ENERGIAKLUB
CLIMATE POLICY INSTITUTE
APPLIED COMMUNICATIONS

REKK REGIONÁLIS ENERGIAGAZDASÁGI KUTATÓKÖZPONT

OPPORTUNITIES OF LARGE SCALE ENERGY EFFICIENCY PROGRAMS IN HUNGARY

POTENTIAL FUNDING - POSSIBLE IMPACTS

1 - POTENTIAL FINANCIAL SOURCES TO SUPPORT FUTURE ENERGY RETROFIT PROGRAMMES

Regional Centre for Energy Policy Research (REKK)

2 - MORE EFFICIENT HOMES – MACRO ECONOMIC IMPACTS

A macro-economic analysis of a significant state support scheme to household energy efficiency investments

ENERGIAKLUB Climate Policy Institute and Applied Communications

INTRODUCTION

This project has been brought to lught by the cooperartion of Energiaklub and REKK for the purpose of showing the opportunities of energy efficiency from two aspects. REKK has been investigating the financial opportunities of the Hungarian state budget as well as potential and additional revenues which could be channelled or reallocated towards supporting energy efficiency investments, namely upgrading the Hungarian building stock. At the same time Energiaklub put together a model to assess the likely macro economic impacts of a significant state funded support scheme for household investment subsidies.

We are aware of the lack of studies and reliable models which is hardened by the inconsistency of data in this field. Therefore we built on each others work in this cooperation. Energiaklub based on the study of REKK took a realistic figure as the amount of money which can be allocated just for the household investment support scheme.

Our findings confirm that there are great opportunities on both side: there are financial resources which can be used and well used ofr this goal and on the other side spending this money wisely will help boosting the Hungarian economy and at the same time does not pool out necessary funding from other sectors of the state. Rather the opposite: creates jobs and generating additional revenues for the state budget.

We believe that the figures are convincing and hope that such a program will come into live soon.

The research and the studies have been supported by the European Climate Foundation.

REKK REGIONÁLIS ENERGIAGAZDASÁGI KUTATÓKÖZPONT

POTENTIAL FINANCIAL SOURCES TO SUPPORT FUTURE ENERGY RETROFIT PROGRAMMES

EXECUTIVE SUMMARY

The aim of this research was to map potential financial sources that can be mobilized to provide public financial support for building retrofit programmes.

The presumption of the exercise was that the current budgetary situation does not allow for allocating new sources to revitalize current building retrofit programmes. This is further aggravated by the fact that the resources of the current support schemes (Green Investment Scheme for households and EU funds for public buildings and small and medium sized enterprises) are depleted, hence the financial sources available up to 2013 – according the estimate of the Energy Center and the National Development Agency - are not more than 3-4 billion HUF (10-14 m€). As a consequence, future retrofit programmes can only be financed from the revenues of GHG emissions rights, the elimination and/or redesign of certain support schemes in the energy sector, or from redirecting money from other EU support schemes.

The phase-out of these schemes would create, on the one hand, new resources for energy retrofits, on the other abolishing/cutting down support schemes that – in our view – result in considerable efficiency loss in the operation of the energy markets. We have estimated the size of the potential revenue for each year between 2012 and 2020 and identified those social groups that would be negatively affected by the changes. We have identified three major clusters of future revenue sources:

I.: Auction revenues of various GHG emissions rights, including:

- EUAs of the EU ETS
- EUAAs created by the inclusion of aviation in the EU ETS
- AAUs generated by the Kyoto Protocol
- ESDs from non-ETS sectors

The central budget can receive 10-25 billion HUF (34-85 m€) in 2012 from the auctioning of various GHG emissions rights, and 25-60 billion (85-204 m€) annually in the successive years. This revenue stream can be seriously downscaled in the 2013-2020 period if the government chooses to provide derogation to the power sector from auctioning (decision should be made before 31 September 2011). Another important source of uncertainty in the revenue forecast is the future price of the various GHG emissions rights. In our calculations we have used conservative price estimates. EU regulation requires that member states use minimum 50% of auction revenues for climate policy programmes. Member states, however, can use all revenues to such purposes if they decide so. In Hungary, 16 billion HUF (54 m€) from this future revenue is already allocated to successful tenderers of the Panel Programme of the Green Investment Scheme.

II: Support schemes affecting the price of electricity:

- coal mine support (Oroszlány Power Plant)
- cogeneration support
- reduced electricity price for current and previous employees of the energy sector

All three schemes are built into the price of electricity, meaning that all final consumers bear the associated costs of these special support systems. Once these schemes are closed, it will either reduce final consumer price or, alternatively provide revenues for energy retrofit support programmes. These schemes, altogether, amount to 53-57 billion HUF (180-194 m€) annually, where the biggest volume (43 billion HUF – 146 m€) is the support provided for cogeneration facilities serving district heating purposes.

III: Energy sector support schemes that directly reduce the public budget:

- reduced VAT rate of district heating, and
- exemption of households from the EU energy tax.

The consumers of district heating are enjoying (beyond the support provided for the cogeneration facilities) a reduced VAT rate on this service (5% as opposed to the general 15% tax level). This sums up to 20 billion HUF (68 m€) direct support annually that is not allocated on the bases of social needs but the heating technology (DH as opposed to all other heating options).

The introduction of the minimum EU energy tax rate would contribute to the public budget with 14.7 billion HUF (50 m€). The rate that has been proposed by the Commission (but not yet adopted) could triple this amount from 2013.

We have excluded from our analysis the current gas price support for socially disadvantaged households as it is currently under review and major changes are expected.

We have drawn the following conclusions:

- If the government does not alter the current support schemes (both tariff and direct) then the potential financial sources for retrofit programmes are confined to GHG auction revenues.
- The elimination of these schemes and the re-channeling of these revenues would provide considerable extra revenues to this aim in the magnitude of 50 and 35 billion HUF (tariff and direct, respectively) (170-109 m€).
- None of the support schemes included in this analysis is targeting the poorest strata of the society as none of them is income based (that would aim at energy poverty). Rather they serve smaller segments of the society (e.g. district heating users or energy sector employees) and make all electricity users to pay for it (in the price of electricity or in taxes in general). We suggest that the government should use some sort of housing support to combat energy poverty and stop the current schemes. Only the extension of EU energy tax on households would mean an extra tax for the whole population.
- If the government chooses to leave these support schemes intact than it has no additional revenues that can be mobilized for building retrofit programmes in 2012 and 2013 as GHG emissions rights revenues are likely to materialize at the end of 2013 only. In this case, the government can follow three strategies. First, it uses these two years to reduce the transaction costs of the current building retrofit support schemes (e.g. consolidation of building certificate system, setting up of building energetics standardization for energy renovation purposes) so that auction revenues available from 2014 onwards can be spent more efficiently. Secondly, it can try to mobilize private funds in such investments (e.g. the inclusion of housing saving banks). Thirdly, it can start up a white certificate system that would require energy utilities to invest in energy savings in the household sector.

The following table shows the various revenues streams (upper and lower estimates, the social groups affected by the suggested changes and the alternative use of the deliberated sums.

	short name	description	2012	2013	2014	2015	2020	Affected social groups	Number of affected households	Alternative use	Sources of uncertainty
GHG emissions rights	EUA	Second phase of EU ETS	33	0	0	0	0	-	-	min. 50% for climate policies and associated administrative costs	
	EUA	Third phase of EU ETS	0	68-176	85-176	102-176	172	-	-	min. 50% for climate policies and associated administrative costs	derogation
	ESD	non-ETS CO2 market of the EU	0	15-17	17-21	21-23	37-47	-	-	depends on the buyer country (contract based)	future CO2 emissions
	AAU	Kyoto GHG market	0-47	0	0	0	0	-	-	depends on the buyer country (contract based)	market uncertainties
	EUAA	EU aviation CO2 market	1,7-3,7	1,7-3,7	1,7-3,7	1,7-3,7	1,7-3,7	-	-	min. 50% for climate policies and associated administrative costs	price uncertainty
support provided through electricity tariff	coal mine support	support to the Oroszlány PP and coal mine	24	24	24	24	0	employees of the power plant and the mine	1350	no restriction	
	employee special tariff	Support to the current and past electricity sector employees	8,5-13	8,5-13	8,5-13	8,5-13	8,5-13	current and retired electricity sector employees	80-120 thousand	no restriction	consumed electricity
	cogeneration support	support for cogeneration	146	146	146	146	146	distric heating consumers	647 thousand	no restriction	
direct budgetary support	gas price support	under redesign to household support	-	-	-	-	-	gas consuming families with more than 3 children		no restriction	
	district heating VAT	reduced VAT rate for DH service	68	68	68	68	68	district heating consumers	647 thousand	no restriction	
	EU energy tax	exemption of households from the EU minimum energy tax rate	50	50	50	50	50	all energy consumers		no restriction	the final decision on minimum tax rates

1. table: The revenue streams, the affected social groups and the alternative uses (million EUR)

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MORE EFFICIENT HOMES – MACRO ECONOMIC IMPACTS

- A macro-economic analysis of a significant state support scheme to household energy efficiency investments -

EXECUTIVE SUMMARY

Energiaklub has decided to fill an important gap and carry out the research necessary to confirm the much anticipated positive impacts of a massive energy efficiency program and the vital measures which support it. To this end Energiaklub's Climate Policy Institute and our partners have assessed some of the significant macro-economic effects of the Hungarian state's energy efficiency support scheme.

We have looked at the employment generation potential of energy efficiency programmes, as well as their impacts on the balance of the state budget and of foreign trade.

INITIAL CONDITIONS

At the beginning of our research we fixed the conditions of the program, we are to analise. The hypotetic program is a state investment-support programme which targets the residential sector and has the following characteristics: the programme provides a non-refundable subsidy of 30% for renovating residential buildings to improve their energy efficiency. We assume that it will last for at least 5 years. The amount of subsidy is 50 billion HUF (170 m€)[1] per year, so the total amount of energy efficiency investment amounts to nearly 167 billion HUF (570m€) every year for a five year period. Based on expert's judgement the life expectancy of the investment is twenty years.

The distribution of funding for renovation and its technical aspects

In the analysis the level of investment and its technical content was determined according to the data and results of Energiaklub's earlier research, the "NegaJoule 2020"[2] on the potential of residential energy saving in Hungary. These were set as follows: 80% of the investemtn goes into detached (family) houses, 10% apartment houses, and 10% pre-fabricated blocks of flats.

When making the calculations, we assumed – again based on the "NegaJoule 2020" research – that the own private sources of the households (117 billion HUF – 400m€) will come largely from the household's contribution (general savings or especially earmarked for housing renovation) and only the rest of the money (30%) will come from commercial credit lines or loans designed for energy efficiency renovation purposes.

Input data

In order to adecvatelly using the input-output model we needed the following two basic pieces of information: the cost of saved energy and the structure of the investments broken down by sectors. The latter is called the investment vector.

We based our calculations of the energy savings of such investments on the data and results of the "NegaJoule 2020". The investment of 167 billion HUF (570m€) would result in savings of nearly 23 billion HUF (78m€) and would involve about 110 000 households per year.

There is no precise data available on the market for energy efficiency renovation in Hungary, hence we used several independent sources to try and give an estimate of the vector that we could assign to energy efficiency investments. We asked producers, distributors and contractors about the share of imports in their products, and also what value particular products or services represent during the renovations.

[1] €=HUF292 in September, 2011

[2] More information and downloadeable data of NegaJoule 2020 can be reached here: www.negajoule.eu/en

MACRO-ECONOMIC IMPACTS

The state subsidies invested in residential energy efficiency have direct and indirect macro-economic impacts. We investigated employment creation potential, the effect on the state budget and on the balance of trade. We quantified these with the help of the above data and the input-output model updated and loaded with the 2010 statistical data.

I. Employment

Energy efficiency programmes have two main, distinguishable effects on the labour market. The direct effect is the one brought about by carrying out the actual investments. The indirect effect is brought about when households spend most of the money - on the other goods – which was saved on the energy bills as a result of the investments.

Changes in employment figures	
From investment (yearly)	51 002 persons
From savings (yearly)	4 921 persons
For 5+20 years	747 114 working years

Table 2: Labour market effects

Our assumption is that the state provides the same amount of subsidy for energy efficiency investments over five years. The direct effect of this on the labour market can be calculated with a simple multiplication. The indirect effect on the labour market due to the extra income made available through energy cost savings will be felt for 20 years. (See Fig. 1 and 2.)

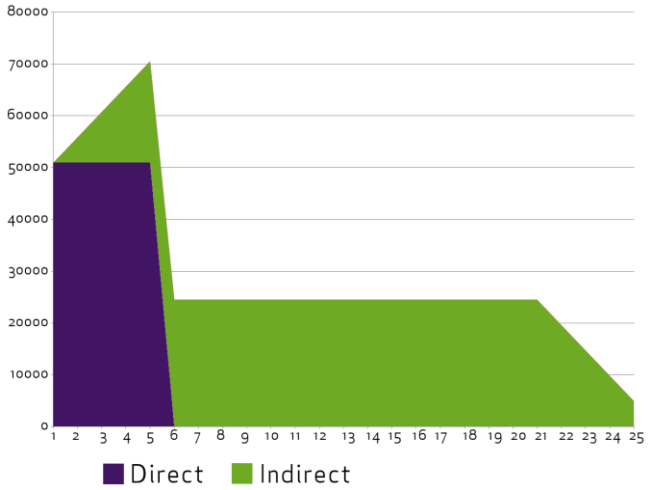

Figure 1: Employment impacts

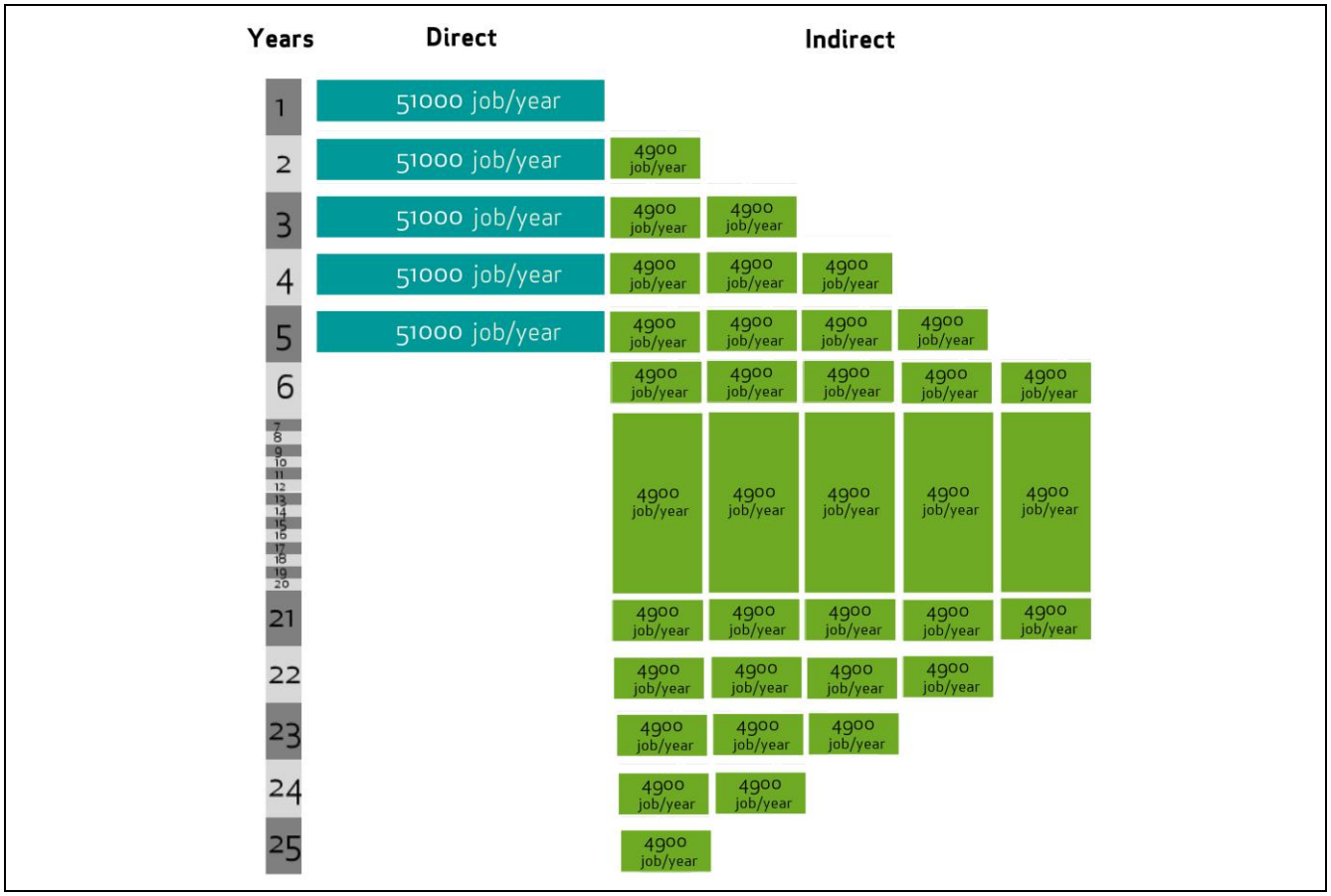

Figure 2: Employment impacts over the 5+20 years of the program

II. Balance of state revenues

Energy efficiency investments have two ways effect on tax revenues. On the one hand they have a direct effect through the investment, and on the other, an indirect one through the spending of the savings made on energy expenditures (Fig. 3). The investments' effect on tax revenue can be divided into two parts. The first is that of the taxes paid on purchased products (e.g. Value added tax - VAT), the second is that of employment related taxes (income taxes and social insurance contributions paid by the employers and the employees). The part of savings spent on consumption can also be divided between value added taxes (VAT) and taxes on labour. Savings on energy costs, however, represent a loss in tax revenues (VAT of energy services). That should also be taken into account when calculating the overall effect.

The increased corporate income tax is not included in the accumulation of state revenues, which would further extend the budgetary implications of such a support scheme.

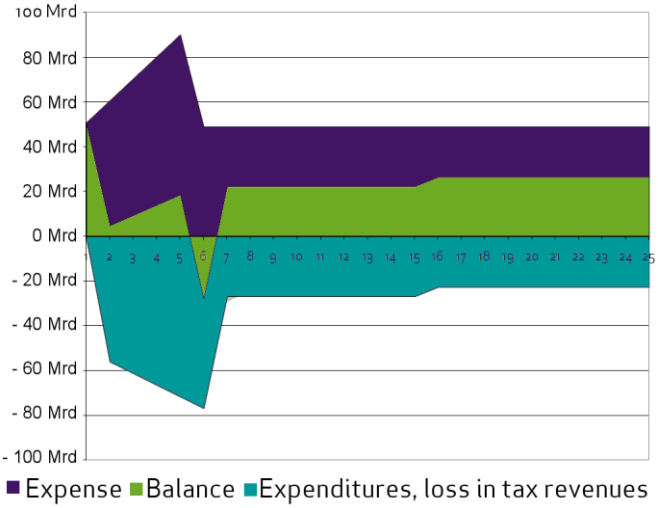

Figure 3: Effect on state revenues

Based on this we can state that in its initial year the programme brings in many billions in revenue, and from its second year it results in a profit of roughlz 10% - 4,8 billion HUF (16m€) on the initial support of 50 billion (170m€). (Table 3)

Budget revenue	Billion HUF	Million €	Sign	
VAT from investment	21,7	74	(+)	Investment years (first 5 years)
Income tax + social insurance contributions from investment	29,2	100	(+)	Investment years (first 5 years)
VAT from extra consumption	5,2	17	(+)	From the second year + 20 years
Income tax + social insurance contributions from extra consumption	4,6	15	(+)	From the second year + 20 years
Less VAT from lowered energy consumption	4,5	15	(-)	From the second year + 20 years
Decreased of tax on interest due to the invested savings (0,7 billion per year)	1,4	5	(-2x)	From the first year
Total	**54,8**	**187**		
The balance of state subsidies and tax revenues	**4,8**	**16**		

Table 3: Brake down of tax revenues

III. Effect on the balance of trade

When analysing the short term effects, it has to be taken into account that the money spent by the households on the investments will not be spent on usual consumption, and that much of the products used in the investments will be imported ones. The additional consumption originating from the savings on energy costs will also generate imports.

Change in import	billion HUF
Short term effect (1 year)	-1352
Mid-term effect (1-5 years)	-633
Long term (5-20 years)	+777

Table 4: The effect on the balance of trade

The imported share of the energy saved will reduce the amount of imports. The difference over long term is that the imported portion of the investment does not need to be taken into account.

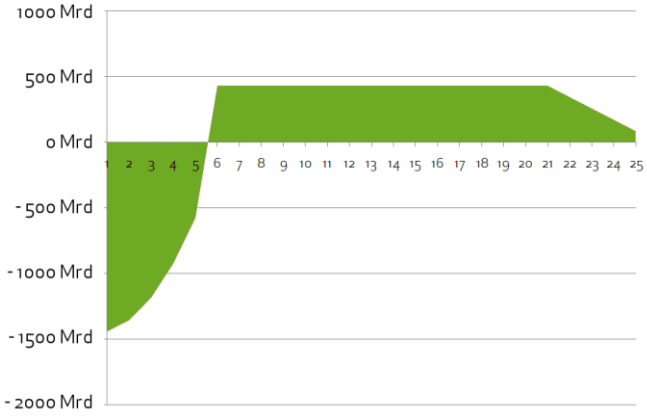

Figure 5: Change in balance of trade

IV. Incremental impacts

Under this title there could be lots of fields discussed, still we focus only on several and mainly those which are easily quantifiable: like energy dependence, CO_2 reduction.

With the reduction in the consumption of natural gas the amount of import drops considerably, by 690 million cubic metres from the sixth year of the program. The overall savings in energy is 7.56PJ, of which there is a direct saving of 4.2PJ in respect of natural gas usage, and a 0.5PJ saving in natural gas used in power stations. In the case of households using firewood and other sources of energy their savings account for 2.9PJ (the percent of renovation was estimated based on the proportion of these alternative fuels).

This, of course, has a positive effect on the national security of supply, not only because of the lessening demand for import and storage capacity but also because it smoothes out the peaks in demand and also reduces the pressure on the natural gas system in winter.

A natural consequence of this is the reduction of greenhouse gas emissions. CO_2 savings are significant and by the end of the sixth year they amount to 1 355 000t/year. Furthermore, we can also count on a reduction in grey economic activity in the sector, which can lead to significant tax revenues. Due to the need to account for the costs covered by the state funding, the compulsory invoicing and billing will terminate the otherwise likely practice of obtaining building materials and services without a receipt or an invoice, evading VAT.

A further question is whether such a programme can bring positive social benefits. Increasing fuel poverty, resulting from rising energy prices and the economic crisis, is becoming a serious problem for the government, too. It is not very likely – again, based on the figures and findings of "NegaJoule 2020" –, that this or similar subsidy programmes would reduce fuel poverty in Hungary, for a number of reasons. Among others we can mention the problem of pre-financing, the 70% of own financial contribution and the high up front investment costs relative to the value of the respective real estate. The aforementioned problems do not allow these families considering even the smallest investments.

CONCLUSIONS

Our research aimed to investigate what effects a serious residential energy subsidy programme has, while we were also curious how it differs from other economic development programmes. Based on the results, we can conclude the following:

1. Effects on the state budget and employment are outstanding, and clearly positive.

2. Budget revenues clearly exceed the budget subsidies, even in the first year, and due to the increasing savings and their incremental effects, the positive balance continues to increase for many years.

3. Our report was calculated based on a 5 year programme, although there is a far greater potential in the sector, as the results of the "NegaJoule 2020" research also show. It is recommended that the desired technological level and the achievable results be analysed and updated in the following cycles.

4. Due to its positive implications for the state budget, the program is intrinsically viable, but many financing opportunities are also available, as shown by the study of REKK[3].

5. From the aspect of employment, we can calculate with 51 thousand workplaces/year created directly during the first 5 years of the investment, with another 4900 workplaces created indirectly from the second year, stemming from the extra consumption based on the savings. In the long term (from the sixth year) this amounts to 24 000 workplace/year. Over the period of 5+20 years this amounts to 747 thousand working years contributed to the national economy.

6. When compared with every other economic development programme, the incremental effects constitute the most significant difference, and these can primarily be attributed to the energy savings. The highly favourable macro-economic effects are derived from this.

7. Further to the energy savings, other indirect impacts are also expected, including, for example; increase in level of comfort, reduction in level of noise in the building, significantly lower maintenance costs, and increase in the value of the property.

8. While in the long term the trade balance is positive due to energy savings, we cannot hide the fact that in the short and medium term the trade balance is negatively effected by the high ratio of import in the products (although this is insignificant compared to the total amount of imports).

9. From a primary energy perspective, a five-year programme can be expected to result in a reduction of 10% in gas imports.

10. The demand resulting from a predictable, long-term program of economic support and subsidies fosters the domestic production of the necessary materials, new industrial sectors develop, and it may prove necessary for the already existing capacities to also expand. The products' domestic manufacture has a positive effect on the import ratio.

11. We can count on other quantifiable effects which could become the subject of further research: security of supply, reduction in the emissions of greenhouse gases, reduction in grey economic activity. CO_2 savings are significant; after the second year they amount to 271 000t, and by the end of the sixth year they amount to 1 355 000t/year. Lifelong savings (5+20ys) are 31 billion t which equals to the annual CO_2 emission of the Hungarian ETS sector.

12. One cannot expect this programme to solve the social problems created by the ever growing energy prices concluding in fuel poverty. These can be treated effectively with specially tailored social programmes, but an improvement in energy efficiency has to play a central role in these programmes, too.

13. Analysing dynamic impacts is not without difficulties (an input-output model is necessarily a static system), but the following may prove interesting for future research and considerations:

- How does a predictable programme change the internal industrial sector?
- How does a cost of energy worsen or improve investment mood?
- How much does householders' willingness to take loans, and the banks' willingness to give them change? And what about the willingness to save?

Finally we have to state that the current research only assessed and quantified the likely impacts of a limited, 5-year long program, but the whole potential is much greater, thuss cannot be realised in such a short timescale.

[3] Potential Financial Sources to Support Future Energy Retrofit Programmes , REKK, 2011