14	Site development in the Lake Tisza region
DAOP- 2009 - 1.1.1./D	Installation of industrial facilities
DDOP- 2009 - 1.1.1./E	Installation of industrial facilities
ÉAOP- 2009 - 1.1.1./E	Installation of industrial facilities
ÉMOP- 2009 - 1.1.1./B	Installation of industrial facilities
KDOP- 2009 - 1.1.1./D	Installation of industrial facilities
KMOP- 2009 - 1.5.3./B	Installation of industrial facilities
NYDOP- 2009 - 1.3.1./E	Installation of industrial facilities
DAOP-1.1.1/E -11	Installation of industrial facilities
KMOP-2007-1.1.3/B	For the tender scheme titled Support for innovation and technology parks
KMOP-2008- 1.1.3/B	For the tender scheme titled Support for innovation and technology parks
DAOP-1.1.1/A-13	Development of business infrastructure and investment environment - support for industrial parks and industrial areas
ÉAOP-1.1.1/A-13	Development of business infrastructure and investment environment - support for industrial parks and industrial areas
ÉAOP-2.1.1/E-12	Development of competitive tourism products and attractions
DAOP-2.1.2-12	Development of business accommodation

<b>Tender symbol</b>	<b>Tender name</b>
DDOP-2.1.2-12	Development of business accommodation
ÉAOP-2.1.2-12	Development of business accommodation
ÉMOP-2.2.1-12	Development of business accommodation
DDOP-2.1.1/D-12	Development of tourist attractions and services
KDOP-2.1.1/D-12	Development of tourist attractions and services
NYDOP-2.1.1/F-12	Development of tourist attractions and services
DAOP-2.1.1/J-12	Development of tourist attractions and services
DDOP-2.1.1/A.B-12	Development of tourist attractions and services
ÉAOP-2.1.1/A.I-12	Development of tourist attractions and services
NHOP-2.1.1/B-12	Development of tourist attractions and services
KDOP-2.1.1/B-12	Development of tourist attractions and services
DAOP-2.1.1/G-11	Development of major tourism products and attractions
DAOP-2.1.1/G-13	Development of major tourism products and attractions
NHOP-2.1.1/A-12	Development of major tourism products and attractions
NHOP-2.1.1/A-14	Development of major tourism products and attractions
NHOP-2.1.1/F-14	Development of tourist attractions and services
NYDOP-2.1.1/A,B-12	Sustainable utilisation of cultural and world heritage sites of the regions of international significance for tourism purposes and development of major spas of international significance
NYDOP-2.1.1/A-13	Sustainable utilisation of cultural sites of the region for tourism purposes
NYDOP-2.1.1/B-14	Development and service expansion of major spas in the region of international significance
KDOP-2.1.1/E-13	Support for major and integrated attraction, product and infrastructure developments
KDOP-2.1.2-14	Infrastructural and quality improvement of accommodation and other services increasing the value of tourist product offerings
KMOP-3.1.1/E-13	Support for major and integrated attraction, product and infrastructure developments
NYDOP-3.1.1/A	Function-enhancing renewal of city centres in non-county towns
NYDOP-3.11/A/2F-2f	Function-enhancing renewal of city centres in non-county towns
NYDOP - 2009-3.1.1/A	Function-enhancing renewal of city centres in non-county towns
NYDOP-2009-3.1.1/C	Small-scale, point-like small town developments
NYDOP-2007-5.2.1.	Development of health services / Development of specialised outpatient health care centres in small regions, modernisation of specialised basic and outpatient care
DAOP-2009-4.1.2/B	Development of rehabilitation services
DDOP-2009-3.1.3/C	Development of rehabilitation services
ÉAOP-2009-4.1.2/C	Development of rehabilitation services
ÉMOP-2009-4.1.2/A	Development of rehabilitation services
ÉMOP-2009-4.1.2/B	Development of rehabilitation services
KDOP-2009-5.2.1/C	Development of rehabilitation services
NYDOP-2009-5.2.1/C	Development of rehabilitation services
NYDOP-2007-5.3/2F	Development of public education infrastructure and services
NYDOP-2010-5.3.1/A	Development of small and micro-regional educational networks and their centres
NYDOP-5.3.1/B-12	Development of educational institutions



<b>Tender symbol</b>	<b>Tender name</b>
ÉMOP-2009-4.3.1/A	Organisation and infrastructural development of public education in line with regional characteristics
NYDOP-2009-5.3.1/B	Development of kindergartens
KMOP-2009-4.6.1/B	Support for investments related to public education institutions
NYDOP-2008-5.3.1/2/2F-2f	Development of public education infrastructure and services
GOP-2007-1.2.2	For the tender scheme titled Support for innovation and technology parks
KMOP-2007-1.1.3/B	For the tender scheme titled Support for innovation and technology parks
GOP-2008-1.2.1	Support for accredited innovation clusters
KMOP-2008- 1.1.3/A	Support for accredited innovation clusters
GOP-2009-1.2.1	Support for accredited innovation clusters
KMOP-2009- 1.1.3/A	Support for accredited innovation clusters
KMOP-2009-1.1.6	Encouraging technical innovation of enterprises in becoming permanent suppliers or strengthening status
KMOP-2007-1.2.1/B	Complex enterprise technology development for small and medium enterprises
GOP-2008-2.1.1/B	Complex enterprise technology development for micro- small and medium enterprises
KMOP-2008-1.2.1/B	Complex enterprise technology development for micro- small and medium enterprises
GOP-2009-2.1.1/B	Complex enterprise technology development for micro- small and medium enterprises
KMOP-2009-1.2.1/B	Complex enterprise technology development for micro- small and medium enterprises
KÖZOP -2009-4.1	Linking modes of transport, development of intermodality and transport infrastructure of economic centres
KÖZOP-2013-4.1	Linking modes of transport, development of intermodality and transport infrastructure of economic centres
TÁMOP-2.4.5-12/1	Support for creating alternative daytime childcare services
TÁMOP-2.4.5-12/2	Support for creating alternative daytime childcare services
TÁMOP-2.4.5-12/5	Creation of corporate and institutional daytime childcare services
TÁMOP-2.4.5-12/6	Creation of corporate and institutional daytime childcare services
TIOP 3.2.3.A-13/1	Support for housing investments
TIOP 3.4.2-11/1	Modernisation of residential institutions managed by the relevant municipality, state, church or non-profit entity
TIOP 3.4.2-08/1	Modernisation of residential institutions
TIOP-2.2.8/14	Implementation of infrastructural developments
GOP-2007-1.2.2	For the tender scheme titled Support for innovation and technology parks
GOP-2008-1.2.2	For the tender scheme titled Support for innovation and technology parks
GOP-2009-1.2.2	For the tender scheme titled Support for innovation and technology parks

<b>Tender symbol</b>	<b>Tender name</b>
GOP-2007-2.1.1/B	Complex enterprise technology development for small and medium enterprises

At present, collection and monitoring of factual data related to energy savings is still underway. Taking into account the estimation methodology of the background study<sup>9</sup> on the estimation of energy savings achieved in non-primary energy efficiency programmes, the energy savings achieved are expected to be as follows:

Table 11: Energy savings achieved primarily in non-energy efficiency programmes

<b>Factual data</b>	<b>2014</b>	<b>2015</b>
New energy savings (PJ/year)	0.4	0.4
Cumulative energy savings (PJ/year)	0.4	1.2

*MND estimate*

For operational programmes launched in the new programming period of 2014-2020, Government Decision No 2010/2016 on policy measures resulting in energy savings required that a mandatory minimum energy saving requirement must be stipulated in calls for tenders under the following name(s) or pertaining to the same subject(s) and, in relation to the latter (if applicable to the given tender), an energy certification or energy auditing requirement must be stipulated and other special conditions guaranteeing eligibility must be included:

- TOP 1.1. Development of local economic infrastructure;
- TOP 1.4. Promoting employment and improving quality of life through the development of family-friendly, job-creating institutions and public services;
- TOP 2.1. Settlement development aiming at economic revitalisation and retaining population;
- TOP 4.1. Infrastructural development of basic health care;
- TOP 4.2. Expansion and improvement of the infrastructure of basic social services;
- TOP 4.3. Rehabilitation of derelict urban areas;
- TOP 6.1 Economic development;
- TOP 6.2 Development of family-friendly institutions and public services promoting job creation;
- TOP 6.3 Urban development stimulating the economy and retaining the population;
- TOP 6.6 Development of urban public services;
- TOP 6.7 Rehabilitation of derelict urban areas;

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<sup>9</sup> Századvég Gazdaságkutató Zrt. Study on the accounting possibility of energy savings arising in non-energy thematic objectives, 2015.

- VEKOP 6.1. Infrastructural development of nurseries and family day care centres as well as kindergartens;
- VEKOP 6.2. Improving the living conditions, as well as social and physical rehabilitation of low-status population in derelict settlement parts;
- EFOP Improving the chances of needy children;
- EFOP Development of institutions and services for social cooperation, replacement of residential institutions, establishment of new capacities;
- EFOP Infrastructural investments to help eliminate peripheral life situations and the integration of Roma and those in persistent poverty;
- EFOP Infrastructure developments for public education and non-formal trainings;
- EFOP Higher education infrastructure developments;
- IKOP
  - o TEN-T lines (Elimination of bottlenecks in railways, Acquisition of suburban motor trains, Railways node and station modernisation, A portion of intermittent projects in the KÖZOP TEN\_T railway network subject to IKOP);
  - o Central Hungary region urban-suburban public transport (Purchase of urban/local buses, trolleybuses, Elimination of bottlenecks in agglomeration-based - including suburban railway - railways and station modernisation, In non-TEN-T railways: acquisition of railway public transport vehicles - e.g. tramway, suburban railway, suburban motor trains, Portion of KÖZOP projects subject to IKOP);
  - o Rural-urban-suburban public transportation outside the Central Hungary region (Purchase of urban/local buses, Elimination of bottlenecks in railways not part of the TEN-T network and station modernisation, Acquisition of public transport vehicles, Part of KÖZOP intermittent projects subject to IKOP);
- KEHOP Developments related to sewage disposal and treatment;
- KEHOP Investments and improvements aimed at optimum utilisation of sewage sludge with energy efficiency elements;
- VP Construction of small grain storage and grain dryer facilities, improving their energy efficiency;
- VP Construction and modernisation of small grain storage, drying and cleaning plants;
- VP Modernisation of livestock farms;
- VP Modernisation of poultry farms;
- VP Modernisation of cattle farms;
- VP Modernisation of pig farms;
- VP Modernisation of sheep and goat farms;
- VP Development of the agricultural water management sector;
- VP Increasing the value of agricultural products and promoting their resource efficiency in processing;
- VP Support for product development and resource efficiency of wine-growing;

- VP Creation of innovation operational groups and support for investments needed for implementing innovative projects
- VP Modernisation of horticulture; building greenhouses and foil houses, increasing energy efficiency through the use of geothermal energy;
- VP Modernisation of horticulture - for supporting plantations with the possibility of irrigation;
- VP Modernisation of horticulture for creating cold store houses - mushroom houses - upgrading of existing mushroom houses - cold store houses;
- VP External reconstruction of buildings defining a settlement image, creating, developing multifunctional community spaces, energy-related modernisation.

After implementation of investment projects for tenders included in the calculations, actual energy savings must be demonstrated according to the support contract (with invoices, measurement data, calculations, etc.). The Beneficiary prepares a report on the use of budget support in which they also account for their own resources used for the investment project.

The results of energy savings of energy-efficiency investments created through the measures can thus be traced through a joint evaluation of the preliminary tender data reporting as well as data arising from the reporting obligations included in the grant contract. The Managing Authority gathers the data from the electronic database on an annual basis and sends the aggregate energy savings data to HEPURA after each year under review.

Overlaps are possible for certain projects with investments implemented within the scope of the Modern Cities Programme (hereinafter: MCP); however, for investment projects implemented within the scope of MCP partly and fully from the operational programme, the energy savings achieved have only been taken into account in the OP.

Similarly, for investments supported by individual decisions, if the project is partly funded from some operational programme, the energy savings are only taken into account in the OP.

Planned subsidies for energy efficiency and the use of renewable energy sources for the 2014-2020 programming period.<sup>10</sup>

Environmental and Energy Efficiency Operational Programme (KEHOP)

Table 12 Planned energy efficiency programmes in the Environmental and Energy Efficiency Operational Programme

PRIORITY	MEASURE	ELIGIBLE ACTION	BENEFICIARIES
KEHOP  Priority 5: Increasing energy efficiency, using renewable energy sources	Promotion of green electricity generation for network, not related to buildings and based on renewable energy sources (5.1.)	<ul style="list-style-type: none"> <li>the establishment of power plants - producing only electricity or cogenerating heat and electricity - which directly supply the electricity generated using renewable energy sources to the network. The following renewable technologies are eligible: Biomass (including all biodegradable organic matter); Biogas production and use; Application of geothermal energy; Solar energy utilisation; Hydroelectric power plants of less than 10 MWe, so-called flow and floating turbines with a typical output of several 100 kWe installed in riverbeds</li> <li>support for electricity storage systems and other devices contributing to network regulation</li> <li>preparation of renewable energy projects</li> </ul>	companies
	Modernising building energy efficiency by combining the use of renewable energy sources (5.2)	<ul style="list-style-type: none"> <li>modernisation of residential buildings, public buildings owned by bodies financed from the central budget as well as by municipalities in the Central Hungary region as well as buildings occupied by non-profit organisations performing public tasks aimed at energy efficiency and the use of renewable energy sources</li> <li>in the Central Hungary region, energy-related renewal of buildings owned by the municipality used by certain institutions involved in public service and the use of renewable energy</li> <li>energy efficiency enhancing investments of buildings with residential functions owned by the municipality in the Central Hungary region</li> </ul> <p>Only for buildings meeting the above conditions:</p> <ul style="list-style-type: none"> <li>improvement of thermal properties of buildings, reducing heat loss, using renewable energy sources (installing primarily solar panels, solar collectors, utilisation of biomass, geothermal energy, heat pump application)</li> <li>modernisation of heating, cooling and domestic hot water systems</li> <li>modernisation of lighting systems to reduce energy consumption in buildings</li> <li>for the public sector: spreading 'soft' type energy management tools that reduce energy consumption through monitoring and continuous control of energy use (procurement of measuring and regulating equipment as well as training on its use and environmental quality assurance)</li> <li>prior to 2019, for central budgetary bodies, establishment of new, nearly zero energy buildings as pilot projects</li> <li>project preparation</li> </ul>	<ul style="list-style-type: none"> <li>households,</li> <li>central budgetary bodies,</li> <li>non-profit sector performing public service tasks (excluding municipal governments),</li> <li>churches,</li> <li>majority state-owned companies,</li> <li>local municipalities in the Central Hungary region,</li> <li>companies under majority ownership of local municipalities in the Central Hungary region</li> </ul>

<sup>10</sup> Extract from Chapter 3.2.2 of Action Plan III

<b>PRIORITY</b>	<b>MEASURE</b>	<b>ELIGIBLE ACTION</b>	<b>BENEFICIARIES</b>
<b>KEHOP</b> Priority 5: Increasing energy efficiency, using renewable energy sources	Energy development and conversion to renewable mode of district heating and heat supply systems (5.3.)	<ul style="list-style-type: none"> <li>development of new, renewable energy-based district heating facilities, modernisation of old, outdated inefficient production units, increasing energy efficiency;</li> <li>replacement of distribution systems, primary line networks, heat insulation of overhead lines and modernisation by placement underground, renovation and separation of heat centres, installation of regulating and telemechanics systems, switching on new loads, development of district heating (thermal heating) as well as installation of new co-operative and market-expanding backbone lines</li> </ul>	<ul style="list-style-type: none"> <li>district heat providers</li> <li>district heat producing companies</li> </ul>
	Awareness raising programmes (5.4.)	<ul style="list-style-type: none"> <li>support for programmes primarily motivating students and families which raise awareness of the benefits of energy- and climate-conscious behaviour</li> </ul>	<ul style="list-style-type: none"> <li>NGOs,</li> <li>churches,</li> <li>municipalities,</li> <li>educational institutions,</li> <li>central budgetary bodies</li> </ul>

## Territorial and Settlement Development Operational Programme (TOP)

Table 13 Planned energy efficiency programmes in the Territorial and Settlement Development Operational

### Programme

<b>PRIORITY</b>	<b>MEASURE</b>	<b>ELIGIBLE ACTION</b>	<b>BENEFICIARIES</b>
<b>TOP</b> Priority 3: Migration to a low-carbon economy especially in urban areas	Increasing the energy efficiency and the share of renewable energy utilisation of municipalities	<ul style="list-style-type: none"> <li>energy-efficiency rehabilitation of municipally owned buildings, institutions and infrastructure, improvement of thermal insulation of buildings,</li> <li>energy modernisation of municipally owned building, institutions and infrastructure, use of renewable energy sources,</li> <li>implementation of energy supply to exploit renewable energy sources adapted to local conditions controlled by the municipality in complex development programmes,</li> <li>support for the preparation of Sustainable Energy Action Programmes (SEAP) of municipalities</li> </ul>	<ul style="list-style-type: none"> <li>municipal budgetary management and budgetary bodies,</li> <li>municipal majority-owned enterprises,</li> <li>institutions fulfilling operational and task-fulfilling responsibilities within municipal-owned buildings,</li> <li>in addition, for awareness-raising actions, non-governmental organisations are as follows;</li> <li>CLLD organisations for renewable energy projects designed to strengthen urban-rural relations and matching local development strategies.</li> </ul>

PRIORITY	MEASURE	ELIGIBLE ACTION	BENEFICIARIES
TOP Priority 6: Sustainable urban development in county-level cities	Increasing the energy efficiency and the share of renewable energy utilisation of municipalities	<ul style="list-style-type: none"> <li>• energy-efficiency rehabilitation of municipally owned buildings, institutions and infrastructure, improvement of thermal insulation of buildings</li> <li>• energy modernisation of municipally owned building, institutions and infrastructure, use of renewable energy sources</li> <li>• implementation of energy supply to exploit renewable energy sources adapted to local conditions controlled by the municipality in complex development programmes,</li> <li>• support for the preparation of Sustainable Energy Action Programmes (SEAP) of municipalities</li> </ul>	<ul style="list-style-type: none"> <li>- municipalities of county-level cities,</li> <li>- enterprises under majority ownership of county-level cities,</li> <li>- institutions fulfilling operational and task-fulfilling responsibilities within municipal-owned buildings,</li> <li>- in addition, for awareness-raising actions, non-governmental organisations are as follows;</li> <li>- CLLD organisations for renewable energy projects designed to strengthen urban-rural relations and matching local development strategies.</li> </ul>

Competitive Central Hungary Operational Programme (VEKOP)

Table 14 Planned energy efficiency programmes in the Competitive Central Hungary Operational Programme

PRIORITY	MEASURE	ELIGIBLE ACTION	BENEFICIARIES
<p>VEKOP Priority 5: Support for energy efficiency, intelligent energy use and the use of renewable energies</p>	<p>Support for development by enterprises aimed at increasing energy efficiency and renewable energy</p>	<p>improving the thermal properties of buildings, reducing their heat losses, using renewable energy sources (installing primarily solar panels, solar collectors, utilisation of biomass, geothermal energy, heat pump application)                      modernisation of heating, cooling and domestic hot water systems, modernisation of lighting systems in buildings,                      partial or full satisfaction of the direct heat and/or electricity demand of economic production processes by increasing the use of renewable energy sources (e.g. the utilisation of solar panels, solar connectors, biomass, hydroelectric power and the utilisation of waste heat during production are eligible),                      modernisation of existing technological (production) devices with low energy efficiency,                      in the Central Hungary region, support for specific projects by enterprises aiming at energy efficiency and increasing the share of renewable energy with grants and combined financial instruments                      for enterprises in the Central Hungary region, support for projects aimed at the 1st measure of KEHOP Priority 5 by means of financial instruments</p>	<p>companies in the Central Hungary region</p>
<p>VEKOP Priority 5: Support for energy efficiency, intelligent energy use and the use of renewable energies</p>	<p>Improvement of external funding opportunities for projects to increase energy efficiency and renewable energy use in the Central Hungary region.</p>	<p>Support for modernisation of residential buildings in KEHOP 5 2nd measure aimed at energy efficiency and the application of renewable energy resources with financial instruments in the Central Hungary region                      Support for modernisation of district heating and heat supply systems in KEHOP 5 2nd measure aimed at energy efficiency and the application of renewable energy resources with financial instruments in the Central Hungary region</p>	<p>Financial institution (The final beneficiary is the population. Only providing credit and financial loans, financial leasing, undertaking guarantee and bank guarantee out of financial services, financial institutions engaged in at least one activity), other leasing companies, capital fund managers (financial intermediaries)</p>



Economic Development and Innovation Operational Programme (GINOP)

Table 15 Planned energy efficiency programmes in the Economic Development and Innovation Operational Programme

PRIORITY	MEASURE	ELIGIBLE ACTION	BENEFICIARIES
GINOP Priority 4: Energy	Support for the developments aimed at increasing energy efficiency and renewable energy use in enterprises	Modernisation of energy efficiency in buildings	for SMEs
GINOP Priority 8: Financial instruments	4 b) investment priority	ort for GINOP 4th priority as well as developments subject to KEHOP 5.1 measure with financial instruments	Financial institutions (only providing credit and financial loans, financial leasing, undertaking guarantee and bank guarantee out of financial services, financial institutions engaged in at least one activity), capital fund managers,
	4 c) investment	for developments subject to KEHOP 5.2 and 5.3 measures / means of financial instruments	Financial institutions (Final beneficiaries are public or private entities, district heat providers and district heat generating companies) (only financial institutions performing at least one of the following activities: granting credit and financial loans, financial leasing, undertaking guarantee and bank guarantee), capital fund managers,

## Human Resource Development Operational Programme (EFOP)

Table 16 Planned energy efficiency programmes in the Human Resource Development Operational Programme

PRIORITY	MEASURE	ELIGIBLE ACTION	BENEFICIARIES
EFOP I./1.,2.,3.,4.,5		- Implementation of energy efficiency improvements as a mandatory element of construction projects originally initiated not only for energy purposes	- only for institutional developments eligible for support from EFOP

## Rural Development Programme (VP)

Table 17 Planned energy efficiency programmes in the Rural Development Programme

PRIORITY	MEASURE	ELIGIBLE ACTION	BENEFICIARIES
VP 3. Promoting the organisation of the food chain - including the processing and distribution of agricultural products, animal welfare and risk management in agriculture	M16	- <u>Creation of innovation operational groups and support for investments needed for implementing innovative projects</u>	farmer, business enterprise
VP 5. Promoting resource efficiency and support for the shift towards a carbon-poor and climate-adaptive economy in the agricultural, food and forestry sectors	M4	- Development and renovation of agricultural buildings and facilities, promoting energy efficiency and the inclusion of renewable energy sources in food and wine processing plants	farmer, business enterprise
VP 6. Promoting social inclusion, poverty reduction and economic development in rural areas	M7	- External reconstruction of buildings defining a settlement image, creating, developing and energy-related modernisation of multifunctional community space	municipal governments church legal entities, non-profit organisations

### 3.1.1.4 Housing construction assistance, energy efficiency bonus

Government Decree No 256/2011 of 6 December 2011 on housing construction assistance regulated the energy efficiency bonus until the end of 2015, which could be used from 1 January 2012. The decree specified the amount of state aid by taking into account the number of children, the floor area of the apartment and the energy class of the residential unit. If the planned new building section or that affected by an extension had a significantly better energy quality than the prevailing energy requirements at the time and the better energy classification was verified by an energy certificate, the amount of state aid had to be applied by a multiplication factor of 1.1, 1.2, or 1.3. The aid was used through a financial institution where the contractual conditions are checked and the relevant data are collected. Relevant data are provided annually to the ministry supervising the specialised field.

Table 18 real properties subsidised in 2013 (items)

Energy class	60-75 m <sup>2</sup>	75-90 m <sup>2</sup>	90-160 m <sup>2</sup>
B	16	5	36
A	27	67	157
A+	7	14	124
low energy consumption (<25 KWh/m <sup>2</sup> a)	54	4	3
total	104	90	320

Source: MNE

Table 19 real properties subsidised in 2014 (items)

Energy class	60-75 m <sup>2</sup>	75-90 m <sup>2</sup>	90-160 m <sup>2</sup>
B	19	0	17
A	10	38	202
A+	34	79	281
low energy consumption (<25 KWh/m <sup>2</sup> a)	19	21	59
total	82	138	559

Source: MNE

Table 20 Number of real properties subsidised in 2015, by energy classification and useful floor area

Energy class	40-60 m <sup>2</sup>	60-75 m <sup>2</sup>	75-90 m <sup>2</sup>	90-160 m <sup>2</sup>
B	12	12	18	41
A	9	44	137	340
A+	1	16	42	260
low energy consumption (<25 KWh/m <sup>2</sup> a)	0	0	2	8
total	22	72	199	649

Source: MNE

The assumption applied in calculating energy savings was that with a constant population, newly built and higher energy efficiency buildings will replace old-fashioned, low energy efficiency buildings, which will result in energy savings in all buildings. The number of eliminated residential units was 1724 in 2014; 2000 in 2015, and 2485 in 2016 (Source: CSO).

Based on the characteristics of domestic housing construction, at least 3-5 months are needed to build a family residential building, but construction is frequently delayed for 1 year. For this reason, we have assumed in the calculations that the building is implemented and completed at least half a year after conclusion of the housing support contract and energy savings can only be included in the calculations afterwards. Therefore, for the year 2014, we took into account the buildings contracted in the second half of 2013.

The method of classifying buildings according to their energy quality as well as building energy classes are regulated in Government Decree No 176/2008 of 30 June 2008 on the certification of energy characteristics of buildings.

Energy quality can be determined primarily on the basis of the ratio of two factors for the building under investigation. These are as follows:

- on the one hand, the aggregate energy indicator of the building (expressed in kWh/m<sup>2</sup> a),
- on the other hand, the aggregate energy indicator of the building used as a benchmark just satisfying the relevant minimum requirements (also expressed in kWh/m<sup>2</sup> a).

Based on the percentage value thus determined, the specific energy class of the building can be determined.

Decree No 7/2006 of 24 May 2006 of the Minister without Portfolio on determining the energy characteristics of buildings [hereinafter: Decree No 7/2006] stipulates that the energy class of individual residential buildings must be determined according to the calculation method (applicable in the relevant year).

As a result, the average energy savings according to energy classes are in accordance with the following table.

Table 21 Average energy savings values

<b>Energy class</b>	<b>Average (estimated) percentage value* according to Government Decree No 176/2008 of 30 June 2008</b>	<b>Energy consumption (kWh/m2a)</b>	<b>Energy savings (kWh/m2a)</b>
Low-energy consumption housing unit (<25 kWh/m2a)	12%	22	160
A+	50%	91	91
A	65%	118	64
B	85%	155	27

Source: Trenecon Kft. <sup>11</sup>.

In view of the fact that the calculation method according to Decree No 7/2006 gives primary energy results, the energy savings value obtained has been converted to final energy according to the proportion of household energy use, taking into account typical energy consumption. <sup>11</sup>

Table 22 Calculated energy savings

<b>Factual data</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
New energy savings final energy (PJ/year)	<b>0.0053</b>	<b>0.0164</b>	<b>0.02</b>
Cumulative energy savings (PJ/year)	<b>0.0053</b>	<b>0.027</b>	<b>0.0687</b>

Source: MND calculation

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<sup>11</sup> Statement of energy savings achieved as a result of policy measures - monitoring of measures under Article 7 of the Energy Efficiency Directive; Report; January 2017

### 3.1.1.5 Energy rationalisation tender at law enforcement bodies

The Ministry of the Interior strives to reduce the costs of operation of real properties under property management of budgetary bodies under the Ministry's management within the scope of so-called energy rationalisation tenders by the following energy efficiency reconstructions and investment projects:

- reduction of specific energy demand (energy modernisation of heating equipment by installation of controllable devices of improved efficiency, etc.)
- reduction of thermal losses by subsequent thermal insulation
- reduction of electricity consumptions (by modernising indoor and outdoor lighting)
- use of renewable energy sources (solar collector, heat pump, etc.)

The source of the tender is the revenue paid back to this chapter from the savings generated at specific bodies of the Ministry of the Interior by subsidies obtained in the previous years, the order of magnitude of which is HUF 100120 million per year. According to the data of 14 development projects implemented in 2014, the total expenditures amounted to HUF 190.5 million. From this policy measure, no savings can be calculated for 2014 as the underlying investment had to be completed by December 2013, but only the savings from the investments after 1 January 2014 could be counted towards the obligation according to Article 7 of the Directive.

Table 23 Energy saving data

<b>Factual data</b>	<b>2014</b>	<b>2015</b>
New energy savings final energy (PJ/year)	-	0.00576
Cumulative energy savings (PJ/year)	-	0.00576

Source: Ministry of the Interior

### 3.1.1.6 Swiss-Hungarian Cooperation Programme

On 27 February 2006, the Commission and Switzerland signed a bilateral agreement on the Swiss Contribution (SC) by the Swiss Government. Under the agreement, Switzerland made a total contribution of CHF 1 billion to the 10 newly acceded countries as a one-off grant for a period of 5 years. Hungary received more than CHF 130 million (about HUF 31 billion) in subsidies from the programme.

Within the scope of the project titled 'Improving energy efficiency in the buildings of the Immigration and Citizenship Office and the Police' under identification number SH/9/2/1, energy efficiency renovation of 9 buildings will be implemented during 2015 from an allocation of HUF 1.3 billion. The aim of the project within the scope of modernisation and upgrade of specific real properties is to modernise the infrastructure of heating, domestic hot water and electricity systems and the spread of renewable energy sources for energy- and cost-effective operation of buildings involved in development. Renovation work under the programme has been completed.

Website:

<http://bmprojektek.kormany.hu/energiahatekonvsag-feilesztese-a-bevandozasi-es-allampolgarsagi-hivatal-es-a-rendorseg-epuleteiben>

Table 24 Energy saving data

<b>Factual data</b>	<b>2014</b>	<b>2015</b>
New energy savings final energy (PJ/year)	-	0.01381
Cumulative energy savings (PJ/year)	-	0.01381

Source: Ministry of the Interior

### *3.1.1.7 Norwegian Financing Mechanism and EEA Financing Mechanism*

Within the scope of the Norwegian Financing Mechanism, the 5 projects of the ‘Green Industrial Innovation’ programmes resulted in demonstrable and eligible energy savings, in which the applicants undertook to achieve a specific energy saving target, since energy savings represented only an optional indicator. The objective of the programme is to strengthen the competitiveness of green businesses, increasing the green characteristics of existing industries, disseminating green innovations, reducing the amount of waste and the pollution of air, water and soil. The 5 projects referred to will result in total energy savings of 0.000473292 PJ/year (473,292 GJ/year) from 2016. From projects implemented in 2016 and 2017, energy savings can be calculated from next year. Monitoring, review and data aggregation are performed at the programme operator.

Website: [https://www.palvazat.gov.hu/egt\\_norveg\\_fm\\_2009\\_2014](https://www.palvazat.gov.hu/egt_norveg_fm_2009_2014)

furthermore: [http://www.norvegalap.hu/7page\\_id=2316&lang=hu](http://www.norvegalap.hu/7page_id=2316&lang=hu)

### *3.1.1.8 Energy efficiency investments of budgetary institutions [based on Government Decree No 232/2015 of 20 August 2015]*

On 18 February 2016, the technical handover of a 10 MW solar electric power plant built by MVM Hungarowind Szélerőmű Üzemeltető Kft. took place. The use of electricity from the power plant is regulated in Government Decree No 232/2015 of 20 August 2015 on the operation of solar electricity power plants in order to reduce the use of fossil fuels by budgetary institutions (hereinafter: Government Decree No 232/2015).

Those non-Budapest or Pest County budgetary institutions in which the average electricity consumption in the second and third year preceding the year under review reached 100 MWh are eligible to use a discounted electricity supply if they are designated and undertake to perform investments in energy efficiency or other measures corresponding to the discount amount.

By taking into account the utmost usefulness for society as a whole, individual ministers will make proposals regarding those end users to be designated who will undertake these obligations.

Each year, the relevant budgetary bodies and the minimum electricity amount to be sold to end users (MWh) are designated in a government decision. Designation so far:

- Government Decision No 1900/2015 of 8 December 2015 on the designation of budgetary institutions entitled to discounted use of electricity in 2016;
- Government Decision No 1578/2016 of 21 October 2016 on the designation of budgetary institutions entitled to discounted use of electricity in 2017;

In the year following the investment project, the end user must perform an energy efficiency improvement measure involving energy savings verified by energy calculations and maintain the relevant result for 5 years.

The energy calculations for verifying the energy savings achieved by the energy efficiency improvement measure to be implemented must be performed by the end user according to the decree on determining energy characteristics of buildings and the relevant Hungarian standards.

The provisions for regular measurement of savings achieved by individual end users, as well as the reference dates of measurements and the provisions for monitoring and tracking savings, will form part of the contract to be concluded by the Company according to the Implementing Decree and Government Decree No 232/2015 of 20 August 2015.

For the purchase of high energy efficiency office equipment subject to Council Decision 2006/1005/EC, Annex III of the Energy Efficiency Directive requires that only energy savings resulting from the purchase of equipment exceeding a required efficiency can be taken into account.

The end users first designated for 2016 must implement the investment projects by 2017 from which energy savings can be only accounted for in 2017 at the earliest. Savings achieved by energy efficiency improvement investments are monitored and verified by experts of the National Energy Network, under professional management of the Ministry of National Development as an implementing authority.



### *3.1.1.9 Energy efficiency regulations for buildings (planned measure)*

Point 4 of Government Decision No 2010/2016 on policy measures resulting in energy savings has stipulated that new requirements be introduced to construction and renovation requirements of buildings especially from an energy efficiency aspect. Modification of the building regulations would decrease the amount of energy required to operate the buildings by requirements for thermal insulation, review of the rules of ventilation as well as shading the buildings against summer heat.

### *3.1.1.10 Investments improving energy efficiency on the basis of budget subsidies granted by special decision*

From chapter-based appropriations from the central budget and from energy efficiency investments implemented from subsidies granted on the basis of individual decisions, the relevant items to be considered are typically energy modernisation of public buildings and/or such energy efficiency investments that also include modernisation of social, health care or educational buildings.

The projects co-financed within the scope of operational programme tenders will be counted to the energy efficiency results of OPs. The National Energy Network will cooperate in the collection of savings.

The energy savings impact of investment projects aimed at improving energy efficiency implemented by individual ministries must be verified by energy calculation. Energy calculations must be performed according to Government Decree No 176/2008 of 30 June 2008 on the certification of energy characteristics of buildings.

At the end of the year under review, the details for those investment projects including energy efficiency improvements will be requested from the individual ministries. In the course of the data report, the technical contents of a development implemented during the investment project (emphasising energy efficiency developments), the relevant expenditures and the energy savings will be obtained. Pursuant to Section 7/D(1)(e) of the Implementing Decree, the staff of the National Energy Network must provide help in reporting energy consumption data; moreover, according to Section 7/D(4)(a), the Network should assist in the monitoring of policies.

In the follow-up phase, the following data have to be collected for each investment project as of 31 December of the year under review.

Calculations submitted to verify savings made by energy efficiency improvement investment can be verified by experts from the National Energy Network. Such verification must be performed for a statistically significant part (for 5 % of end users) of energy efficiency improvement measures. It is also advisable to check implementation on site. During the on-the-spot inspection, the achievement of actual savings should be assessed by taking into account the following:

- whether the investment has been implemented according to the planned technical content,
- what part of the investment is targeted by the energy efficiency development,
- whether the energy savings correspond to the energy calculations of the contract,
- whether the useful life of the investment elements corresponds to the declared value,
- under what financing it was implemented and in what proportion.
- Overlap with other policy measures

The end user must provide relevant data on the useful lifetime of the subject of investment.

Table 25 Expected savings according to the preliminary estimate

<b>Expected energy savings</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
New energy savings final energy (PJ/year)	0.04	0.04	0.04
Cumulative energy savings (PJ/year)	0.04	0.1	0.15

*Source: MND estimate*

### *3.1.1.11 Within the scope of the Modern Cities Programme, measures to improve energy efficiency with budget support*

Under the Modern Cities Programme, the Government is signing contracts with 23 county towns which include support for implementation of the most important development projects promoting the development of individual cities. Subsidy for individual development projects will be funded from central budget supports. Implementing some projects will also result in improvement of energy efficiency, such as theatre or hospital reconstruction, inner city rehabilitation or the renovation of historic buildings.

Therefore, as a consequence of programme implementation, energy efficiency improvements can be planned from 2017 onwards. Many additional projects are implemented from EU sources, which, however will not be included in the calculation here to avoid double accounting. Data concerning the energy savings achieved will be collected and the projects will be audited by the National Energy Network

### 3.1.1.12 *Promoting energy efficient use of public buildings*

From 1 January 2017, Section 11/A of the Energy Efficiency Act requires the head of an organisation in charge of operation and maintenance of a building involved in public services owned and used by public institution to prepare an energy savings action plan according to a relevant template every five years.

For the first time, the plan had to be sent to the competent regional office of the National Energy Network by 31 March 2017. Public institutions must prepare a report on fulfilment of the energy savings action plan by 31 March of next year and each year subsequently, and it has to be sent to the competent regional office of the National Energy Network.

The purpose of preparing the energy savings plan is to explore the energy savings opportunities that can be achieved in harmony with the operation of the given buildings as well as awareness raising of building users.

It is important that the plan propose concrete measures in the short, medium and long terms. Implementation is helped if realistic and preferably feasible targets are set and implementation is also planned in a foreseeable way (for example, the required resource is calculated in advance or scheduled in time). Results achieved can be controlled by regular reading and registration of consumption data.

A sample of the energy savings plan can be downloaded from the energy efficiency website operated by HEPURA.

Available at:  
<http://enhat.mekh.hu/index.php/2017/01/24/energiamegtakaritasi-intezkedesi-tervet-kell-keszit-eniuk-a-kozintezmenyeknek/>

Encouraging building users to utilise the buildings in an energy-efficient manner as well as collection, recording and monitoring consumption data are related to energy saving measures. Based on a methodology published on the energy efficiency information website, energy efficiency awareness-raising of users of the building should be ensured.

Available at:  
<http://enhat.mekh.hu/index.php/2017/01/30/kozintezmenyt-hasznalok-energiahatekonysagi-szemleletformalasa/>

Actions, campaigns, training or other measures taken for awareness-raising should also be included in the annual report.

The Energy Efficiency Act and Section 7/F of the Implementing Decree require regular reporting of energy consumption data on a monthly basis, on the fifth day following the month under review, via an on-line interface.

Collection and registration of consumption data enables the building operator to create relevant reference values and to compare consumption values of the building in similar periods. For example, differences in consumptions during the same period may indicate a technical defect (pipe breakage, filter clogging, etc.) It is also suitable to assess the effectiveness of the measures taken.

Energy savings data are expected to be first determined in 2018, for the year 2017 on the basis of annual reports. Implementation of measures, the relevant data and their credibility are monitored by the staff of the National Energy Network and the same staff will determine the expected lifetime of measures. Logically, measures for awareness-shaping can be taken into account for one year. For machine purposes, the lifetime to be taken into account is determined by the expected period of use of the particular machine or office equipment. In the case of upgrading buildings, savings may be taken into account for the entire period up to 31 December 2020. For public institutions, energy savings of 10-20 % can be achieved according to international examples by minor investments, awareness-raising, conscious building use, and planned maintenance.

### *3.1.1.13 Operation of home savings scheme*

The home savings scheme operating since 1997 is a long-term state-sponsored form of savings, based on the principle of self-reliance. The period of housing savings can be a minimum of 4 and a maximum of 10 years. The person engaged in the home savings scheme and the beneficiary is entitled to state aid once a year to an extent corresponding to the annual deposit amount for their monthly regular savings.

The housing savings system is regulated:

- on the one hand by Act CXIII of 1996 on housing savings banks (hereinafter: Act CXIII of 1996).
- and on the other hand by Government Decree No 215/1996 of 23 December 1996 on state subsidies for housing savings (hereinafter: Government Decree No 215/1996).

According to the prevailing Act CXIII of 1996, the amount of state aid can be 30 % of the amount deposited in the year under review according to the contract, but no more than HUF 72,000 per savings year. For condominiums and housing co-operatives, the amount of support may range from HUF 108,000 - 324,000, depending on the number of dwellings. At the end of the savings period, the amount and interest of the deposit, the amount and interest of the state aid as well as the amount of the loan granted under favourable credit terms related to the specific scheme (collectively, the contract amount) can be used for housing purposes (purchasing, construction, modernisation, upgrading homes, replacement of housing loan, renovation of common areas for condominiums). Therefore, the housing savings scheme can significantly contribute to interventions resulting in energy savings. Utilisation for housing purposes will be verified to housing savings banks by clients with the use of relevant invoices, on the basis of Government Decree No 215/1996. Utilisation can be inspected by a technical expert on site. The Ministry for National Economy is responsible for setting up and operating a monitoring system related to the policy based on the Implementing Decree.

Table 26 Energy savings created as a result of housing savings

<b>Period</b>	<b>Total payment for renovation and upgrades (HUF)</b>	<b>Of which payment for energy purposes (HUF)</b>	<b>Energy savings achieved (PJ)</b>
<b>2015</b>	85,974,122,640	23,676,865,193	<b>0.565</b>
<b>2016</b>	77,716,083,635	21,074,703,938	<b>0.503</b>

*Source: Ministry of the National Economy*

Housing savings can be used without restriction to build new homes for which state aid and energy efficiency bonuses are used, but these cases are ignored here and only taken into account for state aid for housing construction in order to avoid double accounting.

Moreover, there may be an overlap for projects subsidised in the GIS-GEFS housing modernisation sub-programmes, and double accounting is screened out on the basis of statements by those using state aid.

#### *3.1.1.14 Employment of an energy specialist*

The amendment of the Energy Efficiency Act entering into force on 21 December 2016 introduced the obligation of employing an energy specialist. The purpose of the new policy measure is that energy efficiency and energy savings are continuously taken into account in the measures of economic organisations consuming high levels of energy, and efficient operation be promoted by energy specialists. The scope of enterprises involved is determined in the Implementing Decree. Those economic organisations are required to employ energy specialists where the annual complete average energy use in the 3 years preceding the year under review exceeds

- 400,000 kWh of electricity,
- 100,000 m<sup>3</sup> of natural gas or
- 3,400 GJ of heat.

The energy specialist is responsible for promoting the introduction of energy-efficient approaches and behaviour patterns in the operation and decision-making of economic organisations. In this context:

- they participate as professional observers and consultants in performing regular energy audits as well as creating and monitoring the operation of an energy management system according to the EN ISO 50001 standard,
- they put forward proposals on energy-efficient operating solutions, energy-efficiency improvement options,
- they ensure preparation of a statement on energy saving results achieved by the energy efficiency developments implemented and the operating solutions applied,

- they prepare monthly reports on their activities for the economic organisation required to employ said specialist, concerning the energy consumption of said economic organisation in the month under review and the assessment of said consumption in light of previous consumption data, investments, developments and other circumstances,
- they prepare an annual summary report on the basis of monthly reports prepared for the economic organisation required to employ said specialist by 15 May of the year following the year under review concerning energy saving results achieved by energy efficiency developments implemented and the operating solutions applied, which will be published by said economic organisation by 31 March on its website,
- they fulfil tasks within their competence related to energy procurement, energy security and energy efficiency.

An energy specialist must have an auditor's certification (verified by a professional examination) and at least three years of experience. They have to complete a specific amount of training on an annual basis and renew the professional certification every five years. Economic organisations may also engage in energy specialist activities if employing a person meeting the conditions described above. No separate professional registry will be made, so companies required to employ a specialist will have to declare whom they have contracted as a specialist.

In addition to the obligation to prepare audits every four years, the employment of specialists cannot only lead to significant energy savings, but the competitiveness of businesses can improve and the energy intensity of domestic industry can be reduced.

Rationalisation of the operation of large energy consuming economic organisations is expected to yield 1-3 % in energy savings per year on the basis of international studies.

The lifetime of a policy measure can be determined on the basis of measures proposed by the specialist, on the basis of assessments in annual reports. In advance, it is estimated for 3-5 years. The policy measure can first result in energy savings starting from 2017.

Information on the employment of energy specialists, answers to frequently asked questions, and further information can be found on the HEPURA energy efficiency website: <http://enhat.mekh.hu/index.php/informaciok-az-energetikai-szakreferensi-tevekenysegor/>.

#### *3.1.1.15 National Energy Network*

From 2017, one of the most significant measures was introduced, which represents the creation of a consulting network in 18 county government offices, in the Budapest Government Office and in 57 district (and Budapest district) government offices.

For small and medium enterprises and some municipalities, it is important to involve professionals well versed in energy so that they select the most economical solutions offering the best returns in their development decisions and implementing their investments. This requires the assistance of a - preferably local - energy specialist.

Consultants are required to promote energy-efficient operation of public institutions - including local municipalities - and businesses as well as the reduction of energy consumption by the population through professional advice. One of the additional tasks of the National Energy Network will be conscious improvement of the energy efficiency of public institutions.

The establishment of the National Energy Network was already decided in Government Decision 1215/2015 of 17 April 2015 and the requirements concerning network setup and operation have been included in the Implementing Decree and in Act CXXXVIII of 2016 on the amendment of certain acts aimed at climate policy and green economy development and amending the Energy Efficiency Act.

Annex 10 of the Implementing Decree includes the headquarters of National Energy Network offices and their jurisdiction. Professional management of the National Energy Network will be conducted by the minister in charge of energy policy (hereinafter: Minister). Regular contact between the National Energy Network and the Minister will be the responsibility of Budapest Government Office until 30 June 2017 and then that of the Győr-Moson-Sopron County Government Office.

The National Energy Network fulfils the following tasks in relation to public institutions:

- providing free energy-related advice to public institutions;
- maintaining continuous contacts with municipal governments;
- encouraging public institutions to set up an energy management system incorporating energy audits at regional and local level;
- providing professional assistance for preparing an energy saving action plan for public service buildings owned and used by public institutions;
- providing professional assistance to the person in charge of operation of a public service building owned and used by public institutions and serving for public tasks in relation to reporting energy consumption data related to the building;
- cooperating in environmental efficiency awareness raising of users of public service buildings owned and used by public institutions;
- contributing to the elaboration of the county-based regional development programme;
- in the event of a relevant request, participating in the conclusion of energy procurement contracts;
- in the event of a relevant request, providing advice on the auditing of energy procurement contracts and energy bills in the interest of the public institution;
- in the event of a relevant request, providing technical support for energy purchases.

The National Energy Network fulfils the following tasks in relation to business enterprises:

- providing free energy-related advice to businesses and keeping track of the extent of energy savings achieved through consulting;

- encouraging small and medium enterprises to conduct energy audits and carry out recommendations contained in the audits.

The National Energy Network fulfils the following tasks in relation to the population:

- providing free energy-related advice and keeping track of the extent of energy savings achieved through consulting;
- providing information on available energy efficiency tenders.

The National Energy Network has the following other tasks:

- providing for monitoring (if necessary) of savings from certain alternative policy measures, as well as monitoring of measures;
- cooperating in management of energy security crises at a local level.

Persons engaged in professional consulting activity in offices constituting the National Energy Network must have basic or master-level qualifications or equivalent qualifications specified in Annex 12 of the Implementing Decree. These qualifications are the same as basic or master-level qualifications required for energy specialists. Qualifications obtained in foreign educational institutions can be taken into account under Act C of 2001 on the recognition of foreign certificates and diplomas. A person conducting professional consulting must not be subject to disqualification preventing said person from performing activities according to their professional field.

The relevant specialists participating in the activities of the National Energy Network have been appointed and all specialists will take part in a two-day preparatory training. An internal on-line information work interface, forum and knowledge base has been created for network employees within the Energy Efficiency website, on the basis of registration.

The National Energy Network has not only advisory functions, but also performs monitoring and data collection tasks for several policy measures.

Evaluation of the work of the National Energy Network can take place from 2018.



### 3.1.1.16 *Improving the energy efficiency in transport*<sup>12</sup>

Transport energy efficiency measures are identical to policy measures described by Action Plan III adapted by Government Decision No 1601/2015 of 8 September 2015.

#### Support for electric mobility, Jedlik Ányos Plan

The Hungarian Government wants electric drives to play a role in applying alternative drives, progressive and long-term reduction of the use of traditional internal combustion engines. In view of this, the Government adopted the Jedlik Ányos Plan by Government Decision No 1487/2015 of 21 July 2015 and at the same time defined the legislative tasks.

The Economic Greening System (EGS) is a source for tenders promoting the spread of electric mobility.

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<sup>12</sup> KTI Közlekedéstudományi Intézet Nonprofit Kft, on the basis of a report titled '2014-2020 Energy Efficiency Action Plan II Monitoring'; January, 2017

Table 27 Measures supporting the growth of electric cars:

<b>Measures supporting the growth of electric cars:</b>		
<b>Actions</b>	<b>Short description</b>	<b>Economic impact</b>
Green license plate for electric cars	Opportunity for distinction	-
Free parking	Municipal competence; depending on the city, parking-fee exemption may apply only to BEV <sup>13</sup> cars or also to PHEV cars	HUF 35,000-50,000/year
Opportunity for using bus lanes	Like taxis, electric cars can use bus lanes	
Tender for support for the construction of electric charging points Code number: GZR-T-Ö-2016	Supporting the construction of an electric charging infrastructure for local governments (municipal, county, Budapest district and Budapest Metropolitan Municipal Government)	HUF 1.25 billion in grants (support for maximum 500 charging points)
VAT refund	For company cars used for the main activity, and in case of an open-end leasing scheme, the lessor may reclaim the VAT on the car and the lessee the VAT on the lease fee.	For an average electric car: HUF 2.5 million
Registration tax relief	BEV cars will be exempt from the registration tax, PHEV cars will be subject to a reduced registration tax	Tax relief of HUF 135,000 for BEV cars and HUF 60,000 for PHEV cars
Motor vehicle tax relief	BEV cars are exempt from the motor vehicle tax	Tax relief of HUF 27,000 for BEV cars
Tender for support for the purchase of electric cars Tender code number: GZR-D-Ö-2016	A grant of 20 %, up to a maximum of HUF 1.5 million, is available for the purchase of a new BEV car (beneficiaries can be private individuals, business enterprises or local governments)	HUF 1,500,000 subsidy

<sup>13</sup> BEV: Battery Electric Vehicle (purely battery operated electric vehicle);

PHEV: Plug-in Hybrid Electric Vehicle (hybrid electric motor vehicle with external/network charging option);

EREV: Extended-range Electric Vehicle (electric vehicle offering extended range)

According to KEKKH,<sup>14</sup> the number of electric vehicles was 476 in 2015 and it increased to 1473 by the end of 2016. Half of the electric vehicles are BEV, the rest are PHEV and EREV cars.

By 2020, a significant increase in the number of electric vehicles is projected.

**KTI has calculated the energy savings achieved in 2015 through the propagation of electric and hybrid vehicles. According to this calculation:**

- **savings achieved by electric cars = 0.01569 PJ**
- **savings achieved by hybrid cars = 0.09432 PJ**

#### Application of road tolls in 2015

Road tolls are governed by three items of legislation:

- Act LXVII of 2013 on the toll charged for using motorways, national roads and main roads in proportion to the distance travelled;
- Government Decree No 209/2013 of 18 June 2013 on the implementation of Act LXVII of 2013 on the toll charged for using motorways, national roads and main roads in proportion to the distance travelled;
- Decree No 25/2013 of 31 May 2013 of the Minister for National Development on the amount of tolls and toll roads.

The regulation takes into account not only the improvement of road safety, but also aims at promoting passenger and freight transport with lower environmental impact and more efficient vehicles. Freight forwarders are trying to optimise delivery routes by improving and rationalising traffic management, reducing idle runs.

In the field of freight transport, when calculating savings (also) attributable to road tolls in 2015, it must be taken into account that due to the growth of the Hungarian economy, transport performance has increased in absolute terms and the low fuel prices of 2013-2014 temporarily hampered the efficiency efforts of carriers. Therefore, only relative savings can be calculated, the essence of which is the mileage necessary for achieving transport performance with the same vehicle utilisation level, and this has been compared to the actually achieved mileage in 2015 according to the relevant statistics in the freeway sections of trips. In this way, the annual mileage savings of the freight vehicle will be achieved, which have been achieved due to improved vehicle utilisation.

According to the relevant calculations, the introduction and application of tolls resulted in **savings in 2015 amounting to = 0.432 PJ/year**.

The calculation process can be followed in Tables 21 and 22.

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<sup>14</sup> Central Office for Administrative and Electronic Public Services

Table 28 Mileage savings and increase of utilisation level of freight transport vehicles

<b>Mileage savings and increase of utilisation level of freight transport vehicles in 2015</b>						
<b>Freight transport vehicle category</b>	<b>Total mileage of freight transport vehicle, 2015 (km/year)</b>	<b>on a toll network in 2015</b>		<b>utilisation level correction 2012/ 2015</b>	<b>Corrected mileage subject to tolls in 2015 (km/year)</b>	<b>Mileage saved in 2015 (km/year)</b>
		<b>Mileage ratio %</b>	<b>Mileage (km/year)</b>			
3.5-4.99 t	66,532,000	35	23,286,200	1.058	24,655,976	1,369,776
5.0-9.99 t	553,922,000	45	249,264,900	1.034	257,860,241	8,595,341
10 t and greater	345,014,000	60	207,008,400	1.005	208,194,695	1,186,295
Towing vehicles	2,271,109,000	70	1589776 300	1.018	1,618,681,324	28,905,024
Total:	3,236,577,000	-	2,069,335,800		2,109,392,236	40,056,436

Energy savings are obtained by multiplying mileage savings by the average fuel consumption of individual freight transport car category.

Table 29 Energy savings of freight transport

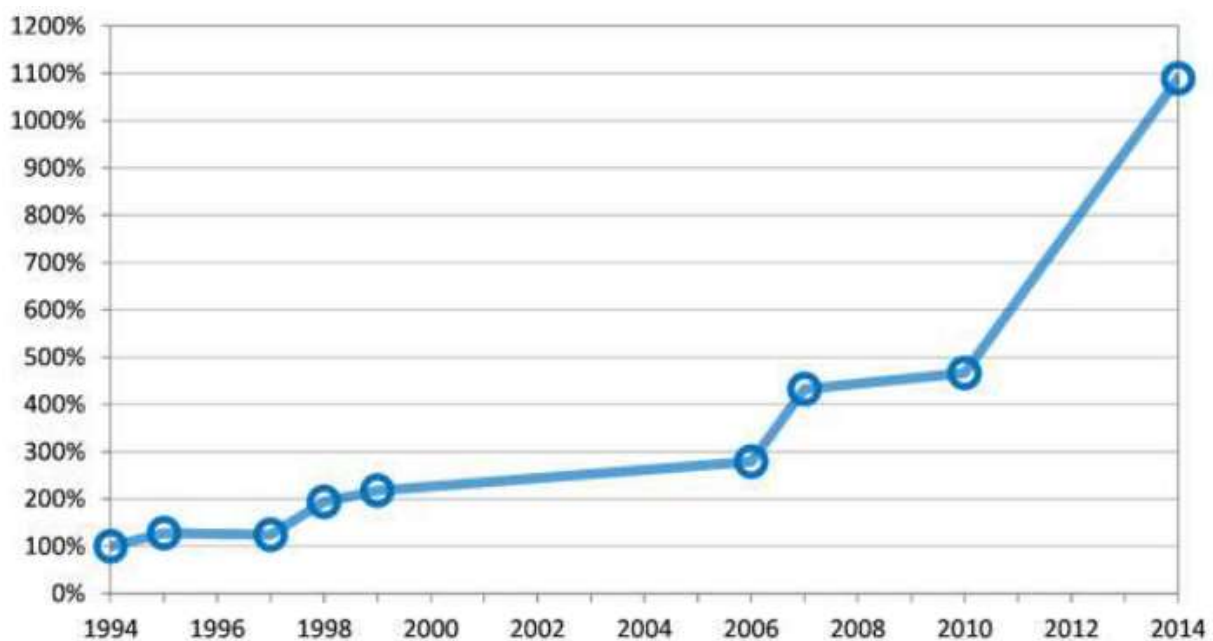
<b>Energy savings of freight transport in 2015 as a result of tolls</b>					
<b>Freight transport vehicle category</b>	<b>Mileage saved in 2015 (km/year)</b>	<b>Average consumption (litre/100 km)</b>	<b>Fuel quantity saved (litre/year)</b>	<b>Energy saved</b>	
				<b>(MJ/year)</b>	<b>(PJ/year)</b>
3.5-4.99 t	1,369,776	9.45	129,443.832	4,621,144.802	0.0046
5.0-9.99 t	8,595,341	18.5	1,590,138.085	56,767,929.63	0.0567
10 t and greater	1,186,295	23	272,847.85	9,740,668.245	0.0097
Towing vehicles	28,905,024	35	10,116,758.4	361,168,274.9	0.3611
Total:	40,056,436	-	12,109,188.17	432,298,017.6	0.4323

## Development of bicycle traffic

The importance of cycling has increased considerably in recent years and the growth starting in 2006 is still continuing at an every-increasing pace. On the one hand, development is motivated by the health and environmentally conscious attitude of society, and a significant role is played by campaigns promoting non-motorised transport (European Car Free Day and Mobility Week, Cycle to work campaign). Development is properly illustrated by a figure illustrating the growth of Budapest bicycle traffic:

Figure 2

### **Change in bicycle traffic compared to a base year of 1994, based on the average of 6 locations, spring measurement, weekday**



Many data and studies are available on the volume of bicycle traffic:

- at present, there are three permanent, 24-hour measuring devices counting cyclists in Budapest;
- relevant measures were performed in the BKK Single Traffic Model project in November 2013 and in April 2014 with the inclusion of travel habit records;
- several bicycle traffic counts were performed in Miskolc;
- a significant amount of data can be found in the Bicycle Road Registration System;
- the CSO document titled 'Assessment of public and individual traffic characteristics of the population' is available,
- research materials of the Budapest Transport Centre;
- the bicycle traffic data of the national public road network can be accessed in the National Road Database.

In bicycle transport, leisure and sports bicycle use were screened on the basis of traffic counting data, or the share of those switching from a car to a bicycle was estimated according to a questionnaire (60 %). Based on the above, according to KTI calculations, **the annual savings in 2015 were 0.34 PJ/year**.

#### Public transport developments of the Transport Operational Programme (KÖZOP)

From the priorities between 2007 and 2013, the development of suburban public transport and urban and suburban transport can be taken into account in terms of energy savings. The financial allowance for the priority was HUF 544.61 billion (with domestic surplus undertakings this was raised to HUF 621.89 billion).

Table 30 Public transport developments completed in 2015

Developments of KÖZOP public transport in the years 2007-2015			
Activity	Track construction/m modernisation	Population affected by intervention	Note
Track construction for Metro 4	7.3	160 (planned 360)	calculation, traffic counting
expansion of Budapest city rail track network	4.5	90	modelling, measurement
renovation of Budapest city rail track network	31.0		
Budapest suburban rail track construction (second track)	18.4	30	modelling, measurement
renovation of Budapest suburban rail track network	47.5		
expansion rural town rail track networks	11.0	250	modelling, measurement
renovation of rural town rail track networks	19.3		
Total		530	
purchase of state-of-the-art			

Energy savings achieved based on KTI calculation for the seven-year period: 1.323 PJ, of which in 2015: 0.165 PJ

The energy efficiency improvement achieved with transport measures according to the calculation of KTI Közlekedéstudományi<sup>15</sup> Intézet Nonprofit Kft is as follows for 2015:

<sup>15</sup> Report titled '2014-2020 Energy Efficiency Action Plan II Monitoring', January 2017

Table 31 Energy efficiency improvement achieved through transport measures

Actions	PJ achieved in 2015
Support for electric mobility, Jedlik Ányos Plan (with hybrid vehicles)	0.110
Application of tolls (traffic rationalisation, capacity utilisation, traffic task sharing)	0.432
Development of bicycle traffic	0.340
KÖZOP traffic development projects	0.165
Total	1.048

### 3.1.1.17 Corporate normative tax relief for energy efficiency measures

By amendment of Act LXXXI of 1996 on corporate tax and dividend tax (hereinafter: the Corporate Tax Act), a tax relief for investments for energy efficiency purposes was introduced. Accordingly, if a business organisation engages in an investment improving energy efficiency, they may utilise a tax relief in the tax year following commissioning of the investment projects, or even for a further five years if so decided by the company. The tax relief may amount to a total of 30 % of the eligible investment costs, but not more than EUR 15 million. This can be increased by 20 percentage points by small and 10 percentage points by medium enterprises. The tax relief may be utilised for energy efficiency investments which began after 1 January 2017.

According to the terms used in the Energy Efficiency Act, investments aimed at energy efficiency are regarded to be investments resulting in increasing energy efficiency by which energy savings are creating resulting in reduction of final energy consumption.

Eligible expenditures with respect to the tax relief:

- total costs of the energy efficiency investment - if it can be determined separately - (e.g. insulation of the company building and production hall, or modernisation of its heating system), or
- the cost value, according to Act C of 2000 on accounting, of a tangible asset (machine) or intangible asset (e.g. building management system) required for achieving a higher level of energy efficiency;
- the part of the cost value of the tangible or intangible asset forming part of an investment directly serving energy efficacy purposes which arises as surplus expenditures in comparison with a less energy efficient investment project, which investment would have been credibly implemented by the taxpayer in the absence of tax relief.

The relevant tax relief can be used when submitting a tax return, on the basis of an energy efficiency certificate. The certificate must include that the investment serves energy efficiency purposes and it must verify the type of energy savings achieved through the investment. The certificate must be based on an energy audit by a registered auditor. Auditing of economic organisations utilising the tax relief are subject to the same rules as those of large companies. The Corporate Tax Act states that for the same investment project, tax relief for investments serving energy efficiency objectives and development tax relief may not be applied simultaneously.

Government Decree No 176/2017 of 4 July 2017 on the rules of implementation of investment tax reliefs for energy efficiency purposes determines the detailed rules of utilising the tax relief and data reporting.

Fulfilment of the conditions of tax relief will be verified by the state tax authority at least once by the end of the third tax year following the first use of the tax relief, and the Hungarian Energy and Utilities Regulatory Authority will verify a statistically specified part of audits verifying energy savings from the aspect of authenticity and professionalism.

Considering the fact that the Corporate Tax Act does not stipulate any cost constraints for energy efficiency investments, the measure primarily offers important assistance to medium or small enterprises to improve their competitiveness and their energy efficiency. According to experience, economic operators - if they have the opportunity to invest at all - rather prefer measures and investments providing a short-term return (1-3 years) and are reluctant to engage in an investment yielding a return for a period of 5-6 years. Investments offering longer-term return are mainly considered when using grants. Corporate tax relief is a new tool for achieving energy efficiency investments yielding a return for 5-6 years, as well. For investments receiving other budget or EU grants, they also have to be considered when calculating the tax relief so that double accounting is avoided.

The tax relief can be utilised for investments started after 1 January 2017. For the year 2017, the corporate profit tax return has to be submitted in 2018, so energy savings data will also be available in 2018 only, for 2017 the earliest. Pursuant to Annex 8 Part 2 Line 18 of the Implementing Decree, energy savings data will be summarised and reported by the Ministry of National Economy. The interest of business enterprises in this tax relief can be regarded as significant.



3.1.1.18 Aggregated energy savings data

Energy efficiency policies adopted to meet Article 7 and resulting energy savings in 2014-2015

Table 32 Aggregate data on energy savings

Policy measures	New energy savings (PJ)		Accumulated savings
	2014	2015	by 2015
National energy efficiency programmes (from quota revenues, GEFS, GIS, budget sources, based on intergovernmental agreement, etc.)	0.13*	0.26	0.51
Primarily energy efficiency programmes implemented from operational programmes (KEOP, ROP, KMOP, KEHOP, TOP, VEKOP, GINOP)	1.0378*	2.5175	4.0928
Primarily non-energy efficiency programmes implemented from operational programmes (TOP, VEKOP, EFOP, IKOP, KEHOP, VP)	0.4	0.4	1.2
Housing support	0.0053	0.0164	0.027
Energy rationalisation tender at law enforcement bodies	-	0.00576	0.00576
Swiss-Hungarian Cooperation Programme	-	0.01381	0.01381
Norwegian Financing Mechanism and EEA Financing Mechanism	-	-	No savings can be accounted for in later years
Energy efficiency investments of budgetary institutions [Government Decree No 232/2015 of 20 August 2015]	-	-	No savings can be accounted for in later years

Policy measures	New energy savings (PJ)		Accumulated savings
	2014	2015	by 2015
Energy efficiency regulations for buildings	-	-	No savings can be accounted for in later years
Investments improving energy efficiency on the basis of budget subsidy granted by special decision	0.04	0.04	0.1
Within the scope of the Modern Cities Programme, measures to improve energy efficiency with budget support	-	-	No savings can be accounted for in later years
Promoting energy efficient use of public buildings	-	-	No savings can be accounted for in later years
Operation of home savings scheme	0.1326	0.565	0.8302
Employment of an energy specialist	-	-	No savings can be accounted for in later years
Results of the operation of the National Energy Network	-	-	No savings can be accounted for in later years
Improving the energy efficiency of transport	1.824	1.048	4.696
Corporate normative tax relief for energy efficiency measures	-	-	No savings can be accounted for in later years
<b>Total:</b>	<b>3.5697</b>	<b>4.86647</b>	

\*Data corrected in 2015 due to increased load level of databases

Source: Ministry of National Development

The study on the monitoring of energy saving measures<sup>16</sup> projects fulfilment of the expected energy savings by 2020 in the event of implementation of policy measures.

<sup>16</sup> Statement of energy savings achieved as a result of policy measures - monitoring of measures under Article 7 of the Energy Efficiency Directive; Report; January 2017, Trenecon Kft.

### 3.2 Energy audits and management systems (Article 8 EED)

Based on the Energy Efficiency Act, the Hungarian Energy and Utilities Regulatory Authority should keep a list of energy auditors and energy auditing organisations (auditor's list) and supervise these persons and organisations; and to carry out the monitoring of energy audit.

A necessary condition for continuing auditing activities is, among others, the fulfilment of an **energy auditor's professional examination** organised by certain cooperating organisations.

This task has so far been fulfilled by the Hungarian Chamber of Engineers as the sole contributor.

The purpose of the exam is to prove that the candidate:

- a) has, during their studies, acquired and is familiar with the basic professional knowledge needed to carry out an energy audit and has amassed the necessary experience in their application;
- b) is familiar with energy efficiency enhancing measures and can determine their expected results for the area audited and is capable of ranking them according to economic and environmental criteria; i.e.
- c) is capable of preparing an energy audit independently or in cooperation with experts with deeper knowledge in specific fields in accordance with minimum requirements stipulated in legislation on energy efficiency.

Prior to the professional examination, it is possible to participate in exam preparatory courses (which is not mandatory), to be organised by the participating organisations if prospective students are present, but other organisations may also hold a relevant course.

Number of auditors:

**Successful exam passed in 2015: by 101 persons**

**Successful exam passed in 2016: by 118 persons**

To provide for the professional strengthening of the auditing activity, according to a legislative amendment entering into force on 21 December 2016, as a further obligation, **a renewal examination every 5 years was stipulated**. The aim of the renewal exam is to demonstrate that in the period since passing the examination, the candidate has been continuously monitoring professional knowledge affecting the energy area and its changes, has learned them, and is capable of their proper application during work.

The minimum content requirements for energy audits are stipulated in the Implementing Decree. It is permitted to apply a European standard series available in Hungarian as a Hungarian standard.

Since 1 July 2017, a further obligation of energy auditors is the completion of **further training** required on an annual basis. The purpose of further training is to enable the energy auditor to continuously update their knowledge for practicing their profession. The curriculum for the training will be compiled in such a way that it covers current new technologies, modern energy efficiency enhancing measures, thus adapting to the requirements of a professional renewal exam. These trainings are aimed at the knowledge of changes in Hungarian and European legislation related to energy efficiency and audit activity and to the updating of previous knowledge. Furthermore, they provide an opportunity to utilise the experience gained in relation to energy audits completed and pay particular attention to IT equipment, applications and methods required to carry out energy audits in compliance with relevant law.

The cooperating organisation registered will always act in accordance with the professional guidance approved by HEPURA supervising the performance of the relevant duties, both in the course of professional energy-related examinations, renewal examinations and annual further training courses.

By 05/12/2015, 62 completed audits were reported to HEPURA, and by this date, it was not a requirement for the audit to be carried out by a registered auditor or a registered auditor organisation.

From 06/12/2015 to 31/12/2015, 6 completed audits were reported.

In the electronic form that can be completed on the HEPURA website, 694 audits were reported altogether, which were carried out between 06/12/2015 and 31/12/2016. Of the audits reported, 3 were not made on the basis of an obligation (voluntary).

**The total number of reported audits up to 13 July 2017: 1095 pcs**

**Number of audits required for large companies: 759**, the rest are audits by the other small and medium-sized companies.

**Large companies affected by the auditing obligation** and other enterprises are currently being audited. According to the list of large companies made available by NTCA: **1194 pcs**.

In addition, the list of large companies registered at HEPURA on the basis of Section 22/B of Energy Efficiency Act by 20 January 2016 can be used for monitoring completion of the energy audit.

Instead of the auditing obligation, many businesses, not only large corporations, but also medium-sized companies, have introduced an energy management system.

During the audit process, it is necessary to identify large companies required to audit and the audits submitted. The list of large companies on the NTCA list and that of large companies registered at the Office by 30 June of the year preceding the year under review is compared, and those large companies are filtered out which did not fulfil their registration obligation. In the event that the large company has failed to comply with its obligation properly or altogether, HEPURA will instruct the large company by setting a relevant deadline to comply with its obligation and may assess a fine that can be repeated [Section 22/B(2) of the Energy Efficiency Act].

It will be checked whether an energy auditor or an auditing organisation has reported an energy audit to the benefit of the obligated large company. The list of large companies out of the registration database for large companies obligated to perform audits not requesting exemption will be compared to the list of reported audits. On the basis of the audit, the Office instructs the large company that has not reported an energy audit by an auditor or an auditing organisation to fulfil the relevant obligation within 180 days. In case of non-fulfilment of the energy auditing obligation, HEPURA may impose a fine of up to HUF 10 million. The fine may be assessed repeatedly, and the minimum amount of the repeated fine is 150 % of the previously imposed fine, the maximum amount being fifteen million HUF (Section 25 of the Energy Efficiency Act).

HEPURA's procedures for monitoring the audits will be summarised in a monitoring plan.

### **3.2.1. Metering and billing (Articles 9-11 EED)**

The provisions according to Articles 9-11 of the Energy Efficiency Directive related to measurement, billing of energy consumption, as well as access to measurement and consumption data have been transposed into Hungarian legislation as follows.

In the field of electricity, compliance is implemented by Act LXXXVI of 2007 on electricity (hereinafter: Electricity Act) as well as Government Decree No 273/2007 of 19 October 2007 on the implementation of certain provisions of Act LXXXVI of 2007 on electricity (hereinafter: Electricity Implementing Decree).

In the field of natural gas, compliance is implemented by Act XL of 2008 on natural gas supply (hereinafter: the Gas Act) as well as Government Decree No 19/2009 of 30 January 2009 on the implementation of the provisions of Act XL of 2008 on natural gas supply.

In the field of district heat, compliance is implemented by Act XVIII of 2005 on district heating services (hereinafter: District Heating Act) as well as Government Decree No 157/2005 of 15 August 2005 on the implementation Act XVIII of 2005 on district heating services (hereinafter: District Heating Implementing Decree). In order to create consistency with the regulatory framework of the Directive, several legislative amendments and the enactment of a new item of legislation have taken place in the period from 2015 until today.

These items of legislation are as follows:

- Act CXCVI of 2015 on the amendment of certain energy-related acts;
- Act LIX of 2016 on the amendment of energy legislation for the purpose of harmonisation of laws;
- Act LXXXI of 2016 on the amendment of certain energy-related acts;
- Government Decree No 91/2015 of 9 April 2015 on the amendment of Government Decree No 19/2009 of 30 January 2009 implementing the provisions of Act XL of 2008 on natural gas supply;
- Government Decree No 123/2015 of 26 May 2015 amending certain government decrease related to energy efficiency;

- Government Decree No 201/2016 of 21 July 2016 on district heating service;
- Government Decree No 202/2016 of 21 July 2016 amending certain energy-related government decrees.

Based on the above legislation, provisions for individual measurement under the relevant directive are guaranteed for these sectors.

The domestic definition of the district heating service user in line with the concept in the directive covers both the community of owners of the buildings and the owners of individual parts of said building [Section 3(g) and Section 44(1) of the District Heating Act, point 20.1 of the District Heating Implementing Decree]. The provision of the Directive concerning the measurement of individual heat consumption of the building as a whole at a heat exchanger pursuant to Article 9(3) is included in Section 43(1)-(4) of the District Heating Act. Measurement of district heat and domestic hot water consumption per building section is mandatory in the cases specified in Section 43(5a) of the District Heating Act. The obligation concerning measurement per individual building section in accordance with Section 43(5a) is detailed in Section 17/C(1a) of the District Heating Implementing Decree.

Users in these sectors receive regular information and invoices about their consumption with the data content specified in the directive provisions. Access to consumption data is free of charge. In addition, within the framework of horizontal regulations and regarding invoice information, Act CLXXXVIII of 2013 on the uniform public service invoice image also includes specific provisions.

### **3.2.2 Consumer information programmes and training (Articles 12 and 17 EED)**

The National Energy Strategy adopted in October 2011 considers the role of social behaviour patterns and their potential for energy savings as important, therefore considers the awareness-raising of consumers as a top priority. Point 4(u) of Parliamentary Decision No 77/2011 of 14 October 2011 on the National Energy Strategy stipulates as a task for the Government to ‘develop an action plan for shaping and developing the energy- and environmentally conscious attitude of consumers’ and to ‘ensure the teaching and media dissemination of knowledge related to sustainable development and energy awareness; and create an energy consulting system reaching a wide range of the population’.<sup>17</sup>

In order to fulfil the above obligation, the Government adopted the Energy and Climate Consciousness and Awareness Raising Action Plan (hereinafter: Awareness Raising AP) by Government Decision No 1602/2015 of 8 August 2015 in August, 2015. The document identifies the governmental measures to be implemented by 2020 that are capable of making a major contribution to changing the public view related to climate change and energy use, and dynamic promotion of changing consumer habits and the relevant activities of domestic actors. The expected long-term impact of the relevant measures is that, instead of a cost-oriented approach, the weight of environmental-oriented and community interest will become more dominant in consumer decisions.

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<sup>17</sup> Parliamentary Decision No 77/2011 of 14 October 2011 on the National Energy Strategy

The target group of the Awareness Raising AP is all of society (children, young people, middle aged and older population) and, in addition to non-governmental and professional organisations, economic operators, businesses, municipal governments, public institutions and public administrative bodies, as energy consumption and environmental protection are an indispensable part of economic activities. Certain provisions of the Energy Efficiency Directive stipulate the obligation of developing programmes beyond the scope of providing information, which encourage households as well as small and medium sized enterprises to carry out energy audits. Fulfilment of this obligation can be achieved through energy and climate conscious campaigns out of the communication measures indicated by the AP. In addition, a working group including the competent ministries as well as representatives of professional and non-governmental organisations as well as research think tanks, universities and stakeholder companies has been set up and held sessions several times a year, aimed at the promotion and implementation of awareness-raising measures.

The Energy Efficiency Directive also prioritises proper information to all interested parties, in particular access to information on energy suppliers, audits and energy savings opportunities to business enterprises. In accordance with Section 20 of the Energy Efficiency Act and the Awareness Raising AP, an energy efficiency information website handled by HEPURA was developed in 2015, given that HEPURA already plays an important role in informing users and consumers; moreover, the required professional and infrastructural background is available which makes possible regular updating of the website. Detailed rules for the operation of the website are laid down in a ministerial decree implementing the Energy Efficiency Act.<sup>18</sup>

The Awareness Raising CST is planning a targeted energy savings information programme to effectively utilise the significant role of existing public administration, public institutional and organisational infrastructure in local awareness-raising and thus encourage local businesses and households (in particular households subject to energy deprivation in disadvantaged areas) to apply conscious energy consumption. The information materials being prepared will present those low-cost measures that can improve the efficiency of a building or building use in general.

It is of utmost importance that households receive professional assistance and information, which obligation is linked to the task specified in Point 4(u) of Parliamentary Resolution No 77/2011 of 14 October 2011 on the National Energy Strategy and the establishment of an energy consulting system. The existing public administration, public institution and organisational infrastructure can be used to provide the relevant consulting services, but said infrastructure should be made suitable for the relevant task. At the same time, the Awareness Raising AP specified as a relevant measure the establishment of a National Energy Network from 1 January 2017 for direct information to public institutions, municipal government, the public, and local businesses.

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<sup>18</sup> Decree No 25/2015 of 26 May 2015 of the Minister for National Development on information promoting the improvement of energy efficiency

In the public institution and municipal sphere, the engineering and energy specialist background (as a result of the conclusion of appropriate energy contracts, rational operation, regular maintenance and proper regulation of building engineering systems) directly results in such energy cost savings that do not require significant investment. Energy costs of municipalities may decrease by at least 5-10 % (ca. HUF 5-10 billion/year) whereas nearly 4.9 PJ energy savings can be achieved by 2020 with the use of free energy consulting to be provided by the national energy network to SMEs<sup>19</sup>.

Municipalities have a significant role in implementing energy-efficient and energy-conscious settlement development and settlement management. To achieve this, the development of sustainable energy action plans (SEAP) can be helpful in addition to the national energy network described above. The sustainable energy action plans will fit in the instruments of settlement development and settlement planning, and a specific handbook adopted at a European level is available for their elaboration<sup>20</sup>. Numerous localities already have an environmental or sustainable energy action plans; however, support is available from the Territorial and Settlement Development Operational Programme for the development of similar action plans. In all cases, awareness-raising programmes must be linked to the development of sustainable energy action plans and the process of implementation.

We expect an important awareness-raising effect from the obligation of public service institutions to prepare a new energy saving action plan, the integral part of which is awareness-raising for users of public institutions. The energy saving action plan must be prepared every five years, for the first time by 31 March 2017 by the party responsible for maintenance and operation of the relevant public institution. In addition, it must ensure awareness-raising of users of the institution's building. A sample of the energy savings action plan can be found on the Energy Efficiency website, along with a list of criteria to perform the awareness raising campaign. Implementation must be reported annually. At the same time, the legislation also requires registration of energy consumption of public institution, which allows monitoring and comparison of consumption.

The website is available at: <http://enhat.mekh.hu/index.php/kozintezmenyek/>

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<sup>19</sup> HEPURA estimate

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



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

In Hungary, the energy certification of buildings is guaranteed at an adequate level, and there has been a well-functioning system for many years for testing and auditing certifiers.

The list of energy certifiers is available at: <https://www.mmk.hu/kereses/tagok>

Energy certificates of buildings are registered in an electronic database. The database is available at: <https://entan.e-epites.hu/>

The services provided by auditors and auditing organisations for business organisations are guaranteed at an appropriate level. Training, examination and further training of auditors are operational, inspection of the auditors (and thus their activities) is being currently started, and the legal framework is already in place.

Certification of energy management systems (according to ISO 50001) is guaranteed.

The list of auditors and auditing organisations and information related to audits can be found at the following website: <http://enhat.mekh.hu/index.php/2015/12/28/energetikai-audit/>.

Information on preparatory and further training courses for auditors is available on the website of the Hungarian Chamber of Engineers: <https://www.mmk.hu/szolgaltatasok/energetikai-audit>

**On the basis of the above, the technical competence and reliability of the energy service providers listed in Article 16 is appropriate, and therefore no further certification or qualification systems are necessary at present.**

A new national standardisation technical committee has been established whose activities are related to the activities of other international and European standardisation technical committees, such as ISO TC 301 Energy management and energy savings; CEN/CLC/JWG1 Energy audits; CEN/CLC/JWG3 Energy management and related services. General requirements and qualification procedures; CEN/CLC/JWG4 Energy efficiency and saving calculation. The Technical Committee promotes the proper application of international and European standards for energy efficiency and energy management systems, thus promoting the energy-conscious functioning of organisations.

### **3.2.4 Energy services (Article 18 EED)**

The terms ‘energy services’ and ‘energy service provider’ are defined in the Energy Efficiency Act. It stipulates that if a public institution intends to conclude an energy efficiency contract during procurement aimed at energy efficiency, the contract must contain at least the contract elements specified in Section 8 of the Implementing Decree. The contract must be concluded in writing.

The mandatory contents of the energy efficiency contract to be concluded by public institutions (with regard to this sub-section, hereinafter: contract) are as follows:

- a) the following details of the contracting energy consumer:
  - aa) name,
  - ab) registered office,
  - ac) tax number, account number, and
  - ad) name of representative, address or registered office and contact information,
- b) the following details of the energy service provider:
  - ba) name,
  - bb) place of residence or registered office,
  - bc) tax number, account number, and
  - bd) name of representative, address or registered office and contact information,
- c) description and costs of the energy service that is the subject to the contract and the ancillary service to be provided for its implementation,
- d) obligation to carry out the services under point c),
- e) the guaranteed savings to be achieved by the implementation of the energy services specified in the contract,
- f) duration of the contract,
- g) obligations of the parties,
- h) terms and conditions for terminating the contract,
- i) legal consequences in the event of a breach of contract, with special regard to the legal consequences of non-fulfilment of the guaranteed savings commitment,
- j) a provision applicable to an event pertaining to the conditions of implementation of the contract influencing the guaranteed savings commitment,
- k) provisions concerning regular measurement of savings achieved by energy services, the reference dates for measurements as well as provisions concerning monitoring and tracking of savings,
- l) provisions for sharing the monetary value of savings achieved by the energy services between the parties,
- m) the results of prior energy audits.

General information on the conclusion of energy efficiency-based contract, the description of contents of the contracts is available on the Energy Efficiency website where a contract template can also be downloaded. Available at: <http://enhat.mekh.hu/index.php/esco-konstrukcio/>

### **3.2.5 Other horizontal measures to promote energy efficiency (Articles 19 and 20 EED)**

We have not identified any regulatory, public procurement or accounting reasons or factors preventing the improvement of energy efficiency.

Horizontal measures affecting every sector are described in detail in Chapter 3.1.1.

### 3.3 Energy efficiency of buildings

#### 3.3.1 Building renovation strategy (Article 4 EED)<sup>21</sup>

Hungary's energy policy is based on the National Energy Strategy 2030, adopted in 2011, which assigns a special role to building energy interventions in reducing energy consumption, given that 40 % of energy consumption is used for energy supply for buildings.

In compliance with our obligation related to improvement of energy efficiency, building energy objectives receive a great deal of emphasis, so the main directions aimed at reducing energy use of domestic building stock are recorded on the basis of a National Building Energy Strategy (hereinafter: NBES) prepared in 2014 and adopted by Government Decision No 1073/2015 of 25 February 2015.

In line with the statements of the National Energy Strategy 2030, the NBES has aimed at primary energy savings of 49 PJ/year by 2020 and 111 PJ/year by 2030.

NBES sets out measures for the renovation of existing building stock to achieve energy savings and to tighten and revise requirements for new buildings and building renovations, as well as to promote research, development, knowledge, training and awareness-raising for the purpose of energy efficiency. Decree No 7/2006 deserves particular attention for definition of relevant measures. This is because Decree No 7/2006 sets out the application of energy requirements concerning buildings subject to its scope, taking into account Directive 2010/31/EU of 19 May 2010 on the energy performance of buildings. In the case of renovation of buildings from subsidy sources (irrespective of subsidy resources after 31 December 2017) and in the event of erecting new buildings up to 31 December 2017, the **cost-optimised energy level** and after 31 December 2020 in the event of new construction, the requirement level of **near zero energy demand** must be met.

As part of background documents underlying NBES,<sup>22</sup> a technical and energy-related survey of the status of Hungarian residential and public buildings as at 2013 has taken place on the basis of which the typing of buildings was completed according to the energy characteristics of buildings. In relation to individual types, renovation variants were determined in order to comply with Hungarian energy requirements. For each building type, the investment cost requirement related to the achievement of relevant requirement levels and the energy savings thus achieved were assessed.

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<sup>21</sup> On the basis of a study titled 'Revision of National Building Energy and preparation of a strategic intervention proposal for building energy', Trenecon Kft. January 2017

<sup>22</sup> Energy situation analysis concerning Hungarian building stock based on a survey of 20,842 buildings by Építésügyi Minőségellenőrző Innovációs Nonprofit Kft.

László Formanek [2013]: Analysis of resource requirement of investments resulting in energy efficiency in residential buildings  
Regional Energy Research Centre [2013]: Modelling primary energy use of residential buildings and public buildings.

Dr Tamás Csoknyai [2013]: Building typology for energy modelling of Hungarian building stock  
Dr Zoltán Magyar [2013]: Building typology for energy modelling of Hungarian building stock

Within the scope of assessment of the development of building stock, the number of renovated and newly erected buildings is forecasted. To estimate in advance the natural development direction of the building stock, it is necessary to separate the financial and energy savings impact of the relevant policy measures in order to assess the energy efficiency improvement achieved without state intervention. Starting out from the so-called non-intervention case thus obtained, we will develop the necessary intervention versions necessary to meet the energy efficiency targets according to the available resources and their cost effectiveness.

This will allow the designation of a development proposal which allocates the available budget resources as efficiently as possible between residential and public institutions.

#### Prediction of the condition and use of the building stock

The basis of the building stock projections up to 2050 is represented by the building typology data of 2012 in NBES as well as the statistical data for the building stock for subsequent years as well as demographic indicators. The annual stock data have been determined from the relationship of the existing stock, the number of new constructions and buildings to be eliminated - after separation of uninhabited buildings in case of residential buildings. In the case of public buildings, no stock increase has been considered on the basis of statistical data.

Quantification of the change in the building stock is primarily necessary for the purpose of energy savings achieved through eliminated buildings replaced by new buildings corresponding to higher energy requirements. However, a significant part of the energy savings target comes from the renewal of the existing stock, so the substantial part of the calculation model is represented by predicting renovations on buildings.

The number of renovated dwellings was estimated in the specific years, taking into account the age of the dwelling and the income situation of the owner. In the event of renovation of public buildings, we have accounted for renovation of 3 % of their heated floor space annually, in accordance with the obligation under the Energy Efficiency Directive for buildings of the central government. We have assumed a 1.5 % renovation rate for non-governmental buildings owned by the municipality and belonging to the additional central budget.

#### Absence of intervention and the impact of policy measures.

A case without intervention describes the forecast of building stock without building energy renovation programmes (policy measures) for the investigation period (2013-2050).

The definition of energy savings of residential buildings and public buildings and their investment cost demands has been performed first by predicting the case including policy measures as well on the basis of building stock forecast. Then, this was corrected by the impacts of policy measures with building energy relevance in the Implementing Decree<sup>23</sup>.

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<sup>23</sup> Based on a 2017 study by TRENCON Tanácsadó és Tervező Kft. titled 'Statement of energy savings achieved as a result of policy measures - monitoring of measures under Article 7 of the Energy Efficiency Directive'

The following table shows the main energy savings that can be estimated as a result of prediction for the specific years.

Table 33 Cumulative energy savings for residential buildings (PJ)

	2020	2030	2050
Cumulative impact of cases without intervention and policy measures	<b>134.74</b>	<b>876.54</b>	<b>4,829.60</b>
Energy savings from renovation	130.43	839.45	4,627.34
Energy savings from new construction	4.30	37.09	202.26
Impact of policy measures	<b>17.74</b>	<b>133.30</b>	<b>659.21</b>
Green economy funding scheme	7.53	72.38	430.44
Family housing allowance	0.27	0.76	1.75
Housing savings	6.98	35.42	156.68
Concerning renovation	6.86	34.48	151.91
Concerning new construction	0.12	0.94	4.77
Operational programme	2.96	24.74	70.34
Case without intervention	<b>117.00</b>	<b>743.24</b>	<b>4,170.38</b>
Energy savings from renovation	113.08	707.85	3,974.65
Energy savings from new construction	3.91	35.38	195.74

Source: Trenecon Kft.

Table 34 Cumulative energy savings for public buildings (PJ)

	2020	2030	2050
Cumulative impact of cases without intervention and policy measures	<b>39.87</b>	<b>189.64</b>	<b>782.55</b>
Impact of policy measures	<b>16.72</b>	<b>69.23</b>	<b>157.55</b>
Primarily energy efficiency programmes implemented using operational programmes (KEOP, ROP, KMOP,	9.77	37.76	83.95

	<b>2020</b>	<b>2030</b>	<b>2050</b>
3 Primarily non-energy efficiency programmes implemented using operational programmes (TOP, VEKOP, EFOP, IKOP, KEHOP, VP)	0.00	0.00	0.00
5 Energy rationalisation tender at the Ministry of the Interior	0.14	0.53	1.18
Swiss-Hungarian Cooperation Programme	0.08	0.22	0.41
Norwegian Financing Mechanism and EEA Financing Mechanism	0.00	0.01	0.01
Energy efficiency investments of budgetary institutions [Government Decree No 232/2015 of 20 August 2015]	0.09	0.45	1.08
Energy efficiency regulations for buildings	0.21	1.05	2.52
Investments improving energy efficiency on the basis of budget subsidy granted by special decision	1.12	3.92	8.40
Within the scope of the Modern Cities Programme, measures to improve energy efficiency with budget support	2.00	10.00	24.00
Results of the operation of the National Energy Network	3.30	15.30	36.00
Case without intervention	<b>23.16</b>	<b>120.40</b>	<b>625.00</b>

*Source: Trenecon Kft.*

#### Ranking renovations according to efficiency

Intervention priorities have been selected on the basis of the ranking according to efficiency (i.e. expenditure needed for the achievement of unit energy savings) of energy savings interventions to be performed on individual building types. When setting up the ranking, we took into account the renovation demand according to the cost-optimal requirement level.

Table 35 Efficiency rankings of residential building types

<b>Building type</b>	<b>Building type properties</b>	<b>Heated floor space [m2]</b>	<b>Number of dwellings/buildings [pc]</b>	<b>Per-unit renovation cost [HUF billion/PJ]</b>	<b>Efficiency ranking</b>
<b>residential 4</b>	family house, 1945-1979 (brick, stone, adobe)	140	672,128	31.2	1
<b>residential 5</b>	condominium with 10 or more dwellings - 1944 (brick, stone, manual masonry element)	103	378,942	35.1	2
<b>residential 11</b>	family house, 1990-2001 (brick, stone, manual masonry element)	838	268,386	37.4	3
<b>residential 12</b>	condominium with 10 or more dwellings, 1980-1989 (prefabricated)	987	152,567	38.7	4
<b>residential 8</b>	condominium with 4-9 dwellings -2001 (brick, stone, manual masonry element)	341	258,261	40.6	5
<b>residential 3</b>	family house, 1980-1989 (brick, stone, manual masonry element)	59	449,213	41.7	6
<b>residential 13</b>	condominium with 10 or more dwellings (medium or large blocks, cast concrete)	2,390	324,617	42.7	7
<b>residential 1</b>	family house, -1944 (brick, stone, adobe )	56	400,537	44.9	8
<b>residential 14</b>	condominium with 10 or more dwellings, -1979 (prefabricated)	1,876	225,830	46.9	9
<b>residential 10</b>	condominium with 10 or more dwellings - 1945-2001 (brick, stone, manual masonry element)	1,328	250,871	49.5	10
<b>residential 2</b>	family house, -1944 (brick, stone, adobe )	102	269,508	54.6	11
<b>residential 6</b>	family house, 1945-1979 (brick, stone, adobe)	110	198,938	71.8	12
<b>residential 7</b>	condominium with 4-9 dwellings, after 2001 (brick, stone, manual masonry element)	132	157,885	114.7	13

<b>Building type</b>	<b>Building type properties</b>	<b>Heated floor space [m2]</b>	<b>Number of dwellings/buildings [pc]</b>	<b>Per-unit renovation cost [HUF billion/PJ]</b>	<b>Efficiency ranking</b>
<b>residential 9</b>	family or row house (1-3 dwellings), after 2001 (brick, stone, manual masonry element)	373	32,241	260.3	14
<b>residential 15</b>	condominium with 10 or more dwellings - after 2001 (brick, other)	1,702	115,757	290.1	15

*Efficiency ranking based on the renovation requirements of certain building types according to cost optimum requirement level - residential buildings<sup>24</sup>*

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<sup>24</sup> Source Trenecon Kft.



Table 36 Efficiency ranking for public buildings

<b>Building type</b>	<b>Building type properties</b>	<b>Heated floor space [m2]</b>	<b>Number of buildings [pc]</b>	<b>Per-unit renovation cost [billion HUF/PJ]</b>	<b>Efficiency ranking</b>
<b>public 3</b>	Health care institution, 1901-1945	6,600	946	35.87	1
<b>public 4</b>	Health care institution, 1901-1945	2,400	946	35.87	1
<b>public 17</b>	Office building, 1980-1989	5,400	284	48.37	3
<b>public 18</b>	Office building, 1980-1989	6,000	284	48.37	4
<b>public 23</b>	Commercial, 1980-	21,600	229	53.12	5
<b>public 24</b>	Commercial, 1980-	43,200	229	53.12	6
<b>public 15</b>	Office building, 1946-1979	3,600	1,363	54.80	7
<b>public 16</b>	Office building, 1946-1979	19,500	1,363	54.80	8
<b>public 19</b>	Office building, 1990-	6,375	377	55.71	9
<b>public 20</b>	Office building, 1990-	10,500	377	55.71	9
<b>public 11</b>	Office building, -1900	2,025	369	60.11	11
<b>public 12</b>	Office building, -1900	1,000	369	60.11	12
<b>public 5</b>	Health care institution, 1946-1979	7,200	1,982	64.64	13

<b>Building type</b>	<b>Building type properties</b>	<b>Heated floor space [m2]</b>	<b>Number of buildings [pc]</b>	<b>Per-unit renovation cost [billion HUF/PJ]</b>	<b>Efficiency ranking</b>
<b>public 6</b>	Health care institution, 1946-1979	572	1,982	64.64	14
<b>public 21</b>	Commercial, 1979-	2,400	927	69.56	15
<b>public 22</b>	Commercial, 1979-	7,200	927	69.56	16
<b>public 33</b>	Education, -1900	2,100	701	72.81	17
<b>public 34</b>	Education, -1900	1,776	701	72.81	17
<b>public 39</b>	Education, 1980-1989	3,600	905	74.33	19
<b>public 40</b>	Education, 1980-1989	2,256	905	74.33	19
<b>public 13</b>	Office building, 1901-1945	2,700	895	77.77	21
<b>public 14</b>	Office building, 1901-1945	2,400	895	77.77	22
<b>public 35</b>	Education, 1901-1945	2,100	1,582	81.49	23
<b>public 36</b>	Education, 1901-1945	1,776	1,582	81.49	24
<b>public 41</b>	Education, 1990-	3,600	787	81.92	25
<b>public 42</b>	Education, 1990-	2,256	787	81.92	25
<b>public 1</b>	Health care institution, -1900	4,500	365	84.00	27

<b>Building type</b>	<b>Building type properties</b>	<b>Heated floor space [m2]</b>	<b>Number of buildings [pc]</b>	<b>Per-unit renovation cost [billion HUF/PJ]</b>	<b>Efficiency ranking</b>
<b>public 2</b>	Health care institution, -1900	1,800	365	84.00	28
<b>public 9</b>	Health care institution, 1990-	12,000	684	94.51	30
<b>public 10</b>	Health care institution, 1990-	3,000	684	94.51	29
<b>public 37</b>	Education, 1946-1979	2,100	3,301	99.35	31
<b>public 38</b>	Education, 1946-1979	5,440	3,301	99.35	31
<b>public 29</b>	Cultural, 1980-1989	10,350	167	116.43	33
<b>public 30</b>	Cultural, 1980-1989	2,900	167	116.43	34
<b>public 27</b>	Cultural, 1946-1979	1,440	1,207	124.22	35
<b>public 28</b>	Cultural, 1946-1979	3,000	1,207	124.22	35
<b>public 31</b>	Cultural, 1990-	24,150	234	127.65	37
<b>public 32</b>	Cultural, 1990-	3,450	234	127.65	38
<b>public 7</b>	Health care institution, 1980-1989	15,000	580	155.85	39
<b>public 8</b>	Health care institution, 1980-1989	2,700	580	155.85	39
<b>public 25</b>	Cultural, 1945-	9,000	1,057	255.88	41

Building type	Building type properties	Heated floor space [m2]	Number of buildings [pc]	Per-unit renovation cost [billion HUF/PJ]	Efficiency ranking
public 26	Cultural, 1945-	6,000	1,057	255.88	41

*Efficiency ranking based on the renovation requirements of certain building types according to cost optimum requirement level - public buildings*

The ranking according to per-unit renovation demand (billion HUF/PJ) primarily assigns a higher ranking to older types even for residential and public buildings, in which case the need for renovation is more significant, but the achievable savings are also high.

In the per-unit cost underlying the efficiency ranking, there is a relatively large spread for individual building types. However, efficiency-based differentiation can be applied well in the long run if the most important goal is to achieve the highest energy savings at a given cost level.

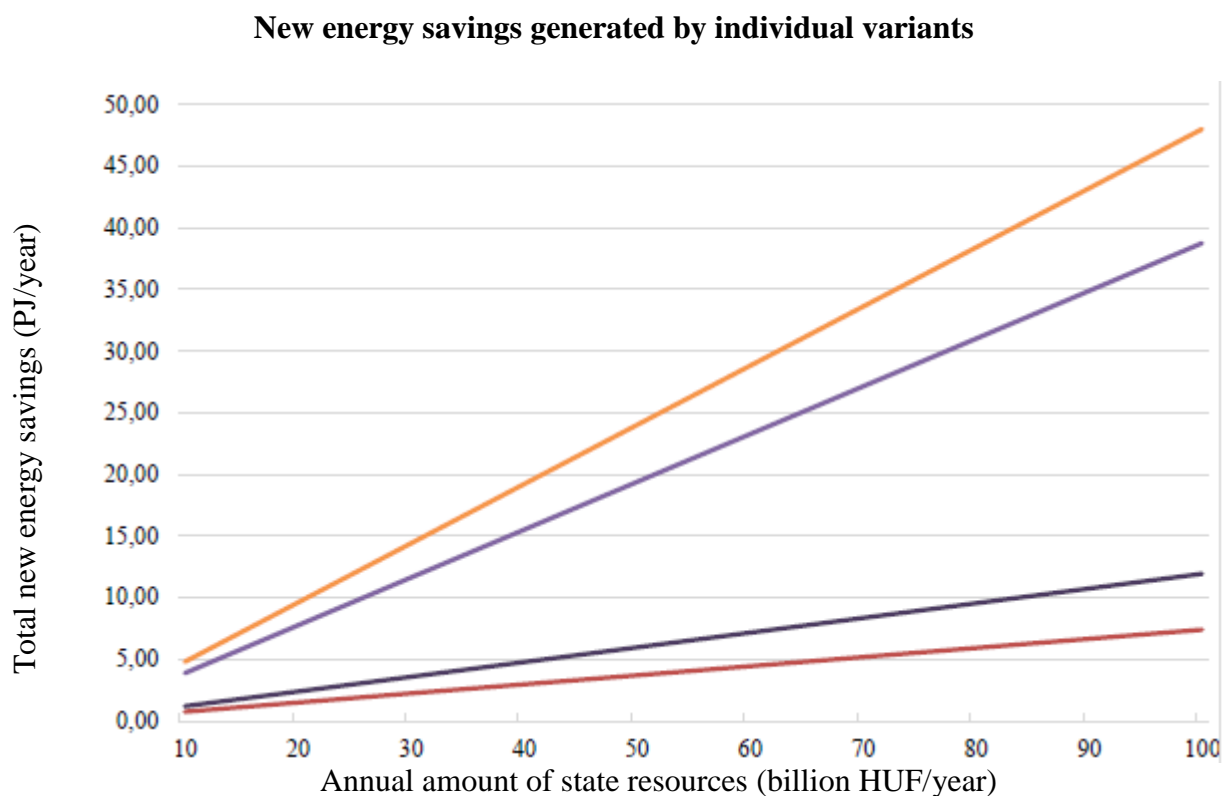
#### Analysis of long-term building renovation versions

We have created the following building renovation variants separately for residential and public buildings:

- **Version 1:** In this version, all building types are taken into account **without differentiation** concerning efficiency, but it is weighted between individual types according to renovation demand, with even distribution of resources. Based on the per-unit renovation demand, the average efficiency for residential buildings is HUF 80 billion/PJ and for public buildings, it is HUF 89.9 billion/PJ.
- **Version 2:** Specific types of buildings have been differentiated according to efficiency; resources are only distributed among the most efficient building types and also weighted according to renovation demand. For residential buildings, the scope of intervention was narrowed down to the 5 most efficient, and for public buildings, it was narrowed down to the 20 most efficient building types. Based on the per-unit renovation demand, the average efficiency is lower in Version 1: for residential buildings, it is HUF 36.6 billion/PJ and for public buildings, it is HUF 58.9 billion/PJ.

Individual versions were depicted as functions depending on how much is the expected available state resource in the 7-year period under review considered in NBES (20182024). During calculations, 30 % aid intensity was assumed for residential and 100 % for public buildings.

Figure 3 New energy savings generated by individual variants depending on the available resource

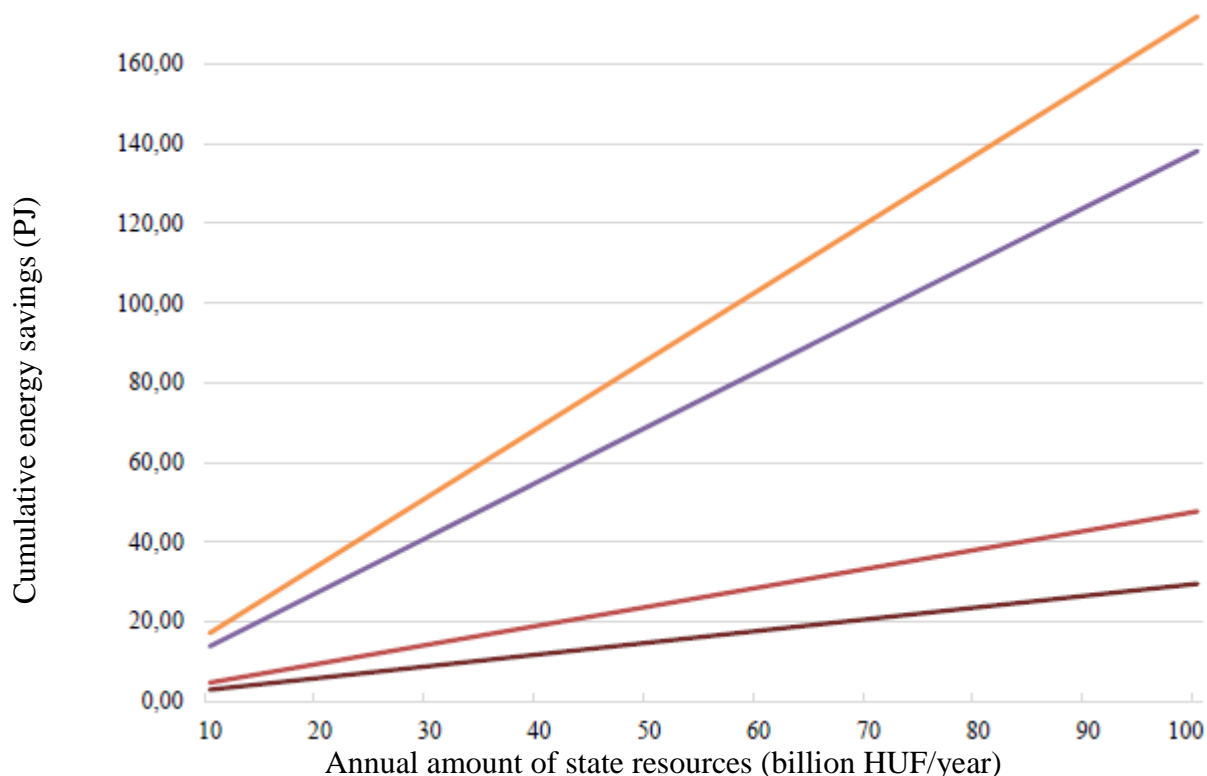


	10	30	50	100
----- residential building - version 1	3.88	11.63	19.39	38.78
----- residential building - version 2	4.80	14.41	24.01	48.02
----- public building - version 1	0.74	2.22	3.70	7.39
----- public building - version 2	1.19	3.58	5.96	11.93

Source: Trenecon Kft.

Figure 4 Cumulative energy savings generated by individual variants depending on the available resource

**Cumulative energy savings generated by individual variants**



	10	30	50	100
----- residential building - version 1	13.82	41.47	69.12	138.23
----- residential building - version 2	17.20	51.60	86.00	171.99
----- public building - version 1	2.96	8.87	14.78	29.56
----- public building - version 2	4.77	14.31	23.85	47.70

Source: Trenecon Kft.

Based on the results, it can be seen that version 2 of the residential buildings (i.e. differentiation according to efficiency) is the most favourable version, partly due to the higher specific efficiency and the 70 % own funds by the public that can be included along with state participation.

With regard to the lowest resource allowance (HUF 10 billion/year), differentiation according to efficiency will result in surplus energy savings for both residential and public buildings. For version 2 of public buildings, a savings surplus of more than 60 % is obtained despite the considerably more relaxed differentiation conditions. In residential buildings, this ratio is around 25 %, and at the same time, the order of magnitude of achievable savings is significantly higher when compared to public buildings. By increasing the available resource allowance, ever-increasing surplus energy savings can be achieved in both cases by differentiating building types.

Therefore, when designating intervention priorities, it is advisable to differentiate building types according to their efficiency; but at the same time, it must be borne in mind that in case of differentiation, higher administrative costs are associated with the resource demand for interventions. However, in the case of a higher available resource allowance, it is definitely advisable to differentiate building types according to their efficiency.

### Effects of the proposed development programme

In the study, social impacts have also been estimated. The impact assessment was prepared for version 1 based on efficiency differentiation of buildings in both residential and public buildings. The impacts were calculated for a non-intervention case corrected by the impact of the policy measures, on a differential basis. Calculations were performed for one out of the four sources of funding under consideration (assuming annual public support of HUF 10 billion),<sup>25</sup> because impacts are expected to change linearly in the event of changing source allowances.

Table 37 Social impacts for version 1 for both residential and public buildings

<b>Summary of impacts</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
<b>Tax impacts</b>	4,756	4,847	4,939	5,030	5,122	5,213	5,305
<b>Foreign trade balance impact</b>	-6,678	-3,756	-834	2,088	5,010	7,932	10,854
<b>Climate impact</b>	52,575	105 639	159 191	213 231	266 539	319 847	373 155
<b>Total</b>	<b>50,654</b>	<b>106</b> <b>731</b>	<b>163</b> <b>296</b>	<b>220</b> <b>350</b>	<b>276</b> <b>671</b>	<b>332</b> <b>993</b>	<b>389</b> <b>314</b>

*Summary of impacts of the proposed intervention priority (million HUF)*

*Source: Trenecon Kft.*

### **3.4 Energy efficiency in public bodies**

The public building inspection by the National Building Energy Strategy has classified public buildings into subtypes according to their intended use (conditions of use), year of construction, typical building structures and the prevalence of building engineering systems.

<sup>25</sup> There is currently no such source of funding in the budget for 2017 or 2018

Table 38 Typical types of public buildings

Serial number	Type	Building date	Subtypes	
1	Health and social care buildings	before 1900	1st building	3-level building with a U-shaped floor plan and basement (hospital), subsequent exterior thermal insulation of facade wall is forbidden
			2nd building	2-level building with a regular floor plan and basement (social care building), subsequent exterior thermal insulation of facade wall is possible
		1901-1945	1st building	3-level building with an L-shaped floor plan and basement, subsequent exterior thermal insulation of facade wall is forbidden
			2nd building	2 level building with a regular floor plan and basement (care home), subsequent exterior thermal insulation of facade wall is possible
		1946-1979	1st building	4-level U-shaped hospital building with basement, traditional structures (hospital)
			2nd building	1-level doctor's surgery building without basement (CLASP light-structured doctor's surgery)
		1980-1989	1st building	9-level building with a regular floor plan and basement (hospital building)
			2nd building	3-level building with a regular floor plan without basement (care home, doctor's surgery)
		after 1990	1st building	8-level building with a regular floor plan and basement (hospital building)
			2nd building	3-level building with a regular floor plan without basement (care home, doctor's surgery)
2	Office buildings	before 1900	1st building	3-level building with a regular floor plan and basement
			2nd building	2-level building with an L-shaped floor plan and basement
		1901-1945	1st building	3-level building with a regular floor plan and basement
			2nd building	2-level building with an L-shaped floor plan and basement
		1946-1979	1st building	3-level U-shaped building without basement, traditional structures
			2nd building	10-level building without a basement and with a curtain wall
		1980-1989	1st building	6-level building with a regular floor plan without basement
			2nd building	6-level building with a U-shaped floor plan and an underground garage
		after 1990	1st building	5-level building with a regular floor plan without basement
			2nd building	7-level building with a U-shaped floor plan, curtain walls and an underground garage

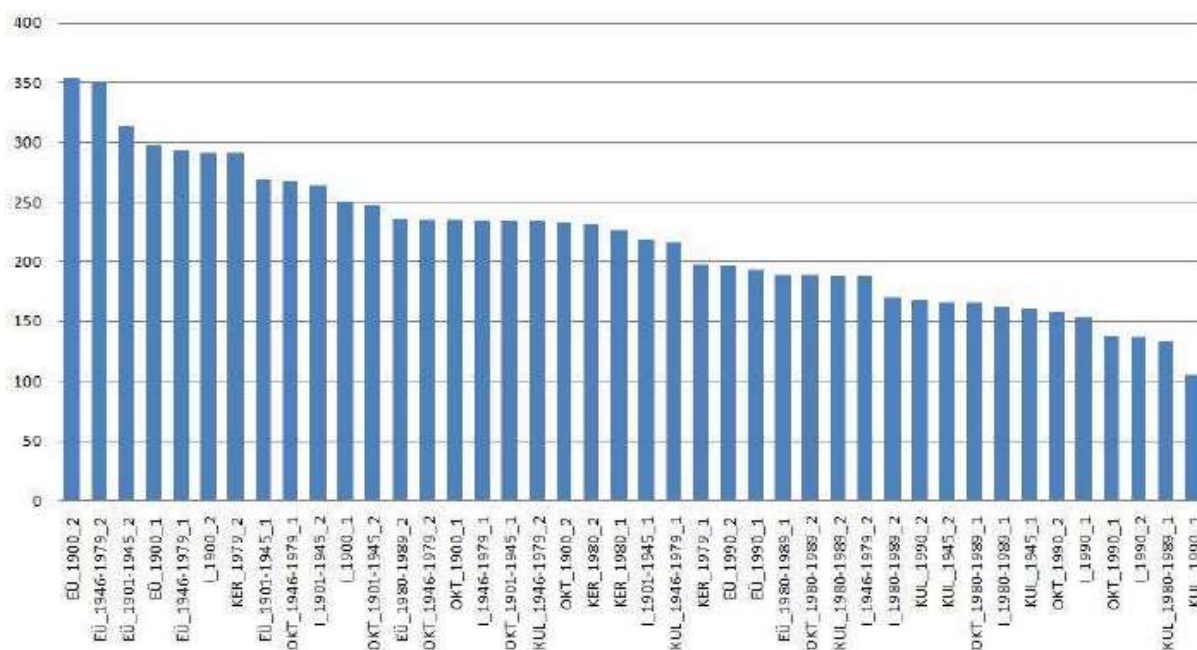
Serial number	Type	Building date	Subtypes	
3	Commercial buildings	before 1980	1st building	2-level building with a regular floor plan without basement (warehouse)
			2nd building	3-level building with nearly regular floor plan, 1 inner courtyard without basement (department store)
		after 1980	1st building	1-to-2-level building with a regular floor plan without basement with light boundary structures (shopping centre)
			2nd building	1-to-4 level building with a regular floor plan and 1 inner courtyard without basement, traditional and prefabricated structures (major store)
4	Cultural buildings	before 1945	1st building	2-level building with a regular floor plan, 2 inner courtyards with basement (museum)
			2nd building	1-to-2-level building with nearly regular floor plan with basement (theatre)
		1946-1979	1st building	1-level building with a regular floor plan without basement with light boundary structures (community centre)
			2nd building	2-level U-shaped building with basement, traditional structures (library)
		1980-1989	1st building	3-level building with a regular floor plan and 2 inner courtyards without basement (cultural centre and library)
			2nd building	Ground floor building with a regular floor plan and 1 inner courtyard without basement (cultural centre)
		after 1990	1st building	7-level building with a regular floor plan and 2 inner courtyards without basement (cultural centre and library)
			2nd building	Ground floor building with a regular floor plan and 2 inner courtyards without basement (cultural centre)
5	Educational building	before 1900	1st building	3-level school building with a regular floor plan
			2nd building	2 level school building with a U-shaped floor plan
		1901-1945	1st building	3-level school building with a regular floor plan
			2nd building	2 level school building with a U-shaped floor plan
		1946-1979	1st building	Socialist realist school from the 1950s
			2nd building	Panel frame school building from the 1970s
		1980-1989	1st building	3-level building with a regular floor plan
			2nd building	2-level building with a U-shaped floor plan
		after 1990	1st building	3-level building with a regular floor plan
			2nd building	2-level building with a U-shaped floor plan

Source: Dr Zoltán Magyar, Training of National Energy Specialists, training material, 10 April 2017



Figure 5 Specific energy consumption of various types of domestic public buildings

### Total primary energy consumption by type of building ( $E_p$ , kWh/m<sup>2</sup>a)



Source: Dr Zoltán Magyar, *Training of National Energy Specialists, training material, 10 April 2017*

Specific energy consumption can serve as a basis for the order of renovation for public building types. Based on the energy demand of use, modernisation of health care institutions is a priority. Renovation of educational buildings is economical, especially for buildings built between 1946 and 1979, and renovation of office and commercial buildings erected in this same period is also economical.

#### 3.4.1 Central government buildings (Article 5 EED)

Section 1 of Energy Efficiency Act defines the concept of central government:

*'24. central government: the nationally competent organisational units of the ministry and the government office, the nationally competent departments of the central office - except for Budapest and county government offices, the nationally competent organisational units of the Directorate General for Public Procurement and Supply as well as the Military National Security Service, the nationally competent law enforcement agencies and defence organisation; moreover if there is no nationally competent organisational unit with regard to the given competence, those organisational units or organisations whose competence extends collectively to the territory of the country;'*

Based on the relevant definition and the available data, a list of central governmental buildings was prepared, which was approved as Annex B to Action Plan III.

**Only the buildings of those organisations have been added to the list that:**

- comply with the concept of statutory central government and carry out their tasks nationwide,
- are state-owned buildings,
- are intended as office buildings,
- are not protected monuments and are not under local (municipal) protection.

Those buildings have been deleted from the registry which comply with prevailing energy requirements or which have been refurbished and, as a result, comply with prevailing building energy requirements or their energy quality is even better. The list can be downloaded from the website of the State Secretariat of the Ministry for National Development for Development and Climate Policy and Special Public Services:

<http://www.kormany.hu/download/1/25/80000/IIINemzeti%20Energiahatékonyasági%20Cselekvési%20Terv%20HU.PDF>

Section 8 of the Energy Efficiency Act stipulates the renovation obligations for buildings with a useful floor area of more than 250 m<sup>2</sup> from 9 July 2015 out of central governmental buildings.

Renovations of central government buildings will be implemented with a 100 % subsidy under the Environmental and Energy Efficiency Operational Programme. Buildings to be renovated are included in Government Decree No 1084/2016 of 29 February 2016 on the establishment of the annual development allowance of the Environmental and Energy Efficiency Operational Programme.

The obligation under Article 5 of the Energy Efficiency Directive will have to be determined taking into account all the useful floor space of the relevant central government buildings. Only the total useful floor space of buildings not meeting the building energy requirement currently in force and included in the central government building register must be taken into account. The annual renewal obligation is 3 %, which means building renovations of nearly 14,500-15,000 m<sup>2</sup> of floor area per year. Renovations are done on an ongoing basis.

### **3.4.2 Buildings of other public institutions**

(Article 5(7) EED)

Rational reduction of energy consumption and improvement of energy efficiency is an important objective of Parliamentary Resolution No 77/2011 of 14 October 2011 on the National Energy Strategy. In order to meet the domestic energy efficiency targets and to meet the 1.5 % energy reduction requirement per year set out in the Energy Efficiency Directive, it is essential to improve the energy efficiency of public institutions and to make conscious economical use of buildings a general practice.

There is a significant energy saving potential in improving the energy efficiency of public building stock of about 10-12 thousand buildings in Hungary. Improving energy efficiency and cost-effective use of buildings together can significantly reduce operating costs and thus reduce the budgetary amounts utilised for this purpose.

From 1 January 2017, Section 11/A of the Energy Efficiency Act requires the head of an organisation in charge of operation and maintenance of a building involved in public services owned and used by public institution to prepare an energy savings action plan according to a relevant template every five years. For the first time, it has to be sent to the competent regional office of the National Energy Network by 31 March 2017.

Meeting the energy savings action plan must be reported on an annual basis and such reports must be sent by 31 March of the subsequent year to the regionally competent office of the National Energy Network.

The energy saving plan is a first step in improving the energy efficiency of public institutions by starting from the assessment of the current situation, exploring energy loss resources, and proposing energy efficiency improvement measures and investments that meet the technical specifications of the building.

The purpose of preparing the energy savings plan is to explore the energy savings opportunities that can be achieved in harmony with the operation of the given buildings as well as awareness raising of building users.

It is important that the plan propose concrete measures in the short, medium, and long terms. Implementation is helped if realistic and preferably feasible targets are set and implementation is also planned in a foreseeable way (for example, the required resource is calculated in advance or scheduled in time). Results achieved can be controlled by regular reading and registration of consumption data.

The proposed measures in the plan not requiring any costs typically related to building use or building operation are primarily operational measures and major investments are primarily owner-related measures. On this basis, we believe that the implementation of the action plan requires cooperation between the owner and the operator. Task-sharing between them also depends on the assignment/contract concluded for performance of the operating task. For this reason, it is necessary for the operator and the owner to reconcile their ideas when making the plan.

In the energy saving action plan - as signified by its name - it is advisable to first indicate proposed measures that can be implemented within any cost or at a low cost level. Of course, it is worth considering and preparing for a larger investment and therefore for interventions and construction works requiring more resources, as well.

The annual report on implementation is intended to enable the organisation responsible for operation to implement energy efficiency measures in a planned, scheduled manner and is suitable for monitoring progress.

The concept of public institution is defined in Section 1(23) of the Energy Efficiency Act, according to which:

*'23. public institution: a contracting entity specified in the Act on public procurement'*.

The obligation to prepare the required energy savings action plan is stipulated in Section 11/A of the Energy Efficiency Act for 'the head of an organisation in charge of operation and maintenance of a building involved in public services owned and used by public institutions'.

The concept of public service is defined in Section 3/A of Act CXCV of 2011 on the public budget.

Obligation is only prescribed by law for those institutions where both conditions are fulfilled simultaneously. The law clearly imposes an obligation to prepare an energy efficiency plan on the 'head of the organisation responsible for the operation and maintenance of the building'. The obligation also exists if the owner and the public institution in the user's role are not the same but both are public institutions.

A sample of the energy savings plan can be downloaded from the energy efficiency website operated by HEPURA. Available at:

<http://enhat.mekh.hu/index.php/2017/01/24/energiamegtakaritasi-intezkedesi-tervet-kell-kesziteniuk-a-kozintezmenyeknek/>

The energy efficiency website also offers useful energy efficiency and energy saving tips and suggestions.

Encouraging building users to utilise the buildings in an energy-efficient manner as well as collection, recording and monitoring consumption data are related to energy saving measures. Based on a methodology published on the energy efficiency information website, energy efficiency awareness-raising of users of the building should be ensured and this should be included in the annual report. The staff of the National Energy Network will provide assistance not only in the preparation of energy efficiency plans, but also in the development of awareness-raising programmes.

The Energy Efficiency Act does not specify whether the action plan is to be prepared per building or institution, but it is advisable to prepare the energy efficiency plan per building. If the public institution carries out its activities in multiple buildings and the individual buildings are under joint operation, it is possible to include the relevant measures in a common energy saving plan, but should be differentiated per building, especially concerning technical measures.

If multiple public institutions carrying out public service functions are operating in a common building and the building sections used by individual institutions have different operators, it is advisable to prepare separate energy savings plans. In the event that there are separate consumption meters (energy consumption is separate and the bills are also paid separately), it is especially justified to prepare the plan separately.

If they are subject to common maintenance or the operator is the same, moreover, if energy consumption in the building cannot be accurately and separately determined, there is no point in making a separate energy savings plan. However, it is possible that awareness-raising for users of the building according to Section 11/A(d) of the Energy Efficiency Act is arranged separately.

The Energy Efficiency Act as well as Section 7/F of the Implementing Decree require regular reporting of energy consumption data on a monthly basis, on the 5th day following the month under review, via an on-line interface.

Collection and registration of consumption data enables the building operator to create relevant reference values (e.g. energy consumption/m or energy consumption/person) and to compare consumption values of the building in similar periods. For example, differences in consumptions during the same period may indicate a technical defect (pipe breakage, filter clogging, etc.) It is also suitable to assess the effectiveness of the measures taken.

For public institutions 10-20 % energy savings can be achieved through minor investments, awareness-raising, and conscious attention. It is therefore necessary to evaluate the impact of the measure within a few years.

### **3.4.3 Purchasing by public bodies (Article 6 EED)**

Sections 10 and 11 of the Energy Efficiency Act regulate the energy efficiency procurement of public institutions.

When ministries, government agencies, central offices, the Directorate General for Procurement and Supply, the Military National Security Service, the law enforcement agencies, and defence organisations with national competence procure products or services or conclude contracts for modernisation or conclusion of buildings and the contract value is equal to or greater than the EU thresholds specified in Act CXLIII of 2015, only high energy efficacy products, services and buildings can be procured by the contracting entities. The relevant obligation should be enforced if this is compatible with cost effectiveness, economic viability, sustainability, technical suitability and the proper implementation of competition.

The provision only applies to military national security bodies and law enforcement bodies of national competence as well as defence organisations if it does not conflict with the purpose of the core activity of these organisations.

The organisation obligated to conduct the energy efficient procurement will provide to HEPURA, by 31 January each year, all documentation prepared in relation to their energy efficient procurements implemented in the year prior to the year under review.

### **3.5 Other end user energy efficiency measures included in industry and transport**

Energy efficiency tender programmes, loan programmes, and grants are available through the Economic Development and Innovation Operational Programme (GINOP). In the OP, the energy efficiency priority tenders are included in Government Decision No 1006/2016 of 18 January 2016 on the specification of the GINOP annual development allowance.

Improving energy efficiency of businesses is the goal of

- mandatory audit required for large corporations (see chapter 3.2 for details);
- the obligation to employ energy specialists required from 2017 for major energy consuming companies (see chapter 3.1.1.14 for details);
- providing free advice by the National Energy Network (see chapter 3.1.1.15 for details),
- introduction of a corporate tax relief available for energy efficiency investments (see chapter 3.1.1.17 for details).

The energy efficiency measures implemented in transport are set out in chapter 3.1.1.16 in detail.

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

The objective of the District Heat Development Plan (hereinafter: DHDP) about to be accepted on the basis of Parliamentary Decision No 77/2011 of 14 October 2011 is to ensure the competitiveness of the district heating service, to improve its efficiency, and to involve renewable energy sources.

In Hungary, the heating of 648,712 household and domestic hot water (hereinafter: DHW) supply for 599,980 dwelling is performed through district heating systems in 2015. The specific air pollution values and centralised, high altitude emission conditions of heat production in thermal power plants and heat plants under controlled conditions are much more favourable from an environmental health perspective than in the case of densely populated areas, the uncontrolled, untreated and decentralised exhaust gas emission from individual and central heating systems. Therefore, development of the district heating service is not only of importance to climate protection and energy security but also from a health care perspective. The DHDP evaluates the current situation of the district heat sector and designates development directions along the situation assessment.

The development directions of the DHDP on the basis of the present working document submitted for approval:

- Increasing the use of renewable energy sources in the district heating sector (in particular biomass and geothermal energy);

- Examination of the possibility of increased use of non-recyclable waste as a heat source in district heating;
- Increasing the energy efficiency of district heating systems;
- From the aspect of energy efficiency, district heating systems should be divided into three parts: the efficiency of the district heat producing, district heat supply and district heat using system. The relevant goal is to increase the energy efficiency of the entire district heating system.
- Expansion of the district heating market, building new district heating systems;
- Increasing social acceptance of district heating;
- Transforming the regulatory and support system of the district heating sector to ensure long-term sustainable operation;
- For newly built facilities, utilisation of industrial waste heat.

Article 14(1) of Directive 2012/27/EU on energy efficiency (hereinafter: EED) requires Member States to carry out an overall assessment of the feasibility potential of high-efficiency cogeneration and efficient district heating/cooling for their territories. Hungary has complied with this obligation by preparing a report containing the information provided in Annex VIII of the EED<sup>2626</sup>.

According to Article 14(3) EED, Member States shall carry out a cost-benefit analysis covering their territories for the purposes of assessment referred to in paragraph (1) with a view to providing a decision-making basis for the quality definition of limited resource sequential orders at a social level, promoting the identification of most cost-effective solutions corresponding to heating and cooling requirements and thus their implementation. This document presents the results of this cost-benefit analysis. The cost-benefit analysis was performed in accordance with Annex IV Part 1 of the EED.

During the analysis, developments aimed at efficient district heating/cooling implementation have been identified and assessed.

The analysis covers municipalities included in the district heating service and more specifically, the district heat purchased by residential/business users. On the basis of the rather high penetration in a European context and the existing experiences, the possibilities of expanding the district heating service are limited, thus the analysis focuses on improving the efficiency of existing systems.

The analysis relies on the following:

- data and findings of the energy efficiency potential estimate prepared in accordance with Article 14(1) EED;
- questionnaire survey performed among affected district heat suppliers, district heat producers and companies subject to the emission trading scheme (EGS);
- data and estimates from industry experts.

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<sup>26</sup> Reports prepared by the Member States are available at the following link: <https://ec.europa.eu/energy/en/topics/energy-efficiency/cogeneration-heat-and-power>



In the course of the analysis

- the district heating system categories and their characteristics created on the basis of currently operating, hydraulically independent district heat systems served as a reference basis;
- the identification of heat generation methods enabling fulfilment of the criteria of effective district heating/cooling and elaboration of development alternatives have taken place.

The highlighted data of categories created are shown in Table 39.

Category symbol	Primary peak heat demand from (MW)	Tech. (natural gas firing)	Quantity	Category average	
				Peak heat power	Heat demand
	(MW)			(MW)	(GJ/a)
1	0 - 0.8	furnace	44		
2A	0.8 - 10	only furnace	47	2.8	26,480
2B		cogeneration and furnace	36	4.57	42,563
3A	10 - 50	only furnace	3	23.7	240,945
3B		cogeneration and furnace	24	24.1	228,083
4B	50 - 100	cogeneration and furnace	5	82.77	794,701
5B	100 - 400	cogeneration and furnace	5	197.6	1,879,055
	Can already be operated efficiently		30		

Table 39 Main data of categories created

No 40 presents the development alternatives examined for each category. Heat-driven cooling was excluded in the early stage of the analysis because of its negligible economic potential. Moreover, it should be pointed out that the energy utilisation of waste is reflected in the complex waste management system and therefore the results of exclusive district heating implementation cannot be directly compared to the calculation results of the other alternatives.

The cost-benefit analysis was performed for the balance of surplus revenue and surplus costs compared to the reference basis achievable by sensible developments in the district heating categories created after typing. Thus, the discounted net present values were defined for the balance of the surplus expenditures arising as a result of new investment and the unrealised expenditures of production units replaced by the investment (differential cash flow).



Category symbol	Development alternatives					
	Biomass cogenerate	Biomass furnace	Geothermal energy	Waste heat	Energy from waste	Cogenerated gas
1	-	-	-	-	-	-
2A	-	✓	✓	✓	-	✓
2B	-	✓	✓	✓	-	-
3A	✓	✓	✓	✓	✓	✓
3B	-	✓	✓	✓	✓	-
4B	✓	✓	✓	-	✓	-
5B	✓	✓	✓	-	✓	-

Table 40 The categories examined and the identified development alternatives

The detailed cost-benefit analysis will be sent to the Commission in a separate document from the National Energy Efficiency Action Plan.

### **3.6.1 Compliance with Articles 14 and 15 of the Energy Efficiency Directive**

As regards Article 14 of the Directive, the Decree requires that compliance with paragraphs (1)-(4) and the last sentence of point I of Annex IX of the Directive be presented. As regards Article 15 of the Directive, it requires that compliance with paragraphs (2) and (4) and point 3 of Annex XI of the Directive be presented. The aforementioned provisions of Article 14 of the Directive are implemented in domestic legislation by the Energy Efficiency Act, the Implementing Decree, the District Heating Implementing Decree, Government Decree No 31/2014 of 12 February 2014 on the rules of official building proceedings concerning certain special industrial buildings, as well as Government Decree No 382/2007 of 23 December 2007 on electricity-related official building proceedings. As regards Article 15, the following legislation ensures compliance:

- The Electricity Act, the Electricity Implementing Decree, the Gas Act, the Energy Efficiency Act
- HEPURA Decree No 7/2016 of 13 October 2016 on the framework rules of determining electricity system use fees, connection fees and special charges.
- HEPURA Decree No 10/2016 of 14 October 2016 on the rules of implementation of electricity system use fees, connection fees and special charges.
- Decree No 4/2011 of 31 January 2011 of the Minister for National Development on the pricing of universal electricity service
- HEPURA Decree No 15/2016 of 20 December 2016 on the amount of electricity system use fees, connection fees and special charges.

### 3.6.2 Energy transformation, transmission, distribution, and demand response

(Article 15, Annex XI point 3, and Annex XIV part 2 point 3.6 of the Energy Efficiency Directive) *Source: Hungarian Energy and Public Utility Regulatory Authority (HEPURA)*

System use fees should reflect the cost-savings in networks achieved by influencing consumption, demand-side response measures, and distributed generation and other energy efficiency measures, including savings from lowering the cost of network investment and a more optimal operation of the network. For higher-level integration of renewable systems, it is of the utmost importance to ensure long-term sustainable system stability.

Some of the conditions specified in Annex XI point 1 have already been satisfied by the price control practice so far since - due to the cost reviews preceding the 4-year price control cycles - in the event of reduction of the network operating costs, the recognised costs of the relevant licensee (DSO<sup>27</sup>) underlying fee calculation has also decreased (by the beginning of the new cycle). The same applies to investments, i.e. due to the reduction of the necessary surplus investment expenditures the (growth of the) regulator's asset value decreases as well, which also affects the amortisation and capital costs underlying fee calculation.

In the current (2017-2020) price control cycle, HEPURA Decree No 7/2016 of 13 October 2016 on the framework rules of determining electricity system use fees, connection fees and special charges stipulates the relevant legislation.

In addition, Section 3(3)(d) and (g) of the HEPURA Decree states that in determining fees, network licensees should 'not be interested in preventing the support for the energy efficiency measures of consumers' and they 'should be encouraged to develop smart networks'.

The aforementioned provision according to Section 10(2) corresponds to the former.

Concerning the development of smart networks, the methodological guide issued by the HEPURA for the price control cycle launched in 2017 contains a specific incentive (see the information concerning demand-side responses on the next page).

Even at present, electricity traders can freely agree with their customers in the tariffs applied: there is no legal impediment to the latter.

Action planned: Support for intelligent systems

Within the scope of KEHOP priority 5 measure 1 - supporting renewable electricity production - the programme aims to provide system-side support for distribution of renewable electricity produced. The promotion of smart networks is encouraged by KEHOP priority 5 measure 2 within building energy programmes by the propagation of energy management instruments for the public sector.

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<sup>27</sup> DSO: distribution system operator, i.e. distribution licensee

As a complementary measure, the Territorial and Municipal Development Operational Programme (TOP) also promotes energy management solutions for energy consumption measurement and intelligent control of municipal infrastructure within building energy programmes. Based on the above, KEHOP also makes it possible to support smart network instruments, i.e. smart network developments (and in relation to the latter, TOP) for the support of further elements of which developments (demand side response) within the scope of a coordinated programme, the Green Economy Financing System resources are available, thereby contributing to the increase of energy efficiency and implementation of the objective of DRS<sup>28</sup> energy priority areas concerning regional development of smart networks.

The method recorded in the methodological guide issued for the entire price control cycle launched in 2017 by HEPURA can also promote enabling the technical conditions of the demand-side response measures.

The essence of this method is that, during corrections based on subsequent examination of the magnitude of investments, the activation value of investments directly linked to smart networks are taken into account by MEKS with a factor of 1.1 instead of the usual 1. This encourages network licensees to use smart network solutions during network developments, if possible.

Pursuant to Section 16(g) of the Electricity Act, Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság (hereinafter: MAVIR), as transmission system operation licensee (TSO<sup>29</sup>), is responsible for obtaining system-level services.

Over the past period, MAVIR modified the Tender Documentation containing the detailed rules of tenders in such a way that even market participants potentially affected by demand side regulation can also participate. According to the operating permit of the transmission system operator, they must inform HEPURA every year on their measures taken in relation to the spread of demand-side response measures.

Section 16(o) of the Electricity Act has been amended, on the basis of which MAVIR is responsible for coordinating and promoting demand-side regulatory measures as set out in the electricity supply codes.

HEPURA has commissioned a study on the possibilities of developing demand-side regulation in the electricity market in Hungary. The study<sup>30</sup> found that the overall technical network loss of electricity transmission and distribution (i.e. loss in its narrow sense) has been declining in recent years, partly due to the increase of distributed production (mainly in small power plants). The relevant amount in 2013 is 3,663 GWh, which is 10.1 % of the total domestic consumption. Similarly to other countries, its greatest proportion is generated on the MVN<sup>31</sup> and LVN<sup>32</sup> distribution networks. Development directions are therefore also focused primarily on this area. The study evaluated the opportunities for improving the energy efficiency potentials and suggestions on this basis.

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<sup>28</sup> DSR Demand side response

<sup>29</sup> TSO: Transmission System Operator

<sup>30</sup> Study on evaluation of the implementation of Article 15(2) of Directive 2012/27/EU on energy efficiency and the energy efficiency potential of the Hungarian electricity infrastructure, GRID CEE Tanácsadó Zrt. 30 November 2015.

<sup>31</sup> MVN: medium voltage network

<sup>32</sup> LVN: low voltage network

By measures related to the transmission network, the loss of the transmission network can be reduced on the order of magnitude of 10 %, thus the available loss reduction can reach 35 GWh. Some of the savings that can be achieved through developments related to the transmission network can be realised by 2020. Interventions related to network development can be implemented on an ongoing basis according to a schedule stipulated in an approved 10-year network development plan.

The total technical loss of the distribution network is around 9.5 % of annual consumption, or 3,420 GWh. Overall, the potential available in the near future by measures concerning the distribution network by voltage level:

- LVN: ~25%
- MVN/LVN: ~30 %
- MVN: ~10%
- HVN/MVN: ~15%
- HVN<sup>33</sup>: ~5%

All this can mean a theoretical loss reduction potential of approximately 500 GWh, which is 13.65 % of the total network loss of 2013. In addition, the regulation of controlled customers for profile smoothing purposes may result in additional savings of 59 GWh/year. With regard to the potential of the distribution network, taking into account resource-side options, technical constraints as well as considerations regarding security of supply, implementing the necessary improvement will take at least 20-25 years. Thus, considering 5-year periods, achieving new savings in the order of magnitude of 100-200 GWh can be a realistic target for the low and medium voltage network.

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<sup>33</sup> HVN: high voltage network

## Abbreviations, simplified names

Energy Efficiency Directive	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
Action Plan III	National Energy Efficiency Action Plan III
NBES	National Building Energy Strategy
DHDAP	District Heat Development Action Plan
ETS	Industrial activities listed in Annex I of Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC
Awareness-raising AP	an Energy and Climate Consciousness and Awareness-Raising Action Plan adopted by Government Decision No 1602/2015 of 8 September 2015
GHG	Greenhouse gases
OECD	Organisation for Economic Co-operation and Development
HEPURA	Hungarian Energy and Public Utility Regulatory Authority
CSO	Central Statistical Office
GEFS	Green Economy Funding Scheme
GIS	Green Investment System
KEOP	Environment and Energy Operational Programme
KEHOP	Environmental and Energy Efficiency Operational Programme
ROP	Regional operational programmes: <ul style="list-style-type: none"> <li>• Southern Great Plain Operational Programme (DAOP)</li> <li>• Southern Transdanubia Operational Programme (DDOP)</li> <li>• Northern Great Plain Operational Programme (ÉAOP)</li> <li>• Northern Hungary Operational Programme (ÉMOP)</li> <li>• Central Transdanubia Operational Programme (KDOP)</li> <li>• Central Hungary Operational Programme (KMOP)</li> <li>• Western Transdanubia Operational Programme (NYDOP)</li> </ul>
TOP	Territorial and Settlement Development Operational
TIOP	Social Infrastructure Operational Programme
VEKOP	Competitive Central Hungary Operational Programme
GOP	Economic Development Operational Programme
GINOP	Economic Development and Innovation Operational
EFOP	Human Resource Development Operational Programme
VP	Rural Development Programme
EEA	European Economic Area
MCP	Modern Cities Programme
OP	Operational programme(s)
NEH	National Energy Network

BEV	Battery Electric Vehicle = purely battery operated electric vehicle
PHEV	Plug-in Hybrid Electric Vehicle = hybrid electric motor vehicle with external/network charging option
EREV	Extended-range Electric Vehicle = electric vehicle offering extended range
SEAP	Sustainable Energy Action Plan abbreviation
SECAP	Sustainable Energy and Climate Action Plan
DHW	domestic hot water
DSO	Distribution System Operator
TSO	Transmission System Operator
DSR	demand side response
MVN	medium voltage network
LVN	low voltage network
HVN	high voltage network

### Frequently quoted legislation and government decision

Energy Efficiency Act	Act LVII of 2015 on energy efficiency
Implementing Decree	Government Decree No 122/2015 of 26 May 2015 implementing the Energy Efficiency Act
Electricity Act	Act LXXXVI of 2007 on electricity
Electricity Implementing Decree	Government Decree No 273/2007 of 19 October 2007 on the implementation of certain provisions of Act LXXXVI of 2007 on electricity
Gas Act	Act XL of 2008 on natural gas supply
District Heating Act	Act XVIII of 2005 on district heating services
District Heating Implementing Decree	Government Decree No 157/2005 of 15 August 2005 implementing Act XVIII of 2005 on district heating services
Government Decision	Government Decision No 1160/2015 of 20 March 2015 on updating the forecasts of energy use of the National Energy Strategy
Decree No 7/2006	Decree No 7/2006 of 24 May 2006 of the Minister without Portfolio on determining the energy characteristics of buildings