

Consumers and energy efficiency

(Workpackage 5)

Country Report for Hungary

An inventory of policies, business and civil initiatives at the national level focusing on heating & hot water and the use of electricity

December, 2015



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Methodological notes:

This report has been compiled as a result of desktop search into:

- i) data on energy consumption in the household sector in Hungary, and
- ii) policies, business and civil initiatives at the national level to promote energy efficiency in the household sector in Hungary.

The report focuses on the use of energy in the household sector for the purposes of heating and the use of hot water, as well as on the use of electricity (transport-related use of energy is excluded).

The data analysis on energy consumption is based on (and confined to, due to comparability reasons) the ODYSSEE database on energy efficiency indicators and data (<http://www.odyssee-mure.eu>), using the most recent data available.

The scope of the information presented in the report in the case of policies at the national level is on governmental measures in effect, as well as on measures already under preparation by the government. In the case of business and civil initiatives, the scope of the report is on initiatives currently in place, including a retrospective overview of some recent successful/innovative cases.

The collection of information was concluded by end of November 2015.

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Abbreviations

CCS	Climate Change Strategy
ECARAP	Energy- and Climate Awareness-Raising Action Plan
CECED	European Committee of Domestic Equipment Manufacturers
EED	Energy Efficiency Directive
EEOP	Environmental and Energy-efficiency Operational Programme
EPC	Energy Performance Contracting
ESCOs	Energy Service Companies
EU	European Union
EUROSTAT	Statistical Office of the European Union
GDP	Gross Domestic Product
GPP	Green Public Procurement
IEE	the Intelligent Energy Europe programme of the European Commission
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
HEuPURA	Hungarian Energy and Public Utility Regulatory Authority
KSH	Hungarian Central Statistical Office
MND	Ministry of National Development
NBEPS	National Building Energy Performance Strategy
NDhDP	National District-heating Development Plan
NEEAP	National Energy Efficiency Action Plan
NEMC	National Energy Management Company
NES	National Energy Strategy
NZEB	Nearly Zero Energy Buildings
PPS	Purchasing Power Standards
SEAPs	Sustainable Energy Action Plans
SME	Small- and Medium-Sized Enterprise
VAT	Value Added Tax

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1. Introduction

1.1. Setting the scene: an overview of socio-economic data and data on residential energy consumption and its environmental aspects

Hungary is the Europe's twenty-second biggest economy in Europe (IMF, 2015). Hungary economy growth by 41.9% in the period 1995-2012; GDP and private consumption at 2005 PPP increased with annual average rate of 2.3% and 1.8%, respectively (Table 1.1).

The economic structure is principally dominated by its tertiary sector, which accounted for about 57.7% of the GDP in 2012, followed by the industry sector (25.7%). The role of the tertiary sector in the Hungarian economy is steadily growing due to constant investments into transport and other services in the last 15 years. The main sectors of the Hungarian industry are heavy industry, energy production, mechanical engineering, chemicals, food industry and automobile production. Also, agriculture is an important sector of the Hungarian economy. About 83% of the country's total territory is suitable for cultivation; of this portion, 75% (around 50% of the country's area) is covered by arable land, which is an outstanding ratio compared to other EU countries.

The population of Hungary was estimated at 9.951.710 as of 2012 (9.903.200 million in 2013, Odyssee database LE), equivalent to 1.9% of the total European Union population. The population from 1995 to 2012 decreased by 3.7%.

Table 1.1. General socio-economic data

SOCIO-ECONOMIC				
Item	Unit	1995	2005	2012
GDP at exchange rate	M€2005	63168,16	90027,41	89652,98
GDP at 2005 PPP	M€2005p	101959,71	145313,22	144708,85
Population	k	10333,98	10093,98	9951,71
Number of households	k	3873	4002	4051,35
Private consumption of household at exchange rate	M€2005	40945,3	59886,51	54494,06
Private consumption of household at 2005 PPP	M€2005p	66089,79	96662,8	87958,85
Value added of agriculture at exchange rate	M€2005	2442,34	3350,24	2308,53
Value added of agriculture at 2005 PPP	M€2005p	3942,19	5407,61	3726,19
Value added of industry at exchange rate	M€2005	14455,94	24309,11	23052,41
Value added of industry at 2005 PPP	M€2005p	23333,32	39237,33	37208,89
Value added of tertiary at exchange rate	M€2005	36836,41	49770,61	51741,81
Value added of tertiary at 2005 PPP	M€2005p	59457,64	80334,72	83516,44

Source: Odyssee database

In 2012, Hungary's final residential energy consumption amounted to 5.14 Mtoe – a 17.7% decrease compared to 1995 – reaching its peak in 2003, with 6.6 Mtoe.

The household sector accounted for 35.1% of Hungary's total energy end-use in 2012, and the residential final energy consumption per capita was 0.51 Toe per inhabitant.

Table 1.2. Data related to residential energy consumption

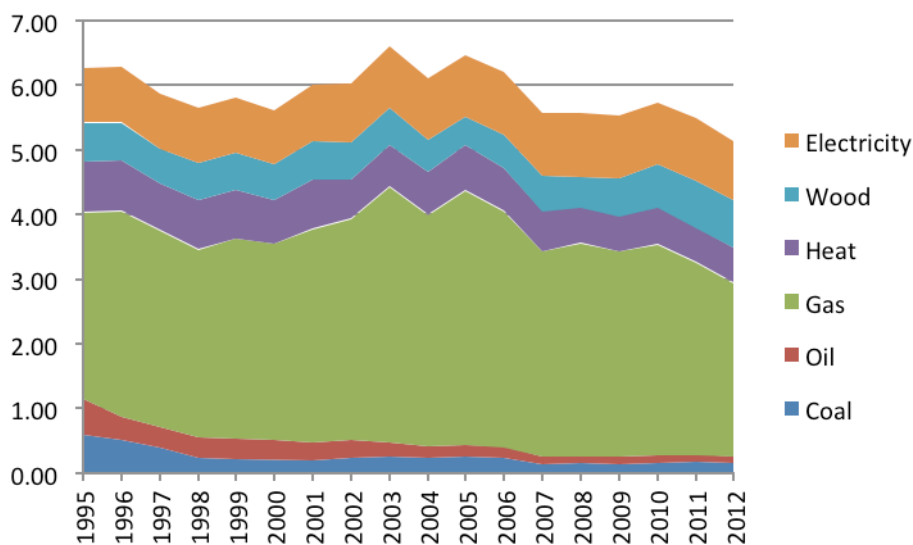
ENERGY				
Item	Unit	1995	2005	2012
Final consumption of residential (with climate correction)	Mtoe	6,27	6,31	5,28
Final consumption of residential	Mtoe	6,25	6,46	5,14
➤ Coal	Mtoe	0,59	0,25	0,15
➤ Oil	Mtoe	0,56	0,19	0,1
➤ Gas	Mtoe	2,89	3,93	2,7
➤ Heat	Mtoe	0,78	0,7	0,54
➤ Wood	Mtoe	0,6	0,44	0,73
➤ Electricity	Mtoe	0,84	0,96	0,91
Space heating	Mtoe	3,84	4,19	3,81*
Water heating	Mtoe	1,02	1,17	1,02*
Cooking	Mtoe	0,51	0,48	0,33*
Air cooling	Mtoe	n.a.	n.a.	n.a.
Electrical appliances and lighting	Mtoe	0,45	0,56	0,59*
Electricity consumption of captive electricity	TWh	n.a.	n.a.	n.a.
Total stock of dwellings	k	3971	4172,79	4393,63
Stock of dwellings permanently occupied	k	3753	3937	3927,79
Total construction of dwellings	k	24,72	41,08	10,56
Floor area of dwellings (average)	m ²	99	87	100
Stock of refrigerators	k	n.a.	3762	3335*
➤ Unit consumption	kWh/year	n.a.	n.a.	n.a.
➤ Rate of equipment ownership	%	n.a.	94	86*
Stock of freezers	k	n.a.	2761	2598*
➤ Unit consumption	kWh/year	n.a.	n.a.	n.a.
➤ Rate of equipment ownership	%	n.a.	69	67*
Stock of washing machines	k	n.a.	2961	3917*
➤ Unit consumption	kWh/year	n.a.	n.a.	n.a.
➤ Rate of equipment ownership	%	n.a.	74	101*
Stock of dishwashers	k	n.a.	240	427*
➤ Unit consumption	kWh/year	n.a.	n.a.	n.a.
➤ Rate of equipment ownership	%	n.a.	6	11*
Stock of TV	k	n.a.	5803	5972*
➤ Unit consumption	kWh/year	n.a.	n.a.	n.a.
➤ Rate of equipment ownership	%	n.a.	145	154*

Source: *Odyssee database*

* data are of 2010

Gas has been the principal source of energy, representing the 52.5% of the final residential energy consumption in 2012; however it decreased from 1995 to 2012 of 5.9%. Other fossil fuels like coal and oil were almost disappearing, accounting together for only the 3.1% of the total energy used in 2012 in the residential sector. While heat decreased of 30.7%, electricity and wood (that were the second and the third source of energy in 2012) increased of 8.3% and 21.6%, respectively, over the period 1995 – 2012.

Figure 1.1. Hungary’s final residential energy consumption by source 1995 – 2012 (Mtoe)

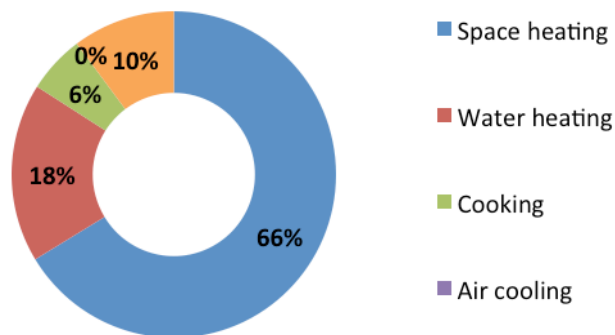


Source: Trotta elaboration based on Odyssee database

In 2010, approximately 66% of energy in the residential sector was used for space heating, roughly 18% for water heating, about 10% for electricity for appliances and lighting, a small part for cooking (6%) and almost no use of air cooling.

Figure 1.2. illustrates the composition of the energy end-use in the residential sector in 2010.

Figure 1.2. Hungary’s final residential energy consumption by end-use 2010 (%)



Source: Trotta elaboration based on Odyssee database

Total use of energy for space heating amounted to 3.81 Mtoe in 2010. Of this, gas was the main fuel accounting for 2.43 Mtoe (63.7%), wood 0.66 Mtoe, heat 0.46 Mtoe, coal 0.14 Mtoe, electricity 0.13 Mtoe.

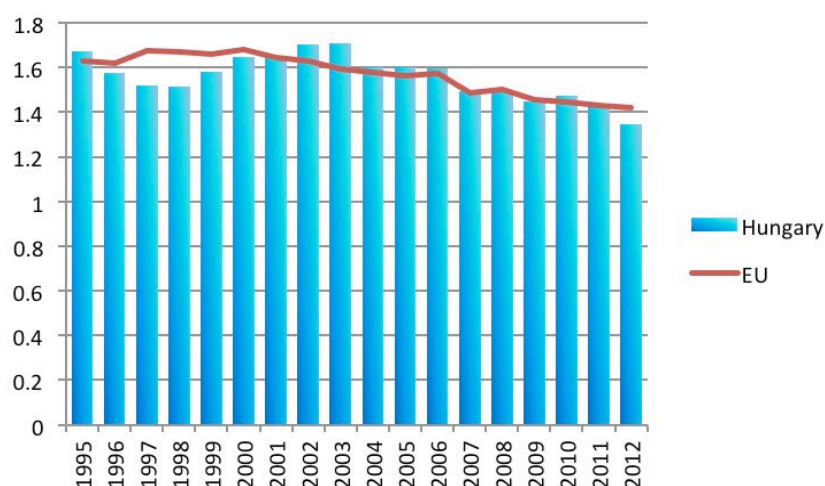
Gas was also the main source of energy used for water heating in 2010; it represented 63.7% of the total energy share of water heating in 2010, followed by electricity (20.5%), heat (10.7%), wood (3.9%).

48.4% of the energy consumed for cooking in 2010 came from gas, 42.4% from oil and 9% from electricity.

In 2010, the average floor area of dwellings was about 77 m², smaller than the average of the European Member States (87.4 m²).¹ Energy consumption of households per permanently occupied dwellings (calculated at normal climate), was 1.48 toe/dw a bit higher than the average of the European Member States (1.44 toe/dw).

Figure 3 shows the household consumption per dwelling of Hungary compared to the average of the European Member States over the period 1995-2012.

Figure 1.3 Hungary's final energy consumption per dwelling 1995-2012 (toe/dwelling)



Source: Trotta elaboration based on Odyssee database

With regard to CO₂ emissions the residential sector's share of total emissions (11.63 MtCO₂) decreased of 38.92% from 1995 to 2012 and it was below the average of the European Union (30.2 MtCO₂), decreased of 4.6%, in the same period. In addition, in 2012 CO₂ emissions per dwelling with climatic corrections (included electricity) were 1,92 (tCO₂/dw), far below the European average (3,74).

Table 1.3. Environmental aspects of residential energy consumption

ENVIRONMENT				
Item	Unit	1995	2005	2012
CO ₂ emissions of households (excluded electricity)	MtCO ₂	11,13	11,18	7,35
Total CO ₂ emissions of households (included electricity)	MtCO ₂	19,04	16,87	11,63
CO ₂ emissions per dwelling	tCO ₂ /dw	2,97	2,84	1,87
CO ₂ emissions per dwelling (with climatic corrections)	tCO ₂ /dw	2,97	2,77	1,92
CO ₂ emissions per dwelling with climatic corrections (included electricity)	tCO ₂ /dw	5,08	4,22	3,02
CO ₂ emissions of space heating per dwelling	tCO ₂ /dw	1,98	2,02	1,65*
CO ₂ emissions of space heating (with climatic corrections)	tCO ₂ /dw	1,87	1,85	1,59*
CO ₂ emissions of space heating with climatic corrections (included electricity)	tCO ₂ /dw	2,34	2,15	1,84*
Degree-days	Degree	2903,04	3036,34	2770,95

Source: Odyssee database * data are of 2010

¹ This is further supported by data from the Hungarian Central Statistical Office (KSH) according to which the average floor space in Hungary is 78 m² (KSH, 2011 and see also KSH, 2012).

1.2. The building stock in the household sector

Typology for buildings from thermal efficiency point of view

According to the National Building Energy Performance Strategy of Hungary (NBEPS, 2015), the residential building stock in Hungary is made up of the following three types of buildings in principle:

A - Detached houses;

B - Blocks of flats built by traditional technologies;*

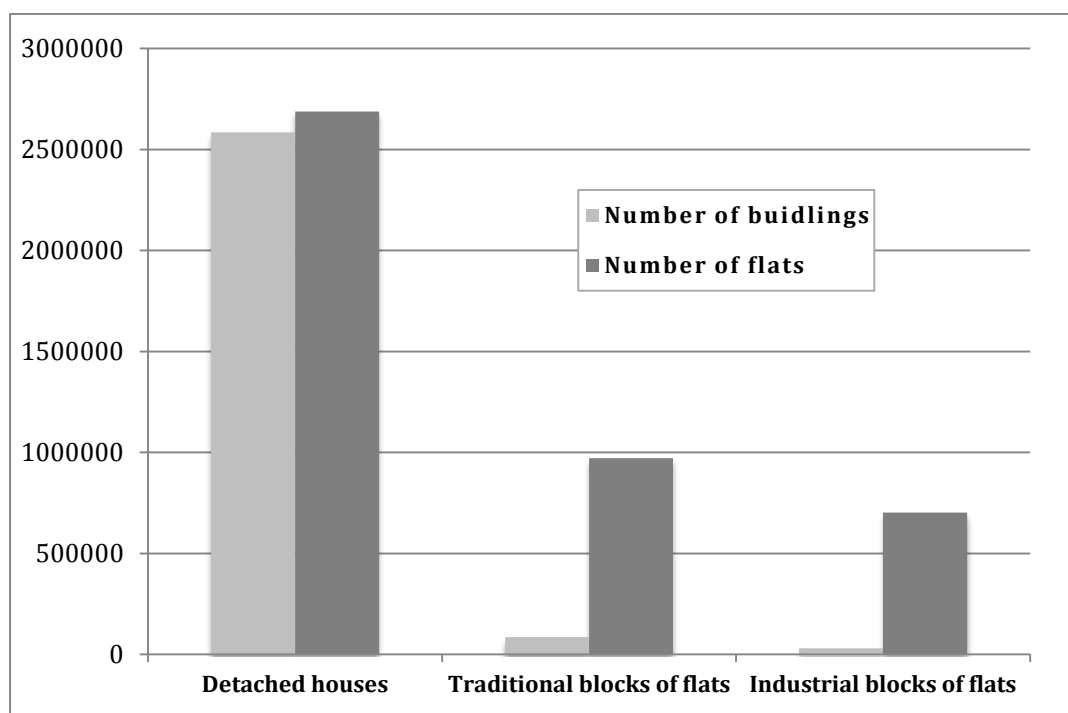
C - Blocks of flats built by industrial technologies;**

* Constructed of brick, rock or of hand-laid building blocks;

** Constructed of mid- or large-panel elements, or of cast concrete

The representation of the different types of buildings in the building stock, in terms of the number of buildings, as well as in terms of the number of dwellings, is shown in Figure 1.4., below.

Figure 1.4. The representation of the different types of buildings in the residential building stock in terms of the number of buildings and the number of flats



Source: NBEPS, 2015

The average age of buildings in the residential sector is about 50 years. Although the number of licences for new buildings shows a slight increase again, after a downturn and then stagnation period starting about 2003, the rate of replacement of buildings remains low in the country, primarily because of the lack of capital. Urbanista (2015)

The dominating basic type of building in Hungary is a **detached house**, both in terms of the number of buildings (circa 95 %) and the number of flats (circa 60 %). Consisting of about 2.5 million flats,

around 63 % of the population, equalling about 6.5 million people live in the stock of detached houses in the country. NBEPS (2015) & KSH (2014)

Within this category about 25% of the buildings were built before 1945 and at the same time the representation of buildings built between 1946-1980 is close to 50%. Consequently, about 75% of the buildings in this category were built before 1980 and thus generally are without thermal insulation. At the same time, buildings built after year 2001 (and thus with higher thermal efficiency standards) in this category represent only about 8% of the stock. NBEPS (2015)

Indeed, the stock of detached houses in Hungary embodies the largest energy saving potential in the residential building stock, both in terms of volume and in terms of the actual range of specific energy consumption values (kWh/m²). NBEPS (2015) & KSH (2014)

Concerning the **blocks of flats**, about 40% of the stock is made up of small-sized buildings (consisting of 1 - 3 flats), built before 2001, by traditional technologies and about 10% of the stock are large-sized buildings (consisting of 10 or more flats), built before 1945. NBEPS (2015)

Furthermore, buildings built by industrial technologies represent a considerable share in the category of blocks of flats in the country: in terms of the number of buildings, their representation is slightly above 25% and in terms of the number of flats it is about 42%. Consisting of about 0.75 million flats, about 20% of the population, equalling almost 2 million people, live in the stock of buildings built by industrial technologies in Hungary. NBEPS (2015) & KSH (2014)

According to the estimates of the NBEPS, about 70% of residential homes in the country are in need of energetic refurbishment and in certain proportion of these buildings it is likely that such refurbishments are economically not viable anymore and thus it will be necessary to replace the whole building. NBEPS (2015)

Ownership structures

The private ownership of residential properties (meaning less professional owners in general) is relatively high in the country, in a comparison to other EU countries: slightly above 90% of the private homes are owned by the inhabitants, compared to the EU average of about 65%. (EUROSTAT, 2012)

The considerable share of condominiums² in the stock of blocks of flats is also an important factor in Hungary in the context of energy efficiency refurbishments, since common property many times is a hindering factor in refurbishment decisions.

The energetic performance of the stocks of household appliances³

According to a biannual survey into the stocks of household appliances in the country initiated by the Hungarian affiliate of the European committee of domestic equipment manufacturers (CECED Hungary), at the turn of 2012/13 in the category of large household appliances already 46% of the stock was older than 8 years old in the country and this share has grown further to 59% by 2015. Respectively, in the category of washing machines, the stock of relatively old and thus inefficient equipment has grown from circa 43% further to about 49% by 2015.

This trend is likely to be related to the economic crisis and the resulting lack of capital on the part of households to invest into newer and more efficient equipment. (CECED Hungary, 2015)

² Condominium: housing blocks, where the flats are owned privately, while the public rooms and other infrastructures of the building, such as the heating system, elevators, etc. are owned jointly.

³ As integrated parts of the housing infrastructure.

1.3. Estimated energy saving potential in the household sector

There are different estimates available for the energy and/or CO₂ emission reduction potential of the Hungarian residential sector. Apart from the different metric used, the comparison of the studies proves challenging also because they are based on different legislation and renovation scenarios.

(1) The first study was prepared in 2007-2008 for the Ministry of Environment and Water (Novikova and Ürge-Vorsatz, 2007 and 2008). Based on the estimation of the IPCC IV Assessment Report, in countries in transition, like Hungary, the residential sector has the highest CO₂ emission reduction potential. In 2004 in Hungary, from among the end-use sectors, this sector was responsible for the largest share of national CO₂ emissions (30%).

The study aimed at estimating the *"CO₂ mitigation potential and associated costs resulting from application of the energy efficient technologies and practices as well as the use of fuel switch options from the demand side."* Furthermore, the study evaluates which options from the many analysed would be most effective in terms of CO₂ emission reduction and cost-effectiveness. The report calls attention to the fact that the energy efficiency options offering the largest amount of CO₂ emission reduction are often not the ones that are the most cost-effective.

In terms of the size of avoided CO₂, until 2025, the improvement of the thermal envelope and heating efficiency **in old family houses** (i.e. detached houses)⁴ is able to supply the largest potential in the residential sector. Namely:

- Installation of pellet boilers or solar thermal systems backed-up with pellet boilers: app. 3.1 million ton of CO₂ compared to the baseline;
- Installation of pumps and condensing boilers to this type of households: up to 1.8 and 0.6 million tons of CO₂ respectively;
- Insulation of walls, roofs, and basements and window exchange: CO₂ savings of 2.4, 1.5, 1.4, and 1.1 million tons of CO₂ respectively.

(2) The second study, entitled Negajoule (Fülöp, 2011), was prepared by Energiaklub⁵. Based on their extensive and detailed calculations, **the energy consumption of residential buildings could be reduced by a total of 152 PJ, or 42%, between 2010 and 2020**, provided that home owners implemented all available energy efficiency options. The largest share of this saving can be achieved by detached houses for two reasons: first, because they have a larger floor area than flats in apartment buildings or blocks of flats, and second, because about two thirds of the population live in such houses.

However, **the cost-effective saving potential is slightly smaller** than the above-mentioned theoretical-technical potential, but still relatively high, 117 PJ.

The study concludes that even though the saving potential is large and a great portion of it could be saved cost-effectively, **the majority of the households are unable to finance the cost of renovations on their own.**

The study distinguished between three types of buildings, namely detached houses, blocks of flats, and other types of apartment buildings. This is noteworthy to mention as even though the largest

⁴ Please note that saving potentials were analysed for different building types. Old family houses (or detached houses) in this report are those that were built before 1992.

⁵ Energiaklub is a non-profit, independent expert organization in Hungary. See more at <http://www.energiaklub.hu/en> and also in *Chapter 4*.

saving potential is available for detached houses, most of the government funding programmes have targeted blocks of flats.

(3) The third estimate for the energy saving potential of the residential sector was made by the draft National Energy Performance of Buildings Strategy 2030⁶ prepared in 2013 and summarized in the "Vision 2040 Hungary 2.0" report by the Sustainable Energy Planning Research Group (Munkácsy, 2014)⁷.

The draft strategy analysed the saving potential of buildings based on three different scenarios, each of them corresponding to different legislation related to the energy efficiency of buildings. The average energy performance of the current residential building stock was estimated to be between 100 - 550 kW/m²/yr. Based on this, the following improvements or reductions in energy consumption can be achieved:

- Scenario A, if renovations are implemented to comply with building regulations in 2006: 90-250 kW/m²/yr;
- Scenario B, if renovations are implemented to comply with the 2013 update of the 2006 regulations: 80-140 kW/m²/yr; and
- Scenario C, if nearly zero energy requirements are met as required by the EPBD Directive (from 2020): 72-100 kW/m²/yr.

(4) A separate estimate of saving potential, also prepared by Energiaklub, is available for multi-apartment buildings, which comprises about one third of the homes in Hungary⁸. The study was prepared in the framework of the European Low Energy Apartment Futures project⁹. According to it, 40% energy saving can be achieved by the renovation of multi-ownership and multi-occupancy housing (e.g. tenements, blocks of flats) (Fülöp, Kun, 2014).

This potential, however, can be greatly surpassed in some cases, as shown by the Solanova ("Solar-supported, integrated eco-efficient renovation of large residential buildings and heat-supply-systems") project in Dunaújváros, Hungary¹⁰ where an energy saving of 85-90% was achieved (see also in Munkácsy, 2014).

With reference to the different results of research, as outlined above, the corresponding energy saving target of the Hungarian government in the volume of 40 PJ final energy consumption for the period of 2012-2020 in the household sector - as presented in the III. NEEAP, 2015 - should be a realistic, at the same time not a very ambitious target though.

For information about the method how this target value in the NEEAP was calculated, please refer to sub-chapter 2.2 "Energy efficiency targets", below.

⁶ The draft strategy is available at http://www.kormany.hu/download/2/a8/10000/N%C3%89eS_tervezet.pdf (last accessed 8 Dec 2015)

⁷ See more about this report in *Chapter 4 in section 4.3.1.*

⁸Source: <http://www.energiaklub.hu/en/node/3608> (last accessed 8 Dec 2015)

⁹ See more about the project at <http://www.lowenergyapartments.eu/>.

¹⁰ See details at <http://www.solanova.eu/>.

1.4. Socio-economic factors influencing energy consumption in households

Energy prices and the relative share of households' expenses on energy services

The unit price of energy in Purchasing Power Standards (PPS) for household consumers in the year 2014 in the case of electricity is slightly above the EU average, while in the case of natural gas it is slightly lower than the EU average. (EUROSTAT, 2014a and 2014b)

The unit prices (not PPS) of energy for households, both in the case of electricity and natural gas, as well as of district heating energy, has fallen considerably between 2012 and 2015, as the result of policy measures by the government aimed at reducing the expenses of households on energy services (please refer also to sub-chapter 2.4 *Side effects of policies*).

As of 2014, Hungarian households, depending on their levels of income, spent between 16.8 and 20.4 % of their disposable income on housing-related energy services (does not include transport), which is a relatively high share in EU comparison. (Author's own calculation, based on KSH, 2015 & MEHI, 2014)

Energy poverty - energy efficiency nexus

Energy poverty in Hungary is a combined result of relatively low levels of disposable income and at the same time the poor thermal efficiency conditions of the housings stock, together with the relatively obsolete and thus inefficient stock of household appliances and heating and hot water boilers. (Please refer also the point above, on the relative high share of expenses in the income of households on housing-related energy services.)

According to statistical analysis study, based on a housing survey conducted in 2011, about 20 % of the Hungarian households were in energy poverty, totalling of about 800.000 households in the country¹¹. (Fülöp and Lehoczki-Krsjak, 2014)

Another and more recent study by Habitat for Humanity Hungary, referring to Eurostat data and applying a different method for the estimate on energy poverty (than the study referred above), concluded that about 11.4 % of the population were not able to heat their homes appropriately in 2014. (Koltai, 2015)

Linked to energy poverty and the relatively high share of housing-related energy costs, households' indebtedness to public utility companies is also an issue in the country.

In the year 2011, about one fourth of the Hungarian population lived in households with accumulated debt towards energy utility companies (electricity, gas and district heating providers). Although the amount of the total debt has begun to shrink after a stepwise programme of the government aimed at reducing utility costs since 2013, indebtedness to the utility companies remains an issue in the county as of end of 2015. (HEuPURA, 2015)

The energy efficiency awareness of household consumers and their willingness to invest in energy efficiency renovations

Individuals and households need to know where exactly they stand in terms of everyday energy efficient practices, and how they can move forward. Based on OTP (2012) Vadovics and Boza-Kiss (2013) noted that, on the one hand, people tend to believe that they do everything they can and they could not possibly save any more through behaviour change. On the other, 64% of people do

¹¹ The criteria is that the yearly energy spending of the household is higher than the national median and, at the same time, with the remaining disposable income the household falls under the official poverty level.

not even monitor their consumption, and when asked to list what exactly they do in order to save energy, they mostly mention defrosting the fridge and unplugging mobile phone batteries.

This is further emphasized by a survey from 2013, which observes that only 38% of households read their energy bills regularly, while 21% never read them (Bell Research, 2013). Only about one fourth of the surveyed households were aware of how much electricity and gas they consume and even less of them were aware of their spending on energy services.

In its representative "Energy efficiency household barometer", Energiaklub (2013a and b) found that 24% of the population plans to renovate their homes within the next 3 years, the most popular measure being the insulation of homes. 40% of those planning to invest, aim at reducing their bills through energy efficiency improvement and expect an average of 30% savings.

The 2014 edition of the Energy efficiency barometer (Fülöp, Kun, 2014) found that in the last 10 years 64% of the households performed some kind of an energy efficiency renovation, most of them (45%) exchanged (some of) their windows. The three most important reasons for doing the renovation were because things got too old (54%), became faulty (28%), or households wanted to reduce their overheads (21%). 81% of households financed the renovations themselves, 15% used bank loans, and only 7% took advantage of government incentives (through competitive calls for proposals). In the near future only 19% people plan energy efficiency investments in their homes, mostly relying on their own saving (82%), and only a small proportion of them planning to take advantage of government incentives (12%) or bank loans (11%).

The 2014 barometer report also found that two thirds of those surveyed knew about the compulsory home energy certificate. 62% of them were aware that they were entitled to seeing the energy certificate of the house or flat they intended to buy. Awareness of the home energy certificate varies with age (older people being more aware), education (better educated people being more aware), and place of living (people living in regional capitals being more aware). (Fülöp, Kun, 2014)

Based on Energiaklub's report (2013a and b), Vadovics and Boza-Kiss (2013) observe that the availability of incentives has seriously decreased in Hungary in recent years, while the motivation of the population – driven by saving money – has increased and could be used as a vehicle to ensure economy-wide energy savings. While there is a huge energy saving potential in renovating residential houses and replacing obsolete appliances, increasing and supporting the capacity of households is also needed, especially in the light of the considerable rate of energy poverty in the country (see details above).

2. Policies effecting energy consumption in households

With the Energy Efficiency Directive (EED) of the European Union (EU) being a strong driving factor, a new legal act (Act LVII of 2015) explicitly to promote energy efficiency was introduced in Hungary in the spring of 2015. Furthermore, several related national strategies and action plans have been worked out, or updated and then approved by the Hungarian government or the Parliament in the last few months, either in the context of the Europe 2020 Agenda, with focus on energy efficiency, or of the Kyoto Protocol on climate change.

Altogether, with the new act on energy efficiency in the centre, but also including the policy objectives, targets and planned implementation measures, etc. defined in the relevant strategies and action plans, in the year 2015 the country has put in place a new, economy-wide policy framework to promote energy efficiency.

As of autumn 2015, some of the implementation measures resulting from this new framework and aimed at the households sector have already been introduced, while most of the other planned measures are still under preparation.

The sub-chapters below provide a snapshot on **public policy development at the national level in Hungary** till the end of November 2015, in retrospect about one year, **with relevance to the promotion of energy efficiency in the households sector**¹², in terms of

- **the (new) national policy framework to promote energy efficiency:** the new act on energy efficiency, strategies and action plans and energy efficiency targets defined in them, as well as governmental bodies responsible for implementation, etc.;
- **on-going and planned policy implementation measures specific to the household sector**, such as normative, economic, as well as informational and co-operative policy measures.

Previous policy cycles with relevance to energy efficiency in households in Hungary focused on the transposition into national law and the implementation of the relevant EU Directives, such as for example the Energy Labelling Directive (2010/30/EU) and the Energy Performance of Buildings Directive (2010/31/EU), as well on the implementation of the *II. National Energy Efficiency Action Plan till 2016* and the *Environment and Energy Operational Programme, 2007 -2013*.

Specific implementation measures in this previous policy period included various pilot-like projects and programmes aimed at e.g. the energy refurbishment of blocks of flats built by industrial technologies, the promotion and installation of individual metering, the replacement of inefficient light bulbs, etc., as well as at raising awareness about energy efficiency and climate change and to create the necessary knowledge base (e.g. the classification of the national building stock and related data collection on), etc.

¹² Throughout this chapter the term „energy efficiency” always refers to end-use energy efficiency.

2.1. General policy framework

The overarching objective of Hungary's energy policy

The overarching objective of the energy policy of the Hungarian government is to guarantee the all-time security of energy supply, with respect to maintaining the competitiveness of the economy, environmental sustainability, as well as the capacity of consumers/households to be able to pay for energy services, hand in hand with the necessary restructuring of the energy sector. (III. NEEAP, 2015, based on the principles of the NES, 2011)

The (new) national act on energy efficiency

Concerning the economy-wide promotion of energy efficiency, in order to transpose the EED into national law, Hungary has recently adopted a new act on energy efficiency (Act No. LVII of 2015, May 2015) and issued a relevant governmental decree (Governmental decree 122/2015, May 2015).¹³

The new act makes explicit reference to the *III. National Energy Efficiency Action Plan* (III. NEEAP, Aug. 2015) and the *National Building Energy Performance Strategy* (NBEPS, Feb. 2015), as the two main programming policy instruments aimed at supporting implementation.

An overview of the country's approach to promote energy efficiency in the households sector by means of this new policy framework (i.e. the new act & governmental decree on energy efficiency, as well as the two aforementioned governmental policy papers) is provided below.

Relevant strategies and action plans in effect

Energy efficiency objectives and targets, as well as the planned means of policy implementation with relevance to the household sector are defined in the following main national policy documents (in chronological order):

- *The Energy- and Climate Awareness-Raising Action Plan of Hungary /ECARAP, Sept. 2015/;*
- *The Energy Efficiency Action Plan of Hungary till 2020, including as annex, the National Zero Energy Housing Action Plan /III. NEEAP, Aug. 2015/;*
- *The National Building Energy Performance Strategy*¹⁴ /NBEPS, Feb. 2015/;
- *The Environmental and Energy-efficiency Operational Programme of Hungary for 2014-2020 /EEOP, Feb. 2015/;*
- *The National Energy Strategy (time frame: 2030, with an outlook to 2050) /NES, 2011/;*

Furthermore, the following two documents are in the process of political endorsement:

- *The II. Climate Change Strategy of Hungary /II. CCS, approved by the government in May 2015, currently in the process of Parliamentary endorsement/*¹⁵; and
- *National District-heating Development Plan (NDhDP), under finalisation by the Ministry of National Development.*

¹³ The new act was adopted in the context of the Commission referring Hungary to the European Court of Justice (ECJ) in March 2015, for not transposing the EED into national law by 5 June 2014, the deadline stipulated. In this same context the country had been the subject to two separate infringement procedures already earlier and it was the only EU Member State finally to be referred to the ECJ by the Commission.

¹⁴ A related action plan to implement the Strategy is under development.

¹⁵ A related action plan to implement the Strategy is under development.

Responsible governmental bodies

- The government in power, with special emphasis on the role in the implementation of the *Ministry of National Development (MND)*; their competencies include:
 - the definition of the national targets for energy efficiency;
 - the development and update of related strategic policy documents to guide implementation, particularly the *National Energy Efficiency Action Plan* and the *National Building Energy Performance Strategy*;
 - the responsible governmental units are the different ministries in charge of the sectorial policies, in the case of the household sector it is the *MND*, hand in hand with the *Ministry of Interior*.
- The Hungarian Energy and Public Utility Regulatory Authority, its competencies include:
 - the registration and publishing of data and information on energy savings achieved by the different policy measures;
 - the setting up and operation of a web portal, aimed at informing the different groups of energy consumers about relevant legal and economic measures to promote energy efficiency, as well as about relevant awareness raising and educational programmes, consumption behaviour patterns and practical methods aimed at promoting energy efficiency.
- ÉMI Non-profit Ltd. for Quality Control and Innovation in Building is in charge of managing the tenders aimed at the furthering of energy efficiency in the household sector, financed from the sale of Kyoto units (see also under “financing for energy efficiency”, below).

The role of regional and local authorities

No specific responsibilities are assigned to regional and local authorities (RLAs) in Hungary in the promotion of energy efficiency in the households sector. However, RLAs are encouraged to work out sustainable energy action plans (SEAPs), on a voluntary basis. Although the focus of SEAPs is on the activities of the RLAs themselves, the furthering of energy efficiency in the household sector by local means may also be in the focus of these action plans.

Financing for energy efficiency

The main sources of the necessary financing for energy efficiency in the households sector in Hungary are (from the largest to the least share):

- EU funding: the program budgets of the *Environment and Energy Operational Programme /EEOP/* and the *Economic Development Operational Programme /EDOP/* of Hungary for the period 2014-2020;
- The *Green Economy Financing Mechanism Fund*: revenues from the sale of Kyoto units¹⁶;
- The specific appropriation *Building Energetics and Energy Efficiency* in the central state budget.

For more information please refer also below, to the sub-chapter “2.3.2. Economic/financial measures”.

¹⁶ The level of income from this source to the state budget is the subject of the market prices of carbon credit (Kyoto) units

An overview of Hungary’s approach to promote energy efficiency in the households sector in terms of the relevant provisions of the EED17

With reference to the relevant Articles and provisions of the directive itself, the country’s approach into implementing the EED in the households sector is summarised in the table below.

Table 2.1. An overview on the promotion of energy efficiency in the household sector in terms of the relevant provisions of the EED	
Provisions of the EED	National approach/measures
Article 3., Energy efficiency targets and Article 4., Building renovations	
Each Member State (MS) shall set indicative national energy efficiency targets, based on either primary or final energy consumption, primary or final energy savings, or energy intensity.	<ul style="list-style-type: none"> - For details please refer below, under the sub-chapter “2.2. Energy efficiency targets”.
Article 6., Purchasing by public bodies¹⁸	
MSs shall ensure that central governments purchase only products, services and buildings with high energy-efficiency performance	<ul style="list-style-type: none"> - A governmental decree (1849/2014, December 2014) on energy efficient public procurement implements the relevant EU requirements; - An <i>Action Plan for the Promotion of Green Public Procurement (GPP)</i>, also addressing energy efficient public procurement, is under development.
Article 7. Energy efficiency obligation schemes	
<p>Each MS shall set up either an energy efficiency obligation scheme on energy distributors and retail energy sales companies, or, as an alternative, introduce other policy measures, such as financing schemes and incentives, regulations, etc. to achieve energy savings equivalent 1,5 % of the annual energy sales to final customers.</p> <p>The transport sector may be partially or fully excluded from this calculation.</p>	<ul style="list-style-type: none"> - The “alternative policy measures” option is chosen; - At present a background study to identify an optimal mix of financial measures to be introduced, as well as to assess their expected impact is under preparation; - For the main directions of planned policy options please refer to sub-chapter “2.3.2. Economic/financial measures”; - The transport sector is excluded from the calculations of energy savings.

¹⁷ The provisions of the EED with the most relevance to the households sector (by direct or indirect effect) are those stipulated in article 3, 4, 6, 7, 9, 10, 11, 12, 17, 19 and 20.

¹⁸ GPP has an indirect effect on the energy efficiency of households via fostering the development of the markets of energy efficient products and services

Articles 9-11 Metering; billing information; and cost of access to metering and billing information	
<p>MSs shall ensure that, final customers of energy:</p> <ul style="list-style-type: none"> - are provided with competitively priced individual meters¹⁹; - are provided accurate billing information based on actual consumption; - receive all their bills and billing information for energy consumption and have access to their consumption data in an appropriate way and free of charge. 	<ul style="list-style-type: none"> - Related to these provisions only some smaller additions/modification were necessary in the transposition of the EED, as most of the stipulated conditions have already been established earlier (by the relevant national act on electricity and respectively by the act on the supply of natural gas and the act on district heating); - Concerning the roll-out of smart metering systems, relevant pilot projects are on-going
Article 12., Consumer information and empowering programme and Article 17., Information and training	
<p>MSs shall take appropriate measures to promote and facilitate an efficient use of energy, including policies to promote behavioural change</p> <p>MSs shall ensure that</p> <ul style="list-style-type: none"> - information on available energy efficiency mechanisms and financial and legal frameworks is transparent and widely disseminated; - suitable information, awareness-raising and training initiatives to inform citizens of the benefits and practicalities of taking energy efficiency improvement measures are available. 	<ul style="list-style-type: none"> - The main programming instrument in this regard is the <i>National Energy- and Climate Awareness Raising Action Plan</i>; - For details please refer below, under the sub-chapter “2.3.3 Informational measures”
Article 19., Other measures to promote energy efficiency	
<p>MSs shall evaluate and if necessary take appropriate measures to remove regulatory and non-regulatory barriers to energy efficiency, in particular</p> <ul style="list-style-type: none"> - the split of incentives between the owner and the tenant of a building or among co-owners; - legal and regulatory provisions, and administrative practices, regarding public purchasing and annual budgeting and accounting. 	<ul style="list-style-type: none"> - The legal conditions concerning the co-ownership of dwellings and housing communities are already enabling for decisions to be made for energy efficient investments and no further legal action is necessary; - no regulatory barriers exist in public purchasing and/or in budgeting and accounting that would impede the implementation of energy efficiency projects.

¹⁹ In so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings.

Article 20 Energy Efficiency National Fund, Financing and Technical Support	
<p>MSs shall facilitate the establishment of financing facilities, or use of existing ones, for energy efficiency improvement measures to maximise the benefits of multiple streams of financing.</p> <p>MSs may set up an Energy Efficiency National Fund. The purpose of this fund shall be to support national energy efficiency initiatives.</p>	<ul style="list-style-type: none"> - A Specific Appropriation for Building Energetics and Energy Efficiency in the central state budget is in place since 2013; - Income from the sales of Kyoto units are made available through the <i>Green Economy Financing Mechanism Fund</i>; - There is no <i>Energy Efficiency National Fund</i> in place and there are no related plans to establish one either. - For more details please refer to sub-chapter "2.3.2. Economic/financial measures"

Source: III. NEEAP, 2015; NBEPS, 2015 & NECARAP, 2015

2.2. Energy efficiency targets

Economy-wide targets

In terms of the expected value of primary energy use in year 2020, with reference to Article 3 of the EED, **Hungary defined an indicative target of 1,113 PJ, in the spring of 2013**. This indicative target was defined based on 2008 data, calculating with steady economic growth, hand in hand with staidly increasing energy demand for the coming decade, in line with the relevant forecast of the National Energy Strategy (NES), endorsed in 2011.

However, due to significantly lower economic growth than assumed by the NES and thus lower levels of energy consumption as well, **this indicative target was updated by the Government Resolution No. 1160/2015 of 20 March 2015, to 1,009 PJ**, corresponding to a target value **in terms of final energy consumption of 693 PJ** and respectively **in terms of gross final energy consumption of 603 PJ**. These new target values calculate with a more moderate, nevertheless continued increase of both economic growth and energy consumption (i.e. without planned de-coupling).

With reference to the 1.5 % energy saving obligation, as laid down in Article 7 of the EED, based on actual final energy consumption for the years 2010-12, **the obligation on the part of the country has been defined in the volume of 7.336 PJ/year final energy savings, corresponding to 51.353 PJ for the entire period between 2014 and 2020**.

With reference to Article 24 of the EED and in order **to define sector specific targets**, based on the corresponding (and updated) different projections and scenarios of estimated energy consumption by 2020 in the NES, **the economy-wide energy saving targets of 92 PJ, in terms of primary energy savings and respectively 73 PJ in terms of final energy savings, have also been defined²⁰**.

This latest target value of 73 PJ forms the basis for the definition of sector-specific targets in the NEEAP, including that of the household sector (see below).

Sources: NEEAP, 2015 & Government Resolution No. 1160/2015, 2015)

²⁰ This target value is defined as the difference between the values of projected (i.e. without policy) final energy demand /"Business as Usual Scenario"/, and the expected (i.e. as a result of policy measures) final energy consumption of the economy /"Policy Scenario"/ by 2020, in the National Energy Strategy, as updated by Government Resolution No. 1160/2015.

Household sector

The target values for the household sector in terms of final energy savings (derived from the calculated economy-wide energy saving target of 73 PJ to define sector-specific targets, see also above) are presented in Table 2.2, below.

Table 2.2. Final energy savings already achieved and related targets till 2016, respectively till 2020 in the households sector		
Estimated savings already achieved, 2008 - 2012*	National interim target for the period 2012 - 2016	National overall target for the period 2012 -2020
29.9 PJ	20.0 PJ	40 PJ

Source: III. NEEAP, 2015

* Please note: in this period, due to the economic crisis, the level of energy consumption has dropped in all sectors of the economy and thus it is not possible to determine the volumes of effective energy savings that have happened independently from the economic effects.

The building stock in the household sector

Target values for the building stock in the household sector have been defined in the *National Building Energy Performance Strategy* (NBEPS) in February 2015, in terms of primary energy savings, per categories of the building stock (please refer to Table 2.3, below).

Concerning different scenarios for energy savings in the building stock of the household sector in the scope of the NBEPS, please refer also to sub-chapter "1.3. Estimated energy saving potential in the household sector".

Table 2.3. Targets for primary energy savings in the building stock of the housing sector, by the type of buildings, till 2020			
	Energy saving target till 2020 (PJ)	The number of energetically refurbished dwellings till 2020	Estimated investment necessary till 2020 (Billion HUF)*
Detached houses	17.6	130,000	743
Blocks of flats built by industrial technologies	12.8	380,000	536
Blocks of flats by traditional technologies	8.0	190,000	329
On total	38.4	700,000	1608

Source: NBEPS, 2015

* Concerning the sources of finances please refer to the sub-chapter "2.3.2 Economic/Financial measures", below

2.3. Specific policies

2.3.1. Administrative measures

Legislative-normative, or legislative-informative policies in place in the country are limited to measures resulting from the transposition and implementation of relevant EU Directives (e.g. the eco-design directive, buildings performance directive, energy labelling, etc.). These relevant EU Directives have all been already transposed into national law and implemented, and, accordingly, they have been/are being implemented by the direct effect of EU law.

2.3.2. Economic/financial measures

Use phase

- According to the national act on electricity, all households are eligible for reduced price-rate electricity for the yearly volume of maximum 1,320 kWh (Act No. *LXXXVI* of 2007 on *Electricity*) and consequently, above this yearly threshold a higher price-rate is applied.
- Similarly, households are eligible for reduced priced-rate natural gas, for the yearly volume of maximum 1,200 m³ (Act No. *XL* of 2008 on *Natural Gas Supply*) and above this yearly threshold a higher price-rate is applied.
- The consumption of all energy carriers (in the scope of household consumption: electricity, natural gas, district heat and firewood) is the subject of 27% value added tax (VAT)²¹ (Act No. *CXXVII* of 2007 on *Value Added Tax*).²²

Investment phase

Measures in effect

The main financial instrument managed by the central government to promote investments aimed at furthering energy efficiency in households is a grant scheme, called the ***Warmth of the Home Programme***²³ and presented in the box next page.

²¹ In general, with few exemptions, Hungary applies a standard-rate of 27% value-added tax on final consumption and as such, it is the highest rate of VAT in use across the EU.

²² Other than VAT, there are no further taxes included in the price of energy carriers sold to the household sector, in line with the option given to Member States in Council Directive 2003/96/EC on the taxation of energy products and electricity. On the whole, Hungary, despite the exceptionally high level of VAT, applies one of the lowest rate of tax burden integrated into the costs of energy provided to households.

²³ In Hungarian: “Otthon Melege Program”

The ***Warmth of the Home Programme*** was launched in September 2014 and till date there have been five sub-programmes implemented focusing on the different aspects of energy efficiency in households, e.g. household appliances, facade doors and windows, heating and hot water boilers and insulation. Further sub-programmes are under preparation.

The sources of the programme funds have been the *Green Economy Financing Mechanism* (revenues from the sale of Kyoto units) and the *Specific Appropriation for Building Energetics and Energy Efficiency* of the central state budget.

Due to overwhelming interest on the part of households, all sub-programme funds have been sourced out fully after announcement, either within hours, or after a few days the latest.

Sub-programmes launched in autumn 2014

The replacement of large household appliances in the categories of refrigerators and freezers

The aim of this sub-programme was to raise the energy efficiency of households by supporting the replacement of inefficient refrigerators and freezers to new, energy-efficient ones.

The tender was targeted primarily at pensioners, as well as large families and provided 50% co-financing for the purchase of new appliances, up to maximum HUF 25,000 in the case of A+ category units and respectively HUF 35,000 in the case of A++ and A+++ units. The criterion for the co-financing was to achieve energy savings of at least 10% per annum, or to save, at the minimum, 20 kg/year CO₂ emissions. The total available fund was HUF 500,000,000.-

The modernisation of heating systems (replacement of inefficient heating boilers)

The aim of this sub-programme was to reduce carbon dioxide emissions and thereby also to improve the energy performance of households by supporting the replacement of inefficient heat and/or hot water boilers with high efficiency units utilising condensing technologies.

The tender was aimed at households equipped by individual boiler units in blocks of flats including not more than four independent dwellings by providing 40% co-financing to the maximum amount of HUF 650,000. The total available fund was HUF 1,000,000,000.-

The replacement of energetically obsolete facade doors and windows

The aim of this sub-programme was to reduce carbon dioxide emissions and thereby also to improve the energy performance of households by supporting the replacement of energetically obsolete facade doors and/or windows to new ones meeting the cost-optimal energy efficiency requirements in the national context (as per the EPBD, 2010/31/EU) and, in connection to this, but optionally, to improve the summer heat protection of buildings by the installation of shading structures (without jeopardising winter heat absorption).

The tender was aimed at the owners of (any type of) households by providing 40% co-financing to the maximum amount of HUF 450,000 and respectively, in the case of shading integrated new installations HUF 520,000. The available programme fund was HUF 1,100,000,000.-

The box is continued the next page!

Sub-programmes launched in spring/summer 2015

Support to the complex energetic refurbishment of blocks of flats

The aim of this sub-programme was to reduce carbon dioxide emissions and thereby also to improve the energy performance of households by providing support to housing communities in blocks of flats for the energetic refurbishment of their building.

Co-financing up to maximum of 50% of the total costs was provided for complex energy refurbishment programmes, including the replacement of facade doors and windows of the common areas of the buildings, the thermal insulation of the building facade, the modernisation of energy infrastructure, including the improvement of the efficiency of heating and/or hot water systems as well as the utilisation/integration of renewable energies. The available programme fund was HUF 10,000,000.000.-

The replacement of large household appliances in the category of washing machines

The aim of this sub-programme was to raise the energy efficiency of households by supporting the replacement of inefficient washing machines to new, energy-efficient ones.

The tender provided 50% co-financing for the purchase of a new appliance, up to maximum HUF 25,000 in the case of A+ category units and respectively HUF 40,000 and HUF 45,000 in the cases of A++ and A+++ units. The criterion for the co-financing was to achieve energy savings of at least 10% per annum, or to save, at the minimum, 20 kg/year CO₂ emissions. The estimated monetary savings per households (combined energy and water savings) were up to HUF 12,000 per year.

Due to the high level of interest the original programme fund of HUF 500,000,000.- was raised to HUF 2,000,000,000.-

(Concerning to this sub-programme, please refer also to sub-chapter 3.1.4., below.)

Sub-programme under preparation for 2016:

Support to the complex energetic refurbishment of detached houses

This sub-programme is under preparation and expected to come out in early 2016. At present no details are available yet.

Sources: MND, 2015a and EMI, 2015

Support to the Establishment of Family Homes²⁴

A second grand scheme currently in effect is a social support scheme, with integrated energy efficiency criteria, under which families are eligible for a governmental grant to establish their first home (flat or house).

Since 2013 the size of the grant is differentiated according to the energy efficiency category of the property to be purchased, or to be built. Properties falling into the A, A+ or “passive house” categories receive 10%, respectively 20% and 30% higher grant. The grant, in general, is available for properties to be purchased/built fulfilling the B category at the minimum.

Source: MND, 2015b

²⁴ In Hungarian: „A családok otthonteremtési kedvezménye (CSOK)“

Measures under preparation

The general aim of the government is to introduce “alternative policy measures” (and not an energy efficiency obligation scheme) in order to achieve the energy savings targets as stipulated in Article 7 of the EED.

In the household sector, measures under consideration/preparation include:

- a green loan (soft loan), as well as other financial instruments aimed at promoting energy efficiency investments provided directly to the households; furthermore
- soft loans made available to energy utility companies for financing their ESCO-related activities in the households sector.

According to the III. NEEAP, a background study for the identification of an optimal mix of financial measures to be introduced, as well as to assess their expected impact was meant to be carried out.

(Source: III. NEEAP, 2015)

Although it is not explicitly articulated in the III. NEEAP, it is known that a “*National Green Bank*”, dubbed the *National Energy Management Company* (NEMC), with the aim to provide financial products to promote energy efficiency also in the household sector, was established already in 2014. At present, however, the related financial products are not yet available. (Portfolio, 2015)

With reference to the necessary financial resources for the energetic refurbishment of the building stock in the household sector (pls. refer to Table 2.3 under sub-chapter “2.2. Energy Efficiency Targets”), the original aim of the government was to provide financial support to homeowners in a combined way, both in the form of non-returnable (grants) and respectively returnable (loans) funding, from EU financial sources.

The source of the grants was meant to be the *Environmental and Energy-efficiency Operational Programme of Hungary* (EEOP) for the period 2014-2020, while the necessary finances for the loans were planned to be coming from the *Economic Development Operational Programme of Hungary* (EDOP).

According to the latest policy developments, however, Governmental resolution 1831/2015. modified this original idea and decided that the household sector will be provided support for the energetic refurbishment of buildings in the form of returnable funding (i.e. soft loans) only.

In parallel, there are also plans that the financials that had originally been dedicated to the household sector in the EEOP are going to be reoriented towards the financing the necessary energetic refurbishment of public buildings. This plan is actually contrary to the fact that for the purpose of the energetic refurbishment of public buildings there have been funding secured from other sources already and that the volumes of the estimated energy saving potential in public buildings although is high, it remains only a fraction of that in the household sector.

In addition to EU financial sources, income from the sales of carbon (Kyoto) credits by Hungary on the relevant international markets (*Green Economy Financing Mechanism Fund*) remains an expected major source of financing in the context of the promotion of energy efficiency in the household sector, however depending on the actual market conditions.

Finally, in order to stimulate the construction of new houses and flats in the country, there are policy plans under consideration by the government to decrease the Value Added Tax burden (VAT, 27%) on construction activities in the household sector, down to 5%, and at the same time also to simplify the licencing procedures. The integration of energy efficiency requirements into the eligibility criteria, however, is not in the scope of the plans at present. (Officina, 2015)

2.3.3. Informational measures

Measures in effect

Energy efficiency in the national curricula

Raising awareness about cautions energy consumption and energy efficiency in the first and secondary education in Hungary is an integrated part of the curricula (from 1st to 12th class). (III. NEEAP, 2015)

“Smartly and knowingly - development programmes for an efficient climate protection”²⁵

The aim of this country-wide public event series by the central government is to disseminate information about current measures and programmes to promote energy efficiency (e.g. about the *Warmth of the Home Programme*), as well as about relevant tendering opportunities for stakeholders, including those in the household sector (owners of buildings, housing communities, etc.) (III. NEEAP, 2015 & MND, 2015c)

Measures under preparation

The main programming policy instrument in Hungary concerning informational measures is the ***Energy and Climate Awareness-Raising Action Plan (ECARAP)*** endorsed by the government in September 2015.

Focusing on the objectives, target groups and the main areas of intended implementation from the perspective of promoting energy efficiency in the household sector, an overview of the action plan in outline is provided below.

The ECARAP, being an action plan of cross-sectorial nature, identifies as target audience the entire Hungarian society, including the civil-, business-, household- and public sectors, with the overall objective (with reference to the relevant objectives of the NEEAP and other related national policy documents, etc.) to propagate energy and climate awareness.

For this purpose the document identifies the main areas of action for the government in the short term (in the majority of the cases till 2020) to foster a major change in the awareness, attitudes and values of stakeholders concerning the use of energy and related to climate change, as well as towards the necessary change of related consumption patterns.

Amongst the identified main fields of action in the ECARAP the ones with the most relevance to the household sector are:

- the promotion of energy efficiency and energy conservation; and
- the realisation of new social and economic structures according to the principles of resource efficiency and low carbon-intensity²⁶

The identified primary target group of the ECARAP, in all fields of action in its focus, is the populace. Special attention is paid to children and young people (as a targeted sub-group), because of their particular importance in inducing the necessary shift in the awareness, values and attitudes of society.

Other identified target groups with high relevance to the household sector include the media, energy utility- and other related companies, as well as the civil sector, with emphasis on the importance of the coordination of related activities and messages to the different target groups.

²⁵ In Hungarian: „Okosan és tudatosan, azaz fejlesztésekkel a hatékony klímavédelemért“

²⁶ In addition to and hand in hand with the fields of action: *promotion and use of renewable energies; energy savings and the reduction of emissions in the transport sector; and climate adaptation.*

The intended main “messages” of the ECARAP are differentiated according to also of age groups, e.g. within the group of children and young people age-groups of 3 to 6 years old and 6 to 18 years old are defined, while in the group of adults, the age-groups of 18 to 39 years of and 39+ years old are, differentiated. Furthermore, low-income households suffering from/endangered by energy poverty are identified as a target group on their own.

Measures put forward in the action plan are grouped into the following main areas:

- Informational and communication campaigns/measures;
- Educational and pedagogical measures;
- Financial support for the implementation;
- Other measures aimed at supporting the implementation (e.g. research, coordination etc.);

For the monitoring of the implementation of the ECARAP an awareness-raising working group will be established by end of 2015 and in a next step an indicator system to evaluate the effectiveness of the implementation of the action plan will be worked out by mid-2016.

An outline of the most important informational measures put forward by the ECARAP, together with some other informational measures as reported by the III. NEEAP, is provided below.

“The price of energy” – awareness raising campaign²⁷

An awareness-raising campaign to inform energy consumers about trends in modern consumer societies and the impacts of energy consumption and thus climate change is planned.

Concerning the household sector, the intended aim of the campaign is to motivate the populace to gain an understanding of the operation of their homes from the point of view of energy consumption and efficiency in particular, as well as about their own behavioural patterns and the respective cost-effects in this context, finally, to motivate the households to make energy audits carried out.

It is expected that the campaign will start in the course of 2016/2017. (ECARAP, 2015)

Energy and Climate-awareness webpage aimed at energy consumers

The aim is to create a source of information independent from the enterprises of the energy and energy efficiency industries, focusing on each fields of action in the scope of the ECARAP (pls. refer above). The intended means of conveying messages includes short video messages and scripts as well as interactive tools demonstrating options for energy savings and related good practices. A connection to social media (e.g. Facebook) will be ensured.

It is expected that this webpage becomes operational by the end of 2015. (ECARAP, 2015)

Energy Efficiency Web Portal of the Government

The *Hungarian Energy and Public Utility Regulatory Authority* is in charge to initiate and then to operate of a web portal, aimed at informing the different groups of energy consumers about relevant legal and economic measures to promote energy efficiency, as well as to provide information about relevant awareness raising and educational programmes, consumption behaviour patterns, and practical methods aimed at promoting energy efficiency.

This website is currently under development and expected to be launched soon. (III. NEEAP, 2015)

²⁷ In Hungarian: „Az energia ára“

Tender framework for projects aimed at raising awareness about the rational use of energy

Under the *Environmental and Energy-efficiency Operational Programme of Hungary* for the period 2014-2020, a tender framework for projects aimed at raising awareness about the rational use of energy is programmed.

The tenders are expected to be announced already in 2015. (III. NEEAP, 2015, EEOP, 2015 and ECARAP, 2015)

Project for the integration and expansion of the energy efficiency information services of energy utility companies

The aim of this intended project is to harmonise the communication by energy utility companies towards energy consumers, amongst them households, about potential measures to improve energy efficiency both concerning their own related activities, as well as related programmes, measures and tenders by the government.

It is expected that this project will be submitted in mid-2016. (III. NEEAP, 2015)

Establishment of the National Network of Energy Engineers

It is the aim of the government to establish a *National Network of Energy Engineers*, integrated into the administrative structures of regional and local authorities. The objective of this planned network is to provide consulting services to the different groups of energy consumers, amongst them households, as well as to contribute to the monitoring of energy savings throughout the economy. It is planned the Network will provide targeted services to low-income families suffering from / endangered by energy poverty. (III. NEEAP, 2015 & ECARAP, 2015)

Primary research into values, attitudes and consumption behaviour related to the use of energy

In order to support the implementation activities of the ECARAP, an expansive primarily research into the values and attitudes as well as the respective consumption patterns of the different target groups in the scope of the action plan is intended to be carried out by end of 2016. (ECARAP, 2015)

Secondary education and adult education in the topic of building energetics

Driven by the need for appropriate technical personnel for the implementation of energy efficiency projects, new programmes for the qualification of building energetics technicians will start from autumn 2016. (III. NEEAP, 2015)

2.3.4. Voluntary/negotiated agreements

Voluntary/negotiated agreements (co-operative measures) are currently not in the focus of energy efficiency policies in Hungary.

2.4. Side effects of policies (also of policies targeting something else)

The lowering of the prices of housing-related energy carriers by governmental measures

It is one of the political goals of the Hungarian government to make energy “cheap” for the economy, in order to maintain the competitiveness of the economy and the wellbeing of the society. One of the grounds why this political goal has been formulated is that the profit rate of the energy sector and energy utility companies in general has become unusually (and depending on the point of view, even unjustifiably) high in Hungary by the end of the 2000s and early 2010s. At the same time the bulk of the profit generated in this way has not been re-invested into the Hungarian economy. (In addition, please refer also to sub-chapter 1.4. on the relative share of households’ expenses on energy services and households’ indebtedness to energy utility companies.)

For the reasons as outlined above, the prices of the main energy carriers in the household sector have been reduced by central governmental measures in the country in three consecutive steps, starting in 2013. As a result of this process, the (nominal) price of natural gas has fallen by 25 % (compared to price levels in 2013) and respectively in the price of electricity has fallen by 24.5% and the price of district heating by 22.6% by end of 2015. This price reduction, however, was not differentiated according to the income levels of individuals/households.

The considerable fall in the prices of energy has, in turn, also hampered the price incentive for energy efficiency incentives in the household sector. Furthermore, it is alleged, and in some cases proved, that the market has not been able to compensate for the lower prices: for example, for the providers of district heat, it was necessary to request continued financial state support in order to be able to maintain their operation.

What might be a reasonable price for energy, by keeping a balance in the relevant economic-, social- and environmental aspects, and how to achieve it in the context of the complex infrastructural and regulatory environment, remains the subject of controversies amongst the relevant stakeholders in Hungary at present. *Sources: MND, 2015d & NPUC, 2015*

The establishment of a stated-owned National Public Utility Company

In the context and connected to the reduction of energy prices for the household sector, the Hungarian government has decided to establish a *National Public Utility Company* (NPUC) in order to provide electricity, natural gas and district heating on the national energy markets.

This new energy utility company is 100% state-owned and its goal is to ensure the security of energy supply and at the same time to provide cheap energy to the Hungarian economy, by re-investing all surplus income into the development of the infrastructure and services. The infrastructure of the NPUC has been established and it is under continued expansion by the gradual buying out of the shares of the large private utility companies currently present on the markets.

In 2015, the NPUC has already been operational on the market of natural gas and from 2016 it is going to become active also on the markets of electricity, finally, at a later point in time also on the markets of district heating, for the households. At a later stage, it is planned that the NPUC becomes active also on the markets for business consumers. It is expected that by the beginning of 2016, more than half of the residential consumers of natural gas will be served by this new state-owned energy utility company.

Although according to the government the NPUC will bring significant benefit to the whole economy by reducing the price of energy, according to some other sources, it will not be possible to operate the company without financial support from the central state budget on the long run. *Sources: NPUC, 2015 & Policy Agenda, 2015*

Controversies about the projected/forecasted mid- and long-term energy demand of the economy

The projected/forecasted mid- and long-term energy demand of the economy, as per the relevant scenarios of the National Energy Policy (NEP), provide ground for the calculation of the volumes of the necessary power-generation capacity in the country, as well as for the definition of energy saving targets in the context of the implementation of the EED.

In the centre of the controversies about the estimated levels of energy demand in the Hungarian economy is the planned expansion of the power generation capacity of the *Paks Nuclear Power Plant* (the so-called Paks II project²⁸), which is at issue both in the context of the necessary volumes of power-generation capacity and also concerning the democratic governance of energy policies.

In the case of the former controversy, it is argued that the official projections of the government, even according to the updated versions as per Government Resolution No. 1160/2015 (please refer also to sub-chapter “2.2. Energy efficiency targets”) overestimate the volumes of future energy demand in Hungary. It is because the estimates do not seemingly take into consideration relevant and important factors, such as the stabilisation of the levels of energy consumption in the household sector for example, but even more importantly, because the full potential for energy improvements are not quantified and thus are not in the plans. There are controversies also about the expected rate of further economic growth.

Consequently, it is argued that by the time it is expected to come into operation, there will be no effective need in the economy for the expanded power generation capacity of the *Paks Nuclear Power Plant* to be realised by the Paks II project.

Furthermore, as an alternative to the Paks II project and from its total estimated budget of HUF 4,000 Billion²⁹, Hungary could achieve its integrated goal for the security of energy supply, the promotion of energy efficiency and the expansion of the capacity of renewable energies by investing into energy efficiency and to the development of smart electricity grids.

Sources: Bart, 2015 & MEHI (coord.), 2013

Uncertainty with planned energy efficiency policies and measures

The lack of a strong and reliable overall strategic framework, including marked political will, demonstrated also by the dedication of appropriate budgetary sources for the promotion of energy efficiency, has always been a major hindering factor concerning the necessary energy refurbishments in the household sector in Hungary.

In fact, too often, related governmental policies, especially the planned means of providing support to households even on the short, or mid-term, have been without weight, or the subject of change and consequently created a “vacuum” (i.e. so that the related policy measures and incentives did not meet the expectations) both in the planning and the execution of the necessary energy efficiency investments.

One recent example is a long-awaited funding programme that has been expected to be launched by the government in order to provide financial support for the energetic refurbishment of the building stock in the households sector:

²⁸ The Paks II project is expected to install circa 70 PJ/year new power generation capacity

²⁹ For comparison, for the energetic refurbishment of the building stock in the household sector in the period 2014-2020, with the cumulative energy saving potential of ca. 38 PJ, HUF 1,608 Billion has been allocated

this programme, including a relevant and dedicated budget to provide non-returnable grants to home-owners from relevant EU funds, although it had already been the integrative part of the *Environmental and Energy-efficiency Operational Programme of Hungary* (EEO), it has suddenly been cancelled by the government.

Instead of this planned and quasi-announced grant scheme, households will be proved by soft loans via a state owned financial institution dubbed the *National Energy Management Company* (NEMC), the government has announced recently.

For more details please refer also to sub-chapter “2.3.2. Economic/financial measures”.

Source: MEHI, 2015

Energy governance

The governance of energy policies is many times the subject of controversies in the country: the *Control Energy Programme* (CEP) project managed by *Energiaklub* has identified several democratic issues with the practice of law making in the field of energy policies of the current government in power.

An example of a **typical democracy gap in the practice of law making** in the country - affecting all fields of policy making, not only energy governance - is that many times the relevant new laws /modifications of the legal code are presented to the parliament by the individual members of the parliament belonging to the coalition of the government in power (instead of the government itself) and in this way the obligation on the part of the government for national stakeholder consultation prior to the parliamentary debate is bypassed.

The political process aimed at the expansion of the already existing nuclear power generation capacity of Hungary (Paks II project, see also above) **has been the subject of strong controversies, including claims on serious democratic gaps in the process, since its outset:** in January 2014 the Hungarian government signed the contracts with its Russian counterpart in the project, the Rosatom Corporation, without prior professional sectorial and public consultation.

In fact, according to *Energiaklub*, all the three basic requirements with any political process with an affect on the spending of public money, namely transparency, accountability and cost-efficiency, are violated by the current Paks II project.

Energiaklub has therefore initiated studies, legal procedures and public consultation to reveal the related democracy gaps and to try to bring the project back under democratic control.

Furthermore, one of the main arguments of *Energiaklub* in their related activities from the technical point of view (i.e. beyond the democratic issues) is that the expansion of the already existing capacity is not justified by the current and expected future trends in the consumption of energy in Hungary. (See also the sub-section on controversies concerning the estimated levels of energy demand in the Hungarian economy in the mid- and long-terms.)

In the frame of the CEP project, in order to make the relevant documents of the Paks II project public, several lawsuits against the government (or public bodies representing the government) have been initiated and successfully concluded by *Energiaklub*. Most of the documents of the Paks II project, however, have been classified for 30 years by the government, on the grounds of nuclear safety, and thus remain confidential.

The website of the CEP³⁰ provides more information and details about democratic issues with energy governance in Hungary. Source: CEP, 2015

³⁰ <http://energiakontrollprogram.hu/en>

3. Private sector support complementing public policies

Introduction

The private sector in Hungary supports energy efficiency at the household level in a variety of ways:

- by providing input to policy, developing policy alternatives, analyzing policy and initiating discussion,
- organizing awareness raising and information and knowledge exchange programs mainly through professional organizations partly or fully established by the private sector, as well as
- initiating and implementing concrete actions, e.g. through providing loans, investment and implementing demonstration programs.

These initiatives by the private sector are conducted either by the companies themselves or through various professional and expert organizations established fully or partly by the private sector. Below, the various actions and initiatives are discussed mainly through introducing the organizations.

Please note that as the variety is great and initiatives appear and are discontinued every year, the main objective of the summary provided below is to illustrate diversity and not to provide a complete overview or an exhaustive list of all existing initiatives!

3.1. Organizations fully or partly established by the private sector, and their initiatives

3.1.1. Hungarian Energy Efficiency Institute (MEHI)

Hungarian Energy Efficiency Institute (MEHI) is a non-profit analytical and advocacy organization (a non-profit ltd), closely co-operating with all companies interested in the energy efficiency market. Its main goal is to encourage energy efficiency investments by assisting and inciting government actions, and also by informing both the consumers and market players. It has been a clear recognition at establishing MEHI that energy efficiency is not only a common concern, but a clear business interest for many market players as well; thus the key energy efficiency enterprises of Hungary are among the main partners of MEHI.³¹

MEHI's main activities are as follows:

- it prepares expert studies and reviews, as well as conducts research in the field of energy efficiency in order to influence and input into policy, develop alternative policy and facilitate the exchange of information and knowledge;
- MEHI organizes expert events to facilitate discussion and debate as well as knowledge exchange around the topic of energy efficiency;
- MEHI also provides services in the field of energy efficiency for companies as well as municipalities and private households.

³¹ Source and further information: <http://mehi.hu/en>

- Among numerous other reports MEHI prepared reports or initiated programmes on the following:
 - The **Energy Efficiency in Hungary programme** (*in Hungarian: Hazai Hatékonyág*) wishes to place more focus and attention on energy efficiency - a so far under-utilized potential for competitiveness -, and specifically on energy efficiency in buildings. The programme **presents an alternative that is much more ambitious in terms of the promotion and implementation of energy efficiency than the current government programme**. MEHI and the programme emphasize that apart from contributing to reducing energy consumption, investing in energy efficiency would bring considerable economic gains (e.g. reduction in spending on energy for all sectors, including households) and would create employment. The details of the suggested programme with graphs, calculations, etc. are available at a website specifically devoted to it at <http://hazihatekonysag.hu/>.

MEHI prepared the report in cooperation with associations of companies active in the building and green building sector.
 - In 2015 MEHI prepared a report on the **current status/mood of the Hungarian energy efficiency sector**. The report was based on a survey of enterprises active in the sector and collected information on what they expect would happen in the sector in 2015, including the main threats and challenges. More than 50 companies replied to the survey. A third (36%) of them reported having more business than in 2014 and 18% of them having less.
The main challenges according to the companies are the uncertain economic situation, the constantly changing legal environment and lack of demand. Several companies commented on the fact of the delayed transposition and acceptance of the Energy Efficiency and Energy Performance of Buildings Directives. (MEHI, 2015)
 - In 2014 and 2015 MEHI announced a competition for the "**renovator of the year**" **among households**. Those households have been awarded the prize that managed to carry out their energy efficient renovations in the most cost-effective way possible.

The main objective of the competition has been to provide more visibility to energy efficient renovation and spread good news about it in the media and on social networks as widely as possible.³²

3.1.2. Organizations promoting low-energy architecture and green building, and their initiatives

In Hungary, there are several rather active organizations working in the field of green building and low-energy architecture:

- The **Hungary Green Building Council (HuGBC)** is a non-profit professional and civil organisation, which was launched by architects, engineers, designers, economists, consultants, scientists, investors, various businesses across the building industry and other professionals, who are all committed to providing a clear direction for the sector as a whole. HuGBC is determined to campaign for a radical transformation of our built environment by providing information on sustainable practices and facilitate learning and communication

³² Source and further information: <http://mehi.hu/projekt/az-ev-felujitoja-palyazati-kiiras> (for 2014) and <http://www.mehi.hu/rendezveny/ki-az-ev-felujitoja-dijatado> (for 2015)

between members and the industry, developing sustainable legislation and establishing market conditions that favour this process.³³

- A popular and successful programme of HuGBC organized once or twice every year is the **Green Walk**, which is a week-long series of open days showcasing the most renowned examples of Hungarian green building, focusing on Budapest, the capital. The event is part of the international [Green Building Week](#). During the Green Walk public and private company buildings as well as private homes can be visited by everyone interested.
- The aim of **MAPASZ Innovative Buildings Association** (MAPASZ) is the evaluation, promotion and building of energy efficient and environmentally-friendly buildings that at the same time provide a high level of comfort. MAPASZ has private company, educational institution as well as individual members.³⁴
 - A popular and successful event of MAPASZ is the annual **passive house open door days** (coinciding with the international Passive House Open Door Days) during which anyone interested is invited to visit energy efficient, low-energy buildings, private as well as public ones. MAPASZ organizes visits, including visits around the country to several buildings in buses.
 - MAPASZ is also actively involved in education and information sharing (e.g. organization of conferences, presence at fairs, etc.).
 - Furthermore, MAPASZ has been involved in developing an alternative certification system for low-energy and nearly zero energy buildings.
- **The objective of the Passive House Builders' National Association (PAOSZ) is to promote passive house building and certification in Hungary based on the criteria developed by the Darmstadt Passive House Institute (PHI).**
PAOSZ has both individual and private company members.
 - PAOSZ also participates in the education of architects and experts, including in cooperation with universities, and organizes passive house conferences every year.
 - PAOSZ organizes **passive house open door days** every year during the international Passive House Open Door Days.³⁵

The promotion of low-energy, nearly zero buildings using modern as well as traditional building techniques is an important aim of non-profit initiatives as well, which sometimes cooperate with organizations mentioned here. Please see details of these in *Chapter 4*.

3.1.3. Energy Agencies

- The **ENEREA Észak-Alföld Regional Energy Agency** (operating in Northern Hungary) was established in March 2009 as the first regional energy agency in Hungary with support from the Intelligent Energy Europe (IEE) Programme of the European Union. The mission of the agency is to promote energy efficiency, to support the rational usage of energy resources, to

³³ Source and further information: <http://www.hugbc.hu/egyesulet/bemutakozas>. At the following website it is possible to see which companies are member os HuGBC: <http://www.hugbc.hu/tagsag/tagok>

³⁴ Source and further information: <http://mapasz.hu/>

³⁵ Source and further information: <http://paosz.hu/>

foster the usage of new and renewable energy resources and to support energy diversification.³⁶

- ENEREA is owned by various municipalities, utility companies and non-profit organizations.
 - ENEREA - among other things - organizes awareness-raising programmes for households, and publishes brochures with energy saving tips for them.
- **LENERG Energy Agency Nonprofit Llc.** is a local public organization, operating at the county level as an energy agency located in Debrecen , the second largest city in Hungary. The Agency was established recently and is owned by the University of Debrecen and Foundation for Development of University of Debrecen.³⁷

LENERG has an interesting project targeting households entitled **Social Electricity**, which is connected to a European project (Social Electricity Online Platform (SEOP)) funded by the Lifelong Learning Programme. The mission of the project is to raise the awareness and knowledge of citizens about energy, the environment and sustainability. An important achievement of the project is an online application called [Social Electricity](#) that is intended to help people manage their personal consumption collaboratively, by interacting and comparing with friends, neighbours and other users.³⁸ The project has a Hungarian platform, but does not appear to be very well known yet in the country.

3.1.4. Hungarian Committee of Domestic Equipment Manufacturers (CECED)

CECED operates in Hungary as a member of the European Committee of Domestic Equipment Manufacturers (CECED), which is a Brussels-based trade association that provides a single, consensual voice for the home appliance industry in Europe. Apart from other issues, CECED works in the field of energy efficiency. In relation to household energy efficiency, they perform some rather well-known activities:

- They operate an **interactive website on energy efficiency** with online activities, information and awareness raising tools, in the framework of the "*Spinning Grumbler's World*" programme targeting both adults and children through separate online tools. They offer saving calculators (e.g. how much energy you can save buy purchasing an energy efficient fridge or through exchanging your light bulbs with energy efficient ones), information, games, videos and advice/tips. The interactive website is available both in Hungarian and English at <http://www.forgomorgo.hu/en>.
- Related to the figure of *Spinning Grumbler*, CECED conducted a **nationwide campaign** between 2006-2008 **to motivate the exchange of old devices for energy efficient ones**, and provide information on the selective collection of e-waste. For the campaign they received the National Energy Globe Award in 2009.

Under the same name (Spinning Grumbler) they also issue a newsletter and have a community engagement site (on facebook).

³⁶ Source and further information: <http://www.enerea.eu/english.php>

³⁷ Source and further information: <http://www.lenergia.hu/about-us/?lang=en>

³⁸ Source and further information: <http://www.seop-project.eu/> and <http://www.social-electricity.com/>

- CECED Hungary actively cooperates with the government in the implementation of the **washing machine exchange programme** (which is the 5th sub-programme of the *Warmth of the Home* grant programme, see section 2.3.2.), in the framework of which they also provide information on the energy consumption of washing machines. In this government funded programme, households receive funding (50% of the machine for A+, A++ or A+++ category equipment) to assist in the exchange of their old washing machines provided that with the exchange they achieve at least a 10% reduction in related energy use or avoid 20 kg/year CO₂ emission.³⁹

CECED also conducted research on the **energy saving potential of replacing old household appliances** in Hungarian homes as well as on the ratio of old appliances in households.

Based on CECED's research (CECED, 2013), Vadovics and Boza-Kiss (2013) observed that people have been delaying purchases and appliance exchanges, which causes the – already old – appliance stock in Hungary to slowly get more obsolete. Compared to the situation in 2009, the ratio of appliances older than 8 years has grown in all categories, in average from 43% to 46% in 2009 and 2013, respectively. This translates into a change from a total consumption of 2,673,589 MWh to 3,009,362 MWh and emission increase from 1,663,450 to 1,942,346 tCO₂.

Regarding appliances, only about 6-10% of owners plan to replace their washing machines or fridges and freezers in the near future, despite the fact that the stock is so old. This ratio is slightly higher in the case of owners of products that are at least 10 years old. **Decisions are influenced primarily by the price, and much less by the energy performance of appliances** (CECED, 2013).

3.2. Bank loans

The availability of loans for energy efficient renovations or building varies a lot and changes regularly, mostly based on the availability of state funding/support for energy efficiency . At the moment, due to the specific political and economic circumstances, only a very limited number and types of loans are available.⁴⁰ For the purposes of the current paper it was not possible to conduct a complete and exhaustive overview of all loans available, but based on our internet-based review, **it appears that at the moment (November 2015) loans are only available for blocks of flats/multi-owner apartment houses to supplement** the government funding available for their energy efficient renovation in the framework of the *Warmth of the Home* programme (see section 2.3.2. above).

Loans to supplement the funding available on a competitive basis to multi-apartment houses (with between 5-60 apartments) are available to cover the 50% own contribution required for eligible blocks of flats from the OTP Bank⁴¹.

³⁹ Sources: <http://cecedhu.hu/Mos%C3%B3g%C3%A9pcsere-p%C3%A1ly%C3%A1zat/> and <http://www.csereprogram.hu/> (last accessed 8 Dec 2015)

⁴⁰ The situation was quite different, for example, between 2008-2010, when a lot more options were available, see, e.g.: https://www.mfb.hu/tevekenyseg/maganszemelyek/lakossagi_energiatakarekossagi (last accessed 25 Nov 2015).

⁴¹ Source: <http://otppp.hu/ujabb-konstrukciok-segitik-az-energetikai-korszerusitest-tervezo-tarsashazakat/> (last accessed 25 Nov 2015)

3.3. Initiatives and support for households by utilities

In this section we provide examples of the kind of actions and initiatives utility companies have in order to support household energy efficiency. Please note that not all utility companies were covered in this analysis, but an attempt was made to introduce the better-known campaigns and programmes as well as to indicate the variety of the actions.

3.3.1. E.ON Hungária

E.ON Hungária Zrt. is one of Hungary's leading energy providers. E.ON Hungária Zrt's electricity providers supply customers in the Transdanubian region and Eastern Hungary, while its gas providers operate in the Transdanubian region. The Group provides nearly two and a half million customers with electricity and supplies gas to over half a million customers in 15 counties. In addition, the Group operates several state-of-the-art, environmentally friendly power plants with capacities under 100 MW in the country. The company is also a significant player on the domestic heating market as the heating provider and partner of several cities, towns and companies.⁴²

E.ON Hungária supports energy saving at the household level in various ways:

- **Providing tips and advice online for consumers;**⁴³
- Giving **E.ON Energy Saving Awards** annually to the most energy efficient household appliances. every year E.ON tests and evaluates the energy consumption of household appliances, and then announces the most efficient products. This kind of certification of household appliances can help consumers save up to several thousands of HUF every year by making smart decisions.

The list of most efficient products is published and widely communicated every year.⁴⁴

- Organizing a massive **educational programme called EnergyExperience** (*in Hungarian: Energiakaland*) for children and young people in different age groups (from the age of 5 till 16) that increases energy awareness and improves their knowledge of energy. Educational materials and tools - including online ones - are provided for both teachers and children.

A successful contest has been organized in 2015 for the 2nd time.⁴⁵

- **Cooperating with and support for non-profit organizations** that work actively with consumers, most importantly to help **reduce household energy consumption through behaviour change**. As a result, the E.ON EnergyNeighbourhoods programme has been running for 3 years nationwide, coordinated by GreenDependent Institute. Every year about 25-30 energyneighbourhoods (groups of 5-7 households), or 120-150 households participate in the programme and save on average 8-10% - but the best performing groups as much as 25-30% - energy through behaviour change.

See more details about this programme in *Chapter 4: EnergyNeighbourhoods programme by GreenDependent*.⁴⁶

⁴² Source: <https://www.eon-hungaria.com/en/corporate/eon/history> (last accessed 25 Nov 2015)

⁴³ See: http://www.eon.hu/aktivenergia/2014_nyar/energiatakarekos-otthon (last accessed 25 Nov 2015)

⁴⁴ Source: <https://www.eon-hungaria.com/en/press/releases/2015/a-carefully-chosen-appliance-can-save-thousands-of-forints> (last accessed 25 Nov. 2015)

⁴⁵ Source and further information: <http://www.energiakaland.hu/>

⁴⁶ See details also at <http://www.energiakozossegek.hu>

3.3.2. ELMŰ-ÉMÁSZ

ELMŰ has been operating in Hungary for more than a century. The Company was established in the era of the Austro-Hungarian Empire, and has pursued its activity with the original purpose to supply various groups of consumers with electricity, surviving two world wars and several governmental changes. As ELMŰ-ÉMÁSZ the group of companies has been operating since 2007 as one of the largest electricity providers in Hungary, serving around 2 million consumers.

Similarly to E.ON Hungária, ELMŰ-ÉMÁSZ also offers a variety of incentives and programmes intended to increase household energy efficiency and awareness:

- They offer **GREEN and GEO (geothermal) tariffs** - to allow households to purchase green energy.⁴⁷
- In the framework of the **LED Energy Saving Programme** households are invited to buy premium category LED lights and pay for them in instalments. The company complements this popular programme with an online energy saving calculator tool.⁴⁸
- ELMŰ offers **interest-free loans** for households for the installation of **solar energy systems**.⁴⁹
- ELMŰ also has an **educational programme** called the **enHome GreenLine** (*in Hungarian: enHome Zöldjártat*), which is a roadshow-like service intended to attract and educate consumers with exciting and interesting content and information. Its main goal is to provide information on renewable energy sources for the young generation. The service is free and interactive. Schools and educational institutions are encouraged to incorporate it into their programme of education.⁵⁰
- **Energiapersely** is an **energy saving programme** for households providing tips and advice for saving energy in the home, both online and in the form of printed flyers, including a service that allows households to **borrow energy meters** from ELMŰ-ÉMÁSZ customer service offices.⁵¹
- ELMŰ created the **Liveable Future Park**, a demonstration of energy efficient and renewable energy systems in the form of an open air demonstration park that is open for visits from the public.⁵²

3.4. Energy Service Companies (ESCOs)

3.4.1. State of the art

This chapter is based on a reports prepared by GreenDependent Institute (Boza-Kiss and Vadovics, 2013) in the framework of the IEE supported TRANSPARENSE project.⁵³

⁴⁷ Source and details are available at <https://www.elmu.hu/#!/lakossagi-ugyfelek/tarifak-dijak/zoldtarifa> and <https://www.elmu.hu/#!/lakossagi-ugyfelek/tarifak-dijak/geotarifa> (last accessed 25 Nov 2015)

⁴⁸ Source: <http://elmu.hu/#!/lakossagi-ugyfelek/ajanlataink/led-energiatakarekossagi-program> (last accessed 25 Nove 2015)

⁴⁹ Source: https://enhome.hu/finanszirozasi_megoldasaink/reszletfizetes (last accessed 25 Nov 2015)

⁵⁰ Source: <http://elmu.hu/#!/lakossagi-ugyfelek/ajanlataink/zoldjarat> (last accessed 25 Nov 2015)

⁵¹ Source: <http://elmu.hu/#!/lakossagi-ugyfelek/ajanlataink/energiapersely> (last accessed 25 Nov 2015)

⁵² See details at <https://www.youtube.com/watch?v=9QXzkr1DTNc> (last accessed 25 Nov 2015)

The Hungarian ESCO market has experienced a strong decline during the last 6-7 years. While in the early 1990s Hungary was known as an exemplary ESCO market, it started fluctuating from around 2006, and continued its insecure stride during 2007-2010. Since 2009-2010, obstacles have grown so significant that the previously 20-30 active companies were reduced to 6 in 2013.

Key barriers are:

- **Problems with the policy framework:** such as the weak energy efficiency and buildings policies; promise of non-refundable grants that however prove to be rare and little, no accepted definition of EPC/ESCO and thus a lack of understanding of the concept.
- **Policy instability:** lack of supportive legislation and measures, rapid policy making and unexpected legal changes, counteractive policies and decisions.
- Therefore **the financial bases are also instable:** liquidity problems of the potential clients and also of many ESCOs, unexpected special taxes on banks and energy providers (among others), available bank products are not designed to the preferences of an ESCO project participants.
- **Information barriers:** political messages are counteractive: political goal of utility cost reductions by legal means, support for nuclear energy, discouraging bank loans, general public and public building owners are afraid of bank products due to the credit crash, lack of trust in the construction sector in general, lack of trust in subcontractors by ESCOs, lack of long term thinking and planning. (Boza-Kiss and Vadovics, 2013)

3.4.2. Code of Conduct established, signatories

As part of the TRANSPARENSE project (supported in IEE), a European Code of Conduct for Energy Performance Contracting (EPC) was established and introduced in about 20 countries.⁵⁴

The European Code of Conduct for EPC launched by Transparense in 2014 defines the basic values and principles that are considered fundamental for the successful preparation and implementation of EPC projects. It went through a two year long stakeholder process to make sure market players accept the principles. The Code of Conduct was developed in co-operation with the European associations of EPC providers - the European Association of Energy Service Companies (eu.ESCO) and the European Federation of Intelligent Energy Efficiency Services (EFIEES). While the Transparense project was completed in September 2015, the two European associations - as well as relevant national bodies in the participating countries - continue in administaring and maintaining the European Code of Conduct for EPC and related activities as it is in line with their goals in supporting the European EPC markets.⁵⁵

The main role of the Code of Conduct is to bring confidence to the EPC market in the EU taking into account its variety across the member states. Compliance with the Code of Conduct serves as a minimum guarantee of the quality of EPC projects implemented. During the Transparense project, the Code of Conduct has been tested in 37 pilot projects which at the same time contributed to the promotion of good practice principles both on the side of ESCOs and clients.⁵⁶

⁵³ See details at <http://www.transparense.eu/eu/home/welcome-to-transparense-project> (last accessed 8 Dec 2015).

⁵⁴ See details at <http://www.transparense.eu/eu/epc-code-of-conduct>

⁵⁵ Source: the Transparense project website at <http://www.transparense.eu/eu/home/welcome-to-transparense-project> (last accessed 20 Dec 2015)

⁵⁶ Source: the Transparense project website at <http://www.transparense.eu/eu/home/welcome-to-transparense-project> (last accessed 20 Dec 2015)

In Hungary, the Code was successfully introduced by GreenDependent Institute and signed by 5 companies and 2 supporting organizations⁵⁷. In the future, following the conclusion of the project, the Code will be managed by MEHI (the Hungarian Energy Efficiency Institute) in Hungary.

3.5. Other, miscellaneous initiatives by the private sector or in cooperation with the private sector

3.5.1. Insulation demonstration project by Knauf Insulation

In the winter of 2013/2014 in cooperation with non-profit and expert organizations (e.g. MEHI, Energy Club, Budapest University of Technology and Economics, various media organizations, etc.) Knauf Insulation implemented a demonstration project with the involvement of 2 comparable households and houses that were selected through a competitive process. The two households and houses had to be as similar to each other as possible as the aim of the demonstration project was to show how much lower heating costs insulated houses have.

The project was widely publicized in the media. In addition, anyone could follow the project through its website and Knauf Insulation also issued press releases throughout the process showing first the insulation of the first house, then how it performed in the winter along with measurement data, then the overall heating costs and information about levels of comfort. Finally, at the end of the year the insulation of the second house to reward the families for participating and agreeing to be in the media. A summary publication was also prepared and is available freely online.

The demonstration project showed that by the insulation of a typical detached family home 50% of the heating costs can be saved.⁵⁸

After the conclusion of the project, Knauf Insulation published a summary publication including measurement data as well as detailed technical advice for households on how to implement insulation projects in the best way. (Knauf Insulation, 2014)

3.5.2. Research related to household energy efficiency by the private sector

The private sector also contributes to research on household energy efficiency. As illustrated below, different organizations conduct and publish research on different topics.

- The **TÁRKI** Social Research Institute is an independent, employee-owned research organisation that specialises in policy research in the fields of social policy and the social consequences of economic policies. Their research (Szívós, Tóth, 2013) revealed that:
 - **the changing structure of consumption** that shows how spending on home maintenance including spending on energy grew from 23.4% in 2004-2005 to 33.5 % in 2012; and

⁵⁷ Source and list of signatories can be seen at <http://www.transparence.eu/hu/etikai-kodex/alairo-cegek-listaja> (last accessed 25 Nov 2015).

⁵⁸ Details of the project are available at <http://nalamszigetelnek.hu/mi-igy-hoszigeteltunk> (last accessed 25 Nov 2015).

- inequality and polarization in Hungarian society - including information on **how many households spend on TV, internet, and other household appliances and how this spending changed** between 2004/2005 and 2012.
- **Awareness of households of their energy consumption:**

Research by **OTP Building Society Ltd** (owned 100% by OTP Bank) revealed that people tend to believe that they do everything they can and they could not possibly save any more through behaviour change when 64% of them do not even monitor their consumption, and when asked to list what exactly they do in order to save energy they only mention defrosting the fridge and unplugging mobile phone batteries. (OTP, 2012)

Furthermore, research on the general awareness of households of their energy consumption in Hungary revealed that 64% do not keep track of or monitor their consumption (OTP, 2012), with 21% never looking at their energy bills (Bell Research, 2013).

Please see more about this in *Chapter 1.4*.

4. Initiatives targeting households behavior

Introduction

There are numerous and varied initiatives all over Hungary in the field of energy efficiency and low-carbon living targeting households. They are introduced below, organized into two main sub-chapters: initiatives by municipalities, and initiatives by NGOs and other non-profit organizations.

Please note that as the variety is great, and initiatives appear and are discontinued every year, similarly to Chapter 3, the main objective of the summary provided below is to illustrate diversity and not to provide a complete overview or an exhaustive list of all existing initiatives!

4.1. Initiatives by Municipalities

4.1.1. Organizations

Municipalities, often in cooperation with NGOs, founded several organizations to assist in their work towards more sustainable energy use, higher energy efficiency and the utilization of renewable energy sources.

- The **Alliance of Energy Efficient Municipalities** (EHÖSZ) was founded in 2007. The Alliance is an organization for municipalities (as of Dec 2015 with 20 members) in order to join forces and achieve a higher level of energy efficiency in their settlements. Among other things, the Alliance organizes events to facilitate the exchange of experience between municipalities.⁵⁹
- The **Alliance of Climate-Friendly Municipalities** was also founded in 2007 and has 27 member settlements from all over Hungary (as of Dec 2015). The Alliance publishes a monthly newsletter, organizes events, makes publications to facilitate the work of municipalities in the field of climate adaptation, energy efficiency and the utilization of renewable energy sources.⁶⁰

The Alliance also cooperates with the Hungarian Academy of Sciences to help spread good practice and support the development of local climate change, adaptation and energy strategies. An important feature of the work of the alliance is that they place **great emphasis on the involvement of the local population and communities**, and suggest that all member municipalities support the founding of a local climate club. Furthermore, the Alliance published recommendations⁶¹ for its members which, among other issues, contains advice for employing a climate coordinator.

The local climate clubs founded by the municipalities are often very active and organize numerous programmes with the involvement of the local population, for example in the towns of Tatabánya⁶² and Szekszárd⁶³. In the case of the latter the municipality

⁵⁹ Source and further information: <http://ehosz.hu/>

⁶⁰ Source and further information: <http://www.klimabarathu/>

⁶¹ Source and the details of the recommendations can be found at http://www.klimabarathu/sites/default/files/document/klimabarathu_ajanlasok_2014_final.pdf (last accessed 8 Dec 2015)

⁶² Source and further information on local climate change and energy efficiency programmes in Tatabánya is available at <http://kornyezetvaltozas.lapunk.hu/>.

⁶³ Source and further information on local climate change and energy efficiency programmes in Szekszárd is available at http://zoldtars.hu/szekszardi_klimakor.

cooperates with a local NGO for the running of the climate club, and managing the local climate change fund.

Between 2008 and 2010, with financial support from the Environment and Energy Operational Programme in Hungary through EU funding, the **municipality of Tatabánya** implemented a very **innovative programme called "Climate Ticket"**. The aim of the programme was to set up a system that helped people and organizations to offset their emissions voluntarily at the local level through green investments. The climate-ticket system works by helping businesses and individuals to assess the size of their carbon footprints and to voluntarily pay for them as well as providing investment in projects in the Tatabánya Region. All of the proposed investment projects have numerous co-benefits such as improving the quality of life and well-being of local communities. The local municipality has had plans to continue with the project as the climate ticket idea appears to be popular among local people and organizations. (Vadovics et. al., 2012)

- The third relevant organization established in 2009 by municipalities and a Hungarian NGO, on authority from the European Climate Alliance, is the **Hungarian Climate Alliance**. The Alliance has municipality as well as NGO members. The aim of the Alliance is to join forces between initiatives that involve municipalities and NGOs/local communities in the field of climate change and climate protection.⁶⁴

4.1.2. Support from municipalities for energy efficiency renovation

Several municipalities offer local support for the energy efficient renovation of private homes as well as apartment houses or multi-owner housing blocks. Both the amount of support available and the list of towns where the support is available vary from year to year. Although it would prove to be challenging to prepare a summary study on such initiatives by municipalities, it is worth mentioning an example.

One of the most active towns in this field is Tatabánya, a town of 65-70,000 inhabitants. Through various means, the municipality has supported the energy efficient renovation of buildings, with specific emphasis on apartment houses (or blocks of flats) since 2010⁶⁵. Most recently, in 2014 and 2015, the municipality provided support for blocks of flats on a competitive basis (based on competitive calls for proposals) partly by providing interest-free loans for energy efficient renovations, partly by supplementing the support blocks of flats can receive from the central grant programme, *Warmth of the Home* (see section 2.3.2.). (*Tatabánya is member of EHÖSZ as well as the Alliance of Climate-Friendly Municipalities, the organizations established by municipalities and described above.*)

4.1.3. Low-energy social housing built by municipalities

- **Passive house apartment house, 13th district of Budapest**

One of the district governments of Budapest completed an exemplary unique initiative, the first of its kind Hungary. A multi-flat building with 100 flats was built in the 13th district. The building was completed by 2014. The flats remain local government

⁶⁴ Source and further information: <http://www.eghajlatvedelmiszovetseg.hu/>

⁶⁵ Source: the homepage of the town of Tatabánya where municipal documents can be found and downloaded from (<http://tatabanya.hu/search/searchresults?query=p%C3%A1ly%C3%A1zatok%20eredm%C3%A9nye&spage=15&psize=10> and <http://tatabanya.hu/fooldal/gyorskereso/palyazatok>, last accessed 8 Dec 2015).

property and are rented out on a social basis. The building was successfully certified by the Passive House Institute (PHI, Darmstadt).

Apart from providing energy efficient housing for those in need, the municipality also ensured that they were educated and trained in how to use the buildings in the most efficient way. Furthermore, inhabitants also received training on how to save energy through behaviour change. (NZEB, 2014 and see also⁶⁶)

- **Straw bale 3-apartment eco houses built by the village municipality of Györköny**

The mayor of Györköny developed an innovative programme for building affordable energy efficient houses in the village for multiple reasons:

- to create affordable homes in the village to be able to keep the population there, and in this way prevent the depopulation of Györköny;
- to create employment;
- to build energy efficient and ecologically sustainable houses from locally available materials.

The programme was supported by the Ministry of Rural Development, and was implemented in cooperation with Szent István University and the Duna Összeköt Leader Association.⁶⁷

4.2. Initiatives by NGOs and other not-for-profit organizations

4.2.1. Information and awareness raising (with various tools) for increased efficiency and carbon footprint reduction in households

As there are numerous programmes completed and currently underway in this category, it is impossible to provide a complete overview. Thus, the aim of the authors was to introduce those projects that are more well-known, innovative in nature or significant in their view.

- In 2010 the **Energiaklub**⁶⁸ published a booklet, set up a website and organized numerous events in partnership with local organizations all over Hungary to spread information about the **compulsory energy audit and home energy certificate**. Both the booklet and the website⁶⁹ have been very popular and include tips for increasing the energy efficiency of households. At the website using a simple calculator households were also able to check until recently which energy efficiency category (A+, B, C, D, etc.) their home belonged to.
- In 2012 **Energiaklub** also conducted an information campaign with an interactive website, real-life renovation case studies of different types of houses and flats,

⁶⁶ Source: <http://www.budapest13.hu/hirek/20150127/egyedulallo-beruhazaskent-a-xiii-keruleti-onkormanyzat-megepitette-es-atadta-az-oroszag-első-100-lakasos-passzivhazat>

⁶⁷ Sources: <http://greenfo.hu/hirek/2011/07/26/olcso-fenntarthato-otthonok> and <http://www.sonline.hu/tolna/kozelet/epitsen-szalmabala-hazat-olcso-es-kornyezetbarat-391472> (last accessed 8 Dec 2015)

⁶⁸ Energiaklub is one of the most important non-profit organizations working in Hungary in the field of sustainable energy. See more details at: <http://energiaklub.hu/en>

⁶⁹ The website is available at <http://www.lakcimke.hu/> and the booklet can be downloaded from it (http://www.lakcimke.hu/sites/default/files/lakcimke_2010.pdf, last accessed 8 Dec 2015)

calculators, short documentaries, etc. on energy efficient renovation called "**Renovations are Imminent**". The overall objective of the project was to help the general public realize that energy efficient renovation is in their own interest.⁷⁰

- Between 2009 and 2011 **GreenDependent Association**⁷¹ organized two nationwide campaigns for households called 'Large family - small footprint' and 'Small footprint'. The methodology used in the campaigns was based on behaviour change research.⁷²

The overall aim of the campaigns was to initiate long-lasting behaviour change in household energy use behaviour. The objectives were to raise the energy and climate change awareness of households, to draw attention to and provide information on energy saving possible without investment, and to reduce consumption through various means. Information was provided at community events, online, at information training events, in newsletters, bi-weekly tips and through publications, including case studies by participating households.

An interesting feature of the programmes was that in the implementation GreenDependent closely cooperated with the Association of Large Families (*families with 3 or more children*) in order to reach as many households as possible.

The **Small Footprint monthly electronic newsletter**⁷³ targeting households is still in publication and reaches cc. 3000 households directly, and a lot more indirectly as teachers and NGOs use it in their educational and awareness raising programs.

The results of the Small Footprint campaigns are summarized in Table 4.1.

Table 4.1. The results of the Small Footprint campaigns

	When?	How many participants? (people, households, groups)	Number of voluntary local group coordinators trained	Was consumption monitored (meter reading) and carbon footprint calculated?
Small Footprint (SF)		focus placed on households		
Large Family – Small Footprint campaign	2010-2011	cc. 4000 households reached by campaign, around 500 participating in competition	7	yes, compulsory, focus on carbon footprint (calculated based on meter readings)
Small Footprint campaign	2011-2012	cc. 3000 households reached by campaign, more than 500 participating in competition	20	

Source: adapted from Vadovics and Boza-Kiss, 2013

- The NGO **EcoService**⁷⁴ offers both training and an interactive website with tips for greening the home. The tips include energy saving ideas for homes.

⁷⁰ Source and further information: <http://www.kuszobonafelujitas.hu/>

⁷¹ About GreenDependent Association please see <http://www.greendependent.org/index.php>

⁷² Further information on the Small Footprint programs is available at <http://www.kislabnyom.hu> and [here](#). See also Vadovics and Boza-Kiss, 2013.

⁷³ See issues at <http://www.kislabnyom.hu>

- The **Hungarian Network of Eco-counselling Offices** (KÖTHÁLÓ)⁷⁵ implemented a sustainable lifestyles campaign through its nationwide network of counselling offices in 2008-2009 in 30 towns⁷⁶. The campaign had less specific focus on energy efficiency, instead, it took a more of a holistic approach. Apart from this specific campaign, KÖTHÁLÓ has numerous publications, local and nation campaigns to support households in greening their lifestyles.
- On the initiative of **Energiaklub**, a network of NGOs all over Hungary offers a DIY door and window insulation opportunity for interested households. NGOs provide the know-how (including an online short instruction film), training and rent the equipment necessary for doing the insulation, and then households can do the work themselves.⁷⁷:

4.2.2. Programmes aiming at and measuring consumption reduction

There have been several nationwide programmes in Hungary that actively engaged households in several months long, rather intensive programmes that aimed at reducing their consumptions. All of these programmes have been running for several years. They share certain aspects in their approach and methodology in working with households, namely that:

- they are all group-based and are based on the idea that creating a supporting group or community is vital for initiating and retaining behaviour change; and
- they all train voluntary group coordinators who work with the small groups as well as become multipliers of the programmes. (Heiskanen et. al., 2010; Nye, Burgess, 2008; Vadovics and Boza-Kiss, 2013)

The programmes are the following:

- Since 2010 the **Association of Conscious Consumers**⁷⁸ has been running the **EcoTeams programme**⁷⁹ successfully in Hungary nationwide. EcoTeams is the behaviour change based household sustainability programme of Global Action Plan that was adapted and used in several countries. In Hungary, since the beginning more than 750 households participated in the programme.

In this programme teams of households led by a volunteer coordinator - trained by the Association - examine and green their everyday lifestyles together. Households participating in the EcoTeams programme managed to reduce

- their food waste by 24%,
- their mixed household waste by 23%,
- their electricity use by 15%,
- their natural gas use by 31%, and

⁷⁴ About EcoService please see <http://okoszolgalat.hu/en/fooldal/>, and their eco household training at <http://jollakni.hu/utca.php> (last accessed 8 Dec 2015)

⁷⁵ About KÖTHÁLÓ please see <http://www.kothalo.hu>

⁷⁶ See more about the campaign at <http://www.kothalo.hu/index.php/keop-projekt>

⁷⁷ Source: <http://energiaklub.hu/hatteranyag/utolagos-nyilaszaroszigeteles-a-magyar-energia-brigadokkal> (last accessed 8 Dec 2015)

⁷⁸ See more about the Association of Conscious Consumers at <http://tudatosvasarlo.hu/tve/association-of-conscious-consumers>

⁷⁹ About EcoTeams see more at <http://www.globalactionplan.org.uk/ecoteams>

- their water use by 13%.⁸⁰

The EcoTeams (*or in Hungarian, ÖkoKörök*⁸¹) programme has been supported by various public funding frameworks both in Hungary (e.g. the operative programs through EU funding, green NGO fund) and the EU (e.g. the Lifelong Learning Programme of the EC).

- The **Small Footprint campaigns** by GreenDependent Association mentioned above also aimed at energy use and carbon footprint reduction, and **provided a carbon calculator for households** to measure their carbon footprints based on meter readings, transport use, eating and holidaying habits. The calculator can be used to compare the footprint between various years/seasons/months and is available for use for free (at <http://www.karbonkalkulator.hu>).

Also as part of the campaign GreenDependent Association published **case studies of small footprint households** (Vadovics et. al. 2011 and 2012) to spread good practice and prove that small footprint living is possible. Furthermore, two of the case study owner households were filmed by a national TV channel (Duna TV), and some households were also interviewed for a popular women's weekly magazine (Nők Lapja).

- Since 2011 first **GreenDependent Association**, then **GreenDependent Institute**⁸² has been running the EnergyNeighbourhoods⁸³ programme specifically aimed at reducing energy consumption through behaviour change.

The EnergyNeighbourhoods methodology was originally developed in Belgium. The first campaign, conducted between 2007-2009 in 9 European countries (not including Hungary) won the **ManagEnergy Local Energy Action Award** in 2010⁸⁴ (see also EEB, 2011, and (Vadovics and Boza-Kiss, 2013 for details of the methodology).

Since 2011, every year between 100 and 150 households forming small groups (called EnergyNeighbourhoods) from all over Hungary participate in the programme (so altogether more than 600 households, see Table 4.2.), which is also a competition. **The average saving or energy consumption reduction of participating households is 8-10%, but careful households often save as much as 15-20%, and even achieve more than 30% saving without a decrease in their comfort.**

The EnergyNeighbourhoods programme was first supported (between 2011-2013) by the **EU in the framework of the IEE programme**, and was run in 16 countries. Afterwards, in Hungary the project has been **supported by a utility company, E.ON Hungária** since 2013 (*see also in Chapter 3*). In this set-up the project won a prize in Hungary from the Hungarian Donors Forum⁸⁵.

⁸⁰ Source: <http://tudatosvasarlo.hu/okokorok-eredmenyei> (last accessed 8 Dec 2015)

⁸¹ Information about the Hungarian EcoTeams or ÖkoKörök is available at <http://tudatosvasarlo.hu/mi-okokor> (last accessed 8 Dec 2015)

⁸² About GreenDependent Institute please see <http://intezet.greendependent.org/en>

⁸³ The Hungarian website of the EnergyNeigh program can be accessed at <http://www.energiakozossegek.hu>

⁸⁴ http://www.managenergy.net/resources/1257#.Vj_Btb8Rqs4 (last accessed 8 Dec 2015)

⁸⁵ Source: <http://www.donorsforum.hu/hu/friss-hirek/1-latest-news/618-a-magyar-adomanyozoi-forum-kihirdette-a-tarsadalmi-befektetesek-dij-idei-nyerteseit> (last accessed 8 Dec 2015)

Table 4.2. Summary of groups, households and coordinators participating in the EnergyNeighbourhoods programme

Energy-Neighbourhoods	When?	How many participants? (people, households, groups)	Number of voluntary local group coordinators trained	Was consumption monitored (meter reading) and carbon footprint calculated?
Season 1	2011-2012	24 groups started, 18 completed, 140 households	24	yes, focus on energy saving measured in kWh (compulsory), use of carbon footprint calculator optional
Season 2	2012-2013	25 groups started, 17 completed, 120 households	25	
Season 3	2013-2014	31 groups started, 25 completed, 182 households	37	
Season 4	2014-2015	32 groups started, 26 completed, 90 households	39	
Season 5	2015-2016	24 groups started, about 100 households	26	

Source: partly based on Vadovics and Boza-Kiss, 2013 and partly on additional data from GreenDependent Institute

An encouraging achievement of the EnergyNeighbourhoods programme has been that several people who first participate as group members later feel empowered and encouraged to organize their own groups and become coordinators. Furthermore, there have been groups who participated in the programme for several years, and thus managed to continue reducing their consumption as well as making the changed behaviour last. (Vadovics and Boza-Kiss, 2013)

4.2.3. Initiatives targeting socially disadvantaged and low-income households

As observed in *Chapter 1*, energy and fuel poverty is an important issue in Hungary as quite a large number of households are impacted by it. Thus, there have been several initiatives aiming at finding solutions to the problem by dealing with social as well as environmental sustainability issues.

- Between 2011-2014 **Energiaklub**¹⁰ worked with low-income households to increase their energy efficiency mainly through behaviour change in the framework of the European Energy Check for Low-Income Households project⁸⁶. In the programme Energiaklub reached and worked with 260 low income households through training 10 people to be able to work with them. Each household was visited by a trained person to help them go through their everyday energy use practices and conduct simple measurements. The aim was to save energy - Energiaklub argues that with the measures and tips given to households they are able to save 10-15% of their energy bills, and also increase their comfort.⁸⁷
- **EcoService** - as part of the network of NGOs offering support for DIY door and window insulation (see section 4.2.1. above) - also offers a programme for low-income households in various country towns to learn to insulate their doors and windows, and

⁸⁶ Please see <http://www.ec-linc.info/> for information about the IEE funded project.

⁸⁷ Please see <http://www.csekkcsokkento.hu/> for specific information on the implementation of the project in Hungary.

thus increase their thermal comfort and save energy and money. The programme was first supported by the EGT and Norway NGO grant. Currently, EcoService is running a crowdfunding campaign to be able to continue the programme.⁸⁸

- **Habitat for Humanity Hungary**⁸⁹ also conducted a project for low income households in 2014 with support from the Saint Gobain Initiative Foundation and volunteers. They organized the insulation of houses for low-income households around the town of Vác.⁹⁰
- the **Real Pearl Foundation and Art School**⁹¹ started an innovative **biomass briquettes programme** for households in deep poverty. Today in Hungary cc. 1 million people live below the poverty line. The poorest have no hope for jobs. The majority of them live in small villages in rural areas especially in Southern Baranya and in North and East Hungary where the unemployment rate is higher than the national average. The Foundation operates in such a micro-region (in the Berettyóújfalu micro-region), in the North-East of Hungary.

The biomass briquette technology was developed by a US organization, the Legacy Foundation. The advantages of the technology are that with small investment, using local materials (often waste materials such as agricultural waste) and with the help of hand-powered machines a community can make its own fuel for the winter. At the same time, they create jobs, reduce the price of fuel and, very importantly, save the local forests from being cut down.

The programme has been in operation since 2011 in the village of Told and received the main SozialMarie award⁹² of the Unruhe Privatstiftung, and the Social Integration Award of the Erste Foundation⁹³.

Based on the current plans of the Foundation, the biomass briquette is going to be part of a more complex heating energy efficiency programme in the framework of which stoves will be modernized, houses insulated and doors and windows repaired - in addition to making briquettes.⁹⁴

4.2.4. Community-based programmes

Several programmes mentioned above - see *section 4.2.2.* on the **EcoTeams**, **EnergyNeighbourhoods** and the **Small Footprint** programmes - that have an important group and community building element could be mentioned here. Furthermore, the **Alliance of Climate-Friendly Municipalities** that actively encourages municipalities to help the formation of local climate groups or clubs could be listed here, too. All these programmes **recognize the importance of small groups or communities in achieving and sustaining behaviour change towards lower carbon lifestyles** and more sustainable energy consumption (Heiskanen et. al., 2010; EEA, 2013).

⁸⁸ Source: <http://okoszolgalat.hu/fooldal/> (last accessed 8 Dec 2015)

⁸⁹ About Habitat for Humanity please see <http://www.habitat.hu/>

⁹⁰ Source: <http://www.habitat.hu/hu/projekt/csaladok-otthonainak-hoszigetelese-vac-kornyeken?id=27> (last accessed 8 Dec 2015)

⁹¹ About the Real Pearl Foundation and Art School please see <http://igazgyongy-alapitvany.hu/en/>

⁹² Source: http://sozialmarie.org/cikk/dijazottak_2013.3240.html (last accessed 8 Dec 2015)

⁹³ Source: <http://www.socialintegration.org/network/real-pearl-foundation/> (last accessed 8 Dec 2015)

⁹⁴ Source: <http://igazgyongy-alapitvany.hu/alapitvany/biobrikett-program/> (last accessed 8 Dec 2015)

There are several other community-based programmes that could be mentioned in addition to the ones already discussed elsewhere. They are the following:

- **Transition Town initiatives in Hungary:**

- The first transition town initiative in Hungary has been **Transition Wekerle**⁹⁵ in the 19th district of Budapest (first called Climate-friendly Wekerle), operating since 2008. Among numerous other initiatives, the transition group organized so-called **Energy Brigades** that trained and supported people in the DIY insulation of their doors and windows, also renting them the necessary machines.

Furthermore, some members of the Transition Wekerle group also participated in GreenDependent's first *EnergyNeighbourhoods* programme and set out to decrease their energy consumption by 9%.⁹⁶

- Another member of the transition network in Hungary is **Transition Kecskemét** (MÁK in Hungarian), the members of which participated in the *EcoTeams* programme.

- **Friends of the Earth Hungary** is also involved in an EU-funded (in the framework of the IEE programme) community energy project called **Community Power**.⁹⁷

Research in the project revealed that in Hungary there is no community-owned energy project at the moment (Nov 2015); however, there are various and diverse initiatives that help the move in this direction, the majority of them renewable and sustainable energy projects by municipalities or small regions all over Hungary⁹⁸. Almost all of these projects are based on the cooperation of different stakeholders, most often municipalities, local NGOs and SMEs. The installed renewable energy generation capacities are used to power public and community buildings.

Furthermore, it is the objective of the project to discover and help prepare a more favourable legal environment for community energy in the country, promote relevant solutions, and organize stakeholder events.

4.2.5. Initiatives around energy efficiency and buildings, including traditional architecture

In *Chapter 3* several initiatives by the private sector and their various organizations were mentioned, several of them to do with organizing open door days for the general public as well as a more expert audience to familiarize everyone with the building, maintenance and operation of low-energy, efficient and environmentally-friendly buildings.

In relation to this it is important to mention the initiative of **GreenDependent Institute** to organize open door days called:

⁹⁵ Please see <https://www.transitionnetwork.org/initiatives/talaku-wekerle-transition-wekerle> for more details. (last accessed 8 Dec 2015)

⁹⁶ Source: <http://www.vedegylet.hu/doc/korwebre.pdf> and http://wekerletelep.hu/zold_haitas/.

⁹⁷ See more details of the project at <http://www.communitypower.eu/en/>.

⁹⁸ See database for Hungary at http://www.mtvsh.hu/kozossegi_energia (last accessed 8 Dec 2015)

- **Nearly Zero Energy Buildings (NZEB) Open Doors Days⁹⁹**

In the framework of an IEE supported European project GreenDependent Institute, a not-for-profit organization implemented low-energy buildings open doors days on two occasions, in 2013 and 2014 for a week nationwide each time. Public and private buildings and homes were opened for visitors so that the general population and experts could get hands on information about the building and use of low energy buildings. GreenDependent cooperated with professional organizations (e.g. with MAPASZ described in 3.1.2. above) as well as the media to have the largest possible reach and impact. In the project a website was also prepared with information on all the buildings that were opened¹⁰⁰, two publications with data on the buildings as well as professional articles published, and short documentaries¹⁰¹ made in all the participating countries - and then translated into all national languages.

Table 4.3. provides a summary of the number of visitors in the two years of the campaign as well as the number of buildings opened.

Table 4.3. Number of visitors and number of buildings opened during the two years of the NZEB Open Door Days in Hungary

Visitors (no.)	Actual 2014	Target 2014	Actual 2013	Target 2013
Residential	759	1125	523	625
Public - commercial	242	225	163	150
Total	1001	1350	686	775
Buildings (no.)				
Residential	40	45	31	25
Public - commercial	19	15	12	10
Total	59	60	43	35

Source: GreenDependent, 2014

Two of the most notable findings of the survey filled in by visitors and exhibitors following the open door days are that:

- **63.29% of responding visitors will consider building a new house to a nearly zero energy standard after attending the NZEB Open Doors events;**
- 73.68% of exhibitors would definitely rejoin the campaign in 2015.

A very similar and encouraging conclusion was made for the whole project - based on surveys conducted in the 9 participating countries:

"During the campaigns in the ten countries, 1,440 state of the art exemplary buildings opened their doors to visitors and all together, 25,870 visitors got hands-on-experience of nearly zero energy buildings by sharing the living, working and building experiences of the owners and builders. 79,5% of the visitors were convinced after the visit and considered building to NZEB standards themselves. If 70% of them chooses for a thorough renovation, we **estimate a carbon emission**

⁹⁹ See <http://www.hatekonyhaz.hu/> for details of the campaign in Hungary, and <http://www.nzebopendoorsdays.eu/> for the summary of the campaigns in the 9 European countries.

¹⁰⁰ See a map with details at <http://www.hatekonyhaz.hu/property> (last accessed 8 Dec 2015)

¹⁰¹ The NZEB documentaries from 9 countries can be seen at: <http://www.nzebopendoorsdays.eu/node/23> (last accessed 8 Dec 2015)

reduction of 46,800 tons and an energy saving of 217,120 MWh." (NZE, 2014b: 5, *emphasis by author*)

In Hungary, it is important to note that during the campaign **emphasis was placed on showing not only passive houses, but also renovated low-energy buildings, houses using traditional building techniques, active and autonomous houses as well.**

There was great interest in the open days all over the country from both the owners/occupants of the building and visitors. Because of the interest, GreenDependent Institute has plans for continuing the project in the future.

It is important to mention and underlie the importance of the **rediscovery and emerging availability of traditional building materials for energy efficient housing (and renovation) and relevant construction models** (e.g. with the involvement of local communities and the future owners of the building), providing an alternative to high-tech and solely business-based models of energy efficient new housing developments. This kind of models are also important because they are based on locally available materials like straw, wood, adobe, hemp, etc. Using these materials and a **combination of traditional and modern building techniques**, it is possible to **provide energy efficient housing at an affordable price** (see also the initiative by the municipality of Györköny in section 4.1.3. above and the biomass briquette programme in section 4.2.3.).

There are several non-profit organizations working to promote, spread information and skills about traditional (combined with modern) building techniques:

- **Hungarian Straw Builders' Association**¹⁰² that provides a wealth of information, guidance, expert help, skills training and assistance with straw bale building and renovation. They also have a database of straw bale houses in Hungary.

At the moment they also have an open call for proposals - with funding from the Norway and EGT Grants - to provide funding and assistance for NGOs for the environmentally-friendly insulation of their buildings - of course, using **straw bale insulation** technology.

- **Energy and Environment Foundation**¹⁰³: the mission of the Foundation is to spread knowledge and skills about energy efficient and at the same time environmentally-friendly building techniques, most importantly straw bale building, and at the same time build communities, communities that actively share knowledge and skills and help each other build homes.
- The **Independent Ecological Centre**, a foundation, built up a huge interactive database on sustainable building including sections on theories, case studies, a database of experts, products, publications as well as an exchange forum for used building materials. The database is available freely for everyone at <http://fenntarthato.hu/epites>.

4.3. Other

4.3.1. Developing alternative policy programmes

There are several non-profit organizations who developed alternative policy programmes to motivate the government to have more ambitious objectives in the field of sustainable energy use. Below two notable ones are mentioned:

¹⁰² About the Hungarian Straw Builders' Association see <http://szalmaepitok.hu/>

¹⁰³ About the Energy and Environment Foundations see <http://www.energiaskornyezeti.hu/>

- Friends of the Earth (FoE) Hungary in partnership with CEEweb for Biodiversity¹⁰⁴ developed a **Climate Change Act for Hungary based on an energy quota system** (Farkas, 2011). The proposal is very **ambitious in terms of introducing and building on the concepts of emission and consumption reduction** as well as **resource use caps**.

Between 2008 and 2010 FoE Hungary conducted an extensive campaign with numerous public events and expert forums organized all over Hungary to promote the Climate Change Act - which was even **brought before, debated and voted upon in the Parliament** in 2010. For the campaign, FoE also prepared an easy-to-understand guide for the general public and created an online quota game that helped people understand the advantages of being energy efficient.¹⁰⁵

The proposed Climate Change Act takes a holistic approach from an energy quota scheme and attempts to answer economic, social and environmental challenges in an interconnected manner. The four pillars of the energy quota scheme are as follows:

1. **Non-renewable energy quota:** the aim is to reduce the national non-renewable energy use by a specified amount every year. An energy quota system is introduced for the public with equal quotas for everyone. Those who save energy can sell their remaining quota and receive quota currency, which they can spend on the green market.
2. **Market for environmentally friendly products and services** (green market) based on environmental and ethical regulations, and available for each consumer. Only those products and services can enter the market that are certified and labelled by an independent authority. The currency of the market is quota money.
3. **Revolving fund** that provides interest free and 100% support (in quota currency) for individuals and companies willing to invest in energy saving, efficiency and renewable energy. The entire amount of the support needs to be paid back in quotas. The currency of the market is quota money.
4. **Advisory service** that provides information on lifestyle change and quota planning.

The proposal for the Climate Change Act was checked by legal experts for compliance with EU and national legislation. (Farkas, 2011)

- An interdisciplinary research group from several Hungarian universities called "This is the Way Forward - Sustainable Energy Planning Research Group"¹⁰⁶ - in partnership with the Environmental Planning and Education Association in Hungary - prepared a **sustainable energy action plan** entitled "*This is the Way Forward - Vision 2040 Hungary 1.2*" first in 2011 (Munkácsy, 2011) and then a follow-up plan called "*This is the Way Forward - Vision 2040 Hungary 2.0*" in 2014 (Munkácsy, 2014). The plans are innovative in that apart from considering the technical angle, they also place equal emphasis on the human angle and what is needed in terms of education, awareness raising and changes in the societal value system to be able to realize a more sustainable energy system.

¹⁰⁴ About FoE Hungary please see <http://www.mtvsh.hu/english> and about CEEweb for Biodiversity <http://www.ceeweb.org/>

¹⁰⁵ The webpage of the campaign for the Climate Change Act campaign can be found at <http://www.klimatorveny.hu>

¹⁰⁶ About the (Hungarian) Sustainable Energy Planning Research Group please see <http://ktf.elte.hu/index.php/erre-van-elore-fenntarthato-energiatervezo-kutatocsoport/> (last accessed 8 Dec 2015)

The plans were created to show that taking into account the natural and other capitals as well as the endowments of Hungary, it would indeed be possible to create a sustainable energy system by 2040. Moreover, taking everything into account, the creation of such a system would be cheaper both economically and socially. The authors of the plan observe that in Hungary the mainstream view of the energy future heavily relies on nuclear power and no other alternatives are considered seriously. Thus, to provide inspiration, the authors also include summaries of other countries' visions for their energy future (e.g. Zero Carbon Britain, Danish and German plans, Costa Rica's strategy, etc.).

The plans contain the outlines of a strategy much more ambitious than that of the government's in terms of energy efficiency, the share of renewables in supply, as well as energy use reduction. In relation to the latter they **introduce the concept of energy sufficiency**.

The first plan states that increasing efficiency will not be enough on its own, there will be need for austerity and the voluntary acceptance of consumption limits (Munkácsy, 2011). The issue of sufficiency is then taken up in the follow-up version (Munkácsy, 2014) as an important part of the human factor necessary for realizing the sustainable energy system and the energy use reduction required for it.

4.3.2. Research

Several non-profit organizations undertake to conduct research in the field of energy efficiency and households. Most of such research is conducted by Energiaklub, but other non-profit organizations also participate. Below we list some examples - just as above please note that this is not an exhaustive summary of what is available. Furthermore, here the authors' aim was to indicate that non-profit organizations are involved in research, but the summary of the studies is provided in *Chapter 1*.

- Examples of relevant research conducted by Energiaklub¹⁰:
 - **Negajoule**: the energy efficiency potential of Hungarian private homes (Fülöp, 2011)
 - **Willingness of the Hungarian population to invest in energy efficiency, energy efficiency barometer for the general population** (Energiaklub, 2013; Fülöp, Kun, 2014)
 - **Energy and fuel poverty** (Fellegi, Fülöp, 2012)
- Research conducted by Habitat for Humanity Hungary³¹ on the **relationship between poverty and energy efficiency** (Koltai, 2014; Koltai, 2015)
- Research by **GreenDependent Association** (and later GreenDependent Institute) as a result of participating in the Changing Behaviour European FP7 research project¹⁰⁷ on how to create and manage **effective energy use behaviour change programmes**. In the framework of the Changing Behaviour project, GreenDependent also conducted a successful small-scale pilot project, Gödöllő climate club¹⁰⁸, to test the methodology, and subsequently built its national programmes on the methodology (Small Footprint campaigns, please see *sections 4.2.1. and 4.2.2.* above). Later, the behaviour change programme of GreenDependent Institute called EnergyNeighbourhoods was also built on largely the same

¹⁰⁷ About the Changing Behaviour project please see <http://www.energychange.info/>

¹⁰⁸ About the Gödöllő Climate Club please see <http://www.klimaklub.greendependent.org/>

methodology - and several NGOs and volunteers from all over the country participated in the programme and informal training events to later act as multipliers. (Heiskanen et. al. 2009a and b, 2010; Vadovics and Heiskanen, 2010); Vadovics and Boza-Kiss, 2013)

GreenDependent widely disseminated the outcomes and the methodology of the research project and the resulting methodology both in Hungary and abroad at numerous professional and non-profit conferences, workshops and training events.

References

- III. NEEAP (2015). *III. National Energy Efficiency Action Plan of Hungary*, August 2015
- Act on Energy Efficiency (2015). Act No. LVII of 2015 of the Hungarian Parliament on Energy Efficiency, May 2015
- Act on Electricity (2007). Act No. LXXXVI of 2007 of the Hungarian Parliament on Electricity, 2007
- Act on Natural Gas Supply (2008). Act No. XL of 2008 on of the Hungarian Parliament on Natural Gas Supply, 2008
- Bart, I. (2015). A Nemzeti Energiastratégia 2020-as energiafogyasztási előrejelzése: igazi sci-fi (in Hungarian only). Available from: <http://www.mehi.hu/projekt/a-nemzeti-energiastrat%C3%A9gia-2020-as-energiafogyaszt%C3%A1si-el%C5%91rejelz%C3%A9se-igazi-sci-fi> (last accessed 15 Dec 2015)
- Bell Research (2013). Meg se nézzük a számlát – energiatudatlanságban a háztartások [We do not even look at our bills – households' lack of awareness]. Available from: http://www.piecesprofit.hu/klimablog/fenntarthato_fejlodes/meg-se-nezzuk-a-szamlat-energiatudatlansagban-a-haztartasok/ (last accessed 8 Dec 2015)
- Boza-Kiss, B. and Vadovics, K. (2013). D2.4 Country Report on Identified Barriers and Success Factors for EPC Project Implementation – Hungary (Transparence project). GreenDependent Intézet, Gödöllő, Hungary. Available from: http://www.transparence.eu/tmce/Hungary/D2-04_CountryReportOnBarriersSuccessFactors_HU_GDI_2014-01-08-v04fin.pdf (last accessed 8 Dec 2015)
- CEP (2015). The website of the Control Energy Program (CEP), coordinated by Energiaklub. Available at <http://energiakontrollprogram.hu/en> (last accessed 15 Dec 2015)
- CECED Hungary (2013). A magyarországi háztartásokban található régi háztartási gépek cseréjével elérhető energia-megtakarítási lehetőségek. [Energy saving potential through replacing old household appliances in Hungarian homes.]. Available from: <http://www.cecedhu.hu/aktualis/hirek/68/> (last accessed 8 Dec 2015)
- CECED Hungary (2015). Még öregebbek háztartási gépeink (in Hungarian only). Available at <http://www.cecedhu.hu/aktualis/hirek/95/> (last accessed 10 Dec 2015)
- EEOP (2015). Environmental and Energy-efficiency Operational Programme of Hungary for 2014-2020, February 2015
- EMI (2015). Pályázati információk (in Hungarian only). Available at <http://www.emi.hu/emi/web.nsf/pub/palyazatok.html> (last accessed on 10 Dec 2015)
- Energiaklub (2013a). Hírek: A háztartások negyede korszerűsítene. [News: A quarter of the households would like to renovate.]. Available from: <http://energiaklub.hu/hir/a-haztartasok-negyede-korszerusitene> (last accessed 8 Dec 2015)
- Energiaklub (2013b). Energiahatékonysági barométer 2013. ENERGIAKLUB Szakpolitikai Intézet és Módszertani Központ, Budapest, Hungary. Summary presentation available from: <http://www.greenfo.hu/uploads/dokumentumtar/energiahatekonysagi-barometer-2013.pdf> (last accessed 8 Dec 2015)

- European Environment Agency (EEA) (2013). Achieving energy efficiency through behaviour change: what does it take? Copenhagen, Denmark. pp. 52. Available from: <http://www.eea.europa.eu/publications/achieving-energy-efficiency-through-behaviour> (last accessed 8 Dec 2015)
- European Environmental Bureau (EEB) (2011). *Saving Energy in Europe: 15 Good Practice Case Studies*. Climate and Energy. Brussels, Belgium. pp. 39.
- EUROSTAT (2012). Distribution of population by tenure status, 2012. Available from: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Distribution_of_population_by_tenure_status_Fig2_2012.png#filelinks (last accessed 10 Dec 2015)
- EUROSTAT (2014a). Electricity prices for household consumers on PPS. Available from: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Electricity_prices_for_household_consumers_2014s2.png#filelinks (last accessed 10 Dec 2015)
- EUROSTAT (2014b). Natural gas prices for household consumers on PPS. Available from: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Natural_gas_prices_for_household_consumers_2014s2_%28PPS_kWh%29.png (last accessed 10 Dec 2015)
- Farkas, I. (Ed.) (2011). *Proposed Climate Change Act for Hungary based on energy quota system*. English summary. NSC-Friends of the Earth Hungary, Budapest, Hungary. Available from: http://www.ceeweb.org/wp-content/uploads/2011/12/Climate_law_energy_quota_FoEHungary.pdf (last accessed 8 Dec 2015)
- Fellegi, D., Fülöp, O. (2012). *Szegénység vagy energiaszegénység? Az energiaszegénység definiálása Európában és Magyarországon*. ENERGIACLUB Szakpolitikai Intézet és Módszertani Központ, Budapest, Hungary. pp. 26. [*Poverty or energy poverty? Defining energy poverty in Europe and Hungary*] Available from: http://energiaklub.hu/sites/default/files/energiaklub_szegenyseg_vagy_energiaszegenyseg.pdf (last accessed 8 Dec 2015)
- Fülöp, O. (2011). *NEGAJoule 2020 A magyar lakóépületekben rejlő energiahatékonysági potenciál*. Research report. ENERGIACLUB Szakpolitikai Intézet és Módszertani Központ, Budapest, Hungary. Available from: http://negajoule.eu/sites/default/files/nega_kiadvany.pdf (last accessed 8 Dec 2015)
- Fülöp, O. and Lehoczki-Krsjak, A. (2014). *Energiaszegénység Magyarországon* (in Hungarian only) in *Statisztikai Szemle*, 92. évfolyam 8–9. Szám, Available from: http://www.ksh.hu/statszemle_archive/2014/2014_08-09/2014_08-09_820.pdf (last accessed 10 Dec 2015)
- Fülöp, O., Kun, Zs. (2014). *Lakossági Energiahatékonysági Barométer 2014*. ENERGIACLUB Szakpolitikai Intézet és Módszertani Központ, Budapest, Hungary. Available from: http://energiaklub.hu/sites/default/files/lakossag_energiahatekonysagi_barometer_2014_energiaklub.pdf (last accessed 8 Dec 2015)
- GreenDependent Institute (2014). *NZEB Open Doors 2014 Campaign. D6.3: Survey Results and Analysis Report*. GreenDependent Institute, Hungary
- Gvmt. dcr. on Energy Efficiency (2015). *Governmental decree 122/2015 on the implementation of the Act on Energy Efficiency*, May 2015

- Government Resolution No. 1160/2015 (2015). 1160/2015. (III.20.) Korm. hat. a Nemzeti Energiestratégia energiafelhasználás-előrejelzéseinek frissítéséről. (in Hungarian only), March 2015
- Government Resolution No. 1831/2015. (2015). 1831/2015. (XI. 24.) Korm. határozat. a 2016. évi gazdaságnövekedés érdekében szükséges fejlesztéspolitikai intézkedésekről. (in Hungarian only), November 2015
- Heiskanen, E., Johnson, M., Saastamoinen, M. and Vadovics, E. (2009a). Creating Lasting Change in Energy Use Patterns through Improved User Involvement In: Joint Actions on Climate Change Conference Proceedings, Aalborg, Denmark. Available from: http://www.energychange.info/downloads/cat_view/16-project-outputs (last accessed 8 Dec 2015)
- Heiskanen, E., Vadovics, E., Johnson, M., Robinson, S., Saastamoinen, M. (2009b). Low-carbon communities as a context for more sustainable energy consumption. In: Kerekes, S., Csutora, M., Székely, M. (ed.) *Sustainable Consumption 2009 Conference. Proceedings*. Corvinus University of Budapest. Available from: <http://unipub.lib.uni-corvinus.hu/222/1/suscon2009proceedings.pdf> (last accessed 8 Dec 2015)
- Heiskanen, E., Johnson, M., Robinson, S., Vadovics, E., Saastamoinen, M. (2010). Low-carbon communities as a context for individual behavioural change. *Energy Policy* 38: 7586-7595.
- HEuPURA (2015). Announcements by the Hungarian Energy and Public Utility Regulatory Authority (HEuPURA) (in Hungarian only). Available from: <http://www.mekh.hu/tizmilliárdokkal-csokkent-a-lakossagi-rezsihatralek> (last accessed 8 Dec 2015)
- Knauf Insulation (2014). Te mire költenéd a rezsit? Nálunk szigeteltek! Nálatok mikor fognak? Mi már tudjuk, hogy megérté! Összefoglaló a rendhagyó energia- és rezsimegtakarító kísérletről. Knauf Insulation, Hungary. Available from: http://nalamszigetelnek.hu/sites/default/files/knauf_book_16_oldalas_kiadvany_web.pdf (last accessed 8 Dec 2015)
- Koltai, L. (Ed.) (2014). *Annual report on housing poverty 2013*. English summary. Habitat for Humanity Hungary, Budapest, Hungary. Available from: http://www.habitat.hu/files/HFHH_Housing_report_2013.pdf (last accessed 8 Dec 2015)
- Koltai, L. (Ed.) (2015). *Éves jelentés a lakhatási szegénységről 2014*. Habitat for Humanity Hungary, Budapest, Hungary. Available from: http://www.habitat.hu/files/HABITAT_2014_lakhatasi_jelentes_hosszu_1109.pdf (last accessed 8 Dec 2015)
- Központi Statisztikai Hivatal/Hungarian Central Statistical Office (KSH) (2011). Népszámlálás 2011. Lakások és lakóik. 2.1.7. A lakott lakások szobaszám, alapterület és tulajdonjelleget szerint, 2011. Available from: http://www.ksh.hu/nepszamlalas/tablak_lakas (last accessed 15 Dec 2015)
- Központi Statisztikai Hivatal/Hungarian Central Statistical Office (KSH) (2012). Population Census 2011. Preliminary Data. Hungarian Central Statistical Office, Budapest, Hungary. Available from: <http://www.ksh.hu/docs/eng/xftp/idoszaki/nepsz2011/enepszelo2011.pdf> (last accessed 15 Dec 2015)
- Központi Statisztikai Hivatal/Hungarian Central Statistical Office (KSH) (2014). 2011. ÉVI NÉPSZÁMLÁLÁS: 12. Lakásviszonyok (in Hungarian only). Available from: http://www.ksh.hu/docs/hun/xftp/idoszaki/nepsz2011/nepsz_12_2011.pdf (last accessed 10 Dec 2015)

- Központi Statisztikai Hivatal/Hungarian Central Statistical Office (KSH) (2015). Az egy főre jutó éves kiadások részletezése COICOP-csoportosítás, jövedelmi tizedek (decilisek), régiók és a települések típusa szerint (2010–) (in Hungarian only). Available from: https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_zhc021d.html?down=21113 (last accessed 10 Dec 2015)
- NPUC (2015). Első Nemzeti Közműszolgáltató Zártkörűen Működő Részvénytársaság (NPUC) Rendszerszintű változások a közműszektorban Interjú Horváth Péter János elnök-vezérigazgató úrral (in Hungarian only). Available from: <http://www.enksz.hu/Hirek/2015/12-16> (last accessed 15 Dec 2015)
- MEHI (Hungarian Energy Efficiency Institute, coord.) (2013). A Hazai Hatékonyság program weboldala. Available from: www.hazaihatekonysag.hu/ (last accessed 15 Dec 2015)
- MEHI (Hungarian Energy Efficiency Institute) (2014). Lakossági Energiahatékonysági Beruházások támogatása 2014 – 2020 (in Hungarian only). Available from: http://www.fotav.hu/documents/10697/16007/8_MEHI_SzalaiGabriella_KA.pdf (last accessed 10 Dec 2015)
- MEHI (Hungarian Energy Efficiency Institute) (2015). 2014: A talpon maradás éve volt, 2015: az óvatos reménykedésé. Hangulatjelentés az energiahatékonysági piacról. MEHI, Budapest, Hungary. Available from: http://mehi.hu/sites/default/files/n6_hangulatjelentes_2015_1.pdf (last accessed 8 Dec 2015)
- MEHI (Hungarian Energy Efficiency Institute) (2015). Tényleg elveszi a kormány a magyar otthonoktól a rezsicsökkentő felújítások forrásait. MEHI, Budapest, Hungary. Available from: <http://mehi.hu/hir/t%C3%A9nyleg-elveszi-a-korm%C3%A1ny-a-magyar-otthonokt%C3%B3l-a-rezsics%C3%B6kkent%C5%91-fel%C3%BAj%C3%ADt%C3%A1sok-forr%C3%A1sait> (last accessed 15 Dec 2015)
- MND (2015a). Nemzeti Fejlesztési Minisztérium (MND): vezető hírek (in Hungarian only). Available from: <http://www.kormany.hu/hu/nemzeti-fejlesztési-miniszterium/hirek> (last accessed 10 Dec 2015)
- MND (2015b). Nemzeti Fejlesztési Minisztérium (MND): Okosan és tudatosan, azaz fejlesztésekkel a hatékony klímavédelemért c. országos programsorozat nyitó rendezvénye (in Hungarian only). Available from: <http://www.kormany.hu/hu/esemenytar/okosan-es-tudatosan-azaz-fejlesztésekkel-a-hatekony-klimavedelemert-c-orszag-os-programsorozat-nyito-rendezvenye> (last accessed 10 Dec 2015)
- MND (2015c). Nemzeti Fejlesztési Minisztérium (MND): Családok Otthonteremtési Kedvezménye (in Hungarian only). Available from: <http://www.kormany.hu/download/0/86/40000/U%CC%88gyfe%CC%81ta%CC%81je%CC%81kozato%CC%81honlapCSOK20150701.pdf> (last accessed 10 Dec 2015)
- MND (2015d). Nemzeti Fejlesztési Minisztérium (MND): A rezsicsökkentéssel 334 milliárd forint maradt a családoknál (in Hungarian only) Available from: <http://www.kormany.hu/hu/nemzeti-fejlesztési-miniszterium/parlamenti-allamtitkarsag> (last accessed 15 Dec 2015)
- Munkácsy, B. (Ed.) (2011). *Erre van előre! Egy fenntartható energiarendszer keretei Magyarországon. Vision 2040 Hungary 1.2.* by the Sustainable Energy Planning Research Group at Eötvös Loránd Universtiy. pp. 168. Környezeti Nevelési Hálózat Országos Egyesület, Budapest, Hungary. Available from: <http://munkacsy.web.elte.hu/ERRE%20VAN%20ELORE%201.2x.pdf> (last accessed 8 Dec 2015)

- Munkácsy, B. (Ed.) (2014). *A fenntartható energiagazdálkodás felé vezető út. Erre van előre! Vision 2040 Hungary 2.0*. Prepared by the Sustainable Energy Planning Research Group at Eötvös Loránd University and Environmental Education Network National Association. pp. 196. Budapest, Hungary. Available from: <http://ktf.elte.hu/wp-content/uploads/2014/09/ERRE-VAN-ELORE-2.0.pdf> (last accessed 8 Dec 2015)
- NBEPS (2015). National Building Energy Performance Strategy of Hungary, February 2015
- NECARAP (2015). National Energy- and Climate Awareness Raising Action Plan of Hungary, September 2015
- NES (2011). The National Energy Strategy of Hungary (time frame: 2030, with an outlook to 2050), 2012
- Novikova, A. and Ürge-Vorsatz, D. (2007). *Carbon Dioxide Mitigation Potential in the Hungarian Residential Sector*. Report for The Ministry of Environment and Water of the Republic of Hungary. Budapest, Hungary. Available from: <http://envsci.ceu.edu/sites/envsci.ceu.hu/files/attachment/project/517/reporhungarianresidentialco2mitigationpotential.pdf> (last accessed 8 Dec 2015)
- Novikova, A. and Ürge-Vorsatz, D. (2008). *Szén-Dioxid Kibocsátás-Csökkentési Lehetőségek És Költségeik A Magyarországi Lakossági Szektorban*. Környezetvédelmi és Vízügyi Minisztérium [The Ministry of Environment and Water of the Republic of Hungary]. Budapest, Hungary. Available from: http://www.kvvm.hu/cimg/documents/Klimapolitika_tanulmany.pdf (last accessed 8 Dec 2015)
- Nye, M., Burgess, J. (2008). *Promoting durable change in household waste and energy use behaviour*, A research report completed for the Department for Environment, Food and Rural Affairs. University of East Anglia.
- NZEB Open Doors Days Project Consortium (NZEB) (2014a). *Leading the Way Towards Nearly Zero Energy Buildings. Inspirational Examples from Regions All Over Europe*. Available from: http://www.hatekonyhaz.hu/NZEB_brochure_EU.pdf (last accessed 8 Dec 2015)
- NZEB Open Doors Days Project Consortium (NZEB) (2014b). *Nearly Zero Energy Buildings Open Doors. Visit Today the Buildings of Tomorrow*. Publishable report. Available from: <https://drive.google.com/file/d/0ByiBusvFs0noSUD3aUxHWDhraTg/view?pli=1> (last accessed 8 Dec 2015)
- Officina (2015). Új lakás áfacsökkentés 2016 szabályok: 27-ről 5 százalékra csökken az új építésű lakások áfája (in Hungarian only). Available from: <http://officina.hu/gazdasag/141-uj-lakas-afacsokkentés-2016-afacsokkentés-27-5-szazalek-afa-uj-epitesu-lakasok> (last accessed 15 Dec 2015)
- OTP Building Society Ltd. (OTP) (2012). *Nem energiatudatosak a magyar családok*. [Hungarian households are not energy efficient]. Available from: <http://www.greenfo.hu/hirek/2012/09/20/nem-energiatudatosak-a-magyar-csaladok> (last accessed 8 Dec 2015)
- Policy Agenda (2015). *Rezsicsökkentés: kényszerpályára került a Fidesz* (in Hungarian only). Available from <http://www.policyagenda.hu/hu/nyitolap/rezsicsokkentés-kenyszerpalyara-kerult-a-fidesz> (last accessed 15 Dec 2015)
- Portfolio (2015). *Jönnek az első zöld banki termékek* (in Hungarian only), http://www.portfolio.hu/finanszirozás/bankok/jonnek_az_első_zöld_banki_termékek.211214.html (last accessed on 10 Dec 2015)

- Szívós, P., Tóth, I. Gy. (2013). *Egyenlőtlenség és polarizálódás a magyar társadalomban. TÁRKI Monitor Jelentések 2012*. TÁRKI Társadalomkutatási Intézet Zrt., Budapest, Hungary. Available from: http://www.tarki.hu/hu/research/hm/monitor2012_teljes.pdf (last accessed 8 Dec 2015)
- Urbanista (2015). Nálátok milyen öregek a házak? Egyetlen térképen a magyarországi lakóingatlanok kora (in Hungarian only). Available from: http://index.hu/urbanista/2015/07/28/magyarorszag_i_lakoingatlanok_kora_terkep/ (last accessed 10 Dec 2015)
- Vadovics, E., Antal, O., Baranyi, G., Vadovics, K. (2011). *Nagycsalád - kis lábnyom. Projektbemutató kiadvány családi esettanulmányokkal*. pp. 48. [Large family - small footprint. An introduction to the project with case studies of households]. GreenDependent Sustainable Solutions Association, Hungary. Available from <http://kislabnyom.hu/nagycsalad-kislabnyom/letolt/zarokiadvany.pdf> (last accessed 8 Dec 2015)
- Vadovics, E., Antal, O., Gáll, V., Vadovics, K. (2012). *Kislábnyom projektbemutató kiadvány esettanulmányokkal a mindennapi kislábnyomos életmódról*. pp. 48. [Case studies of everyday small-footprint and sustainable living] GreenDependent Sustainable Solutions Association, Hungary. Available from: http://kislabnyom.hu/sites/default/files/letolt/kislabnyom_zaro_kiadvany.pdf (last accessed 8 Dec 2015)
- Vadovics, E. and Boza-Kiss, B. (2013). Voluntary consumption reduction – experience from three consecutive residential programmes in Hungary. Residential energy master as a new carrier? In: Proceedings of the SCORAI Workshop, June 2013, Istanbul. Available from: http://scorai.org/wp-content/uploads/SCORAI-Europe_Istanbul-Workshop_Proceedings_2013.pdf (last accessed 8 Dec 2015)
- Vadovics, E., Heiskanen, E. (2010). Understanding and enhancing the contribution of low-carbon communities to more sustainable lifestyles: the case of the Gödöllő Climate Club in Hungary. Poster presented at the ERSCP-EMSU conference in Delft, Holland, 26-29 October 2010. Available from: http://www.klimaklub.greendependent.org/kutatasi_eredmenyek/ClimateClub_poster%20presentation_ERSCP-EMSU%20conf_2010Delft.pdf (last accessed 8 Dec 2015)
- Vadovics, E., Milton, S. and the CONVERGE Project Team (2012). *Case Studies ('initiatives') Illustrating Contraction and Convergence. Equity within Limits in Theory and Practice*. pp. 140. CONVERGE Deliverable 33. GreenDependent Institute. Available from: <http://intezet.greendependent.org/hu/node/161> (last accessed 8 Dec 2015)