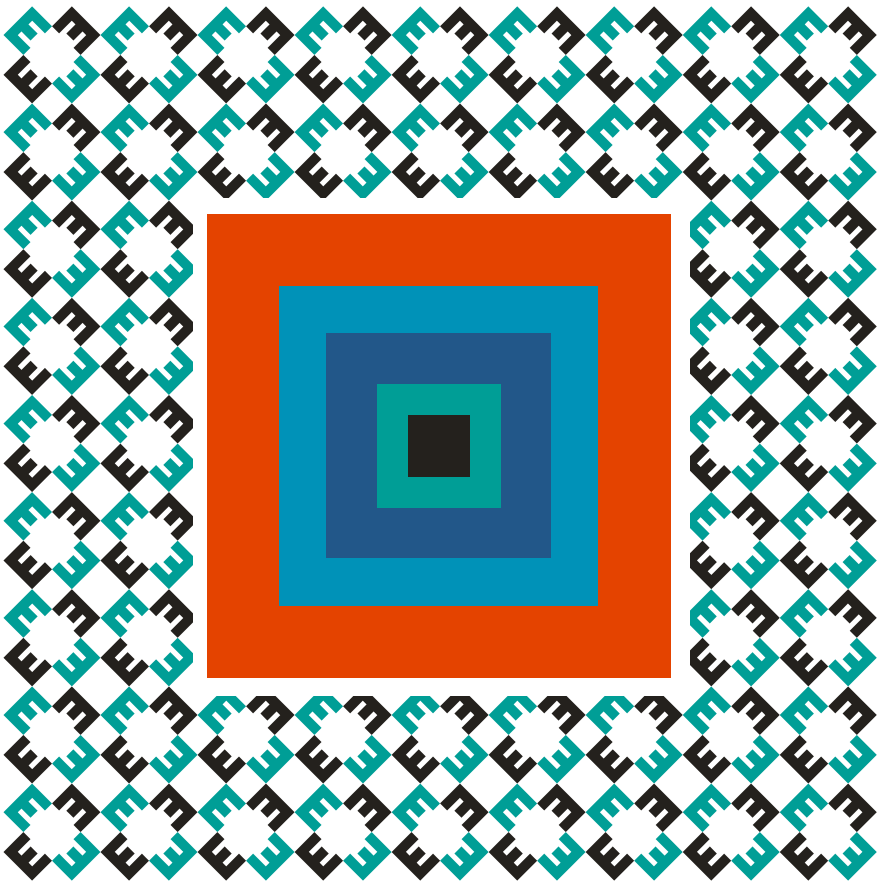
ENERGIAKLUB
CLIMATE POLICY INSTITUTE
APPLIED COMMUNICATIONS

november 2011.

MORE EFFICIENT HOMES – MACRO ECONOMIC IMPACTS

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

EXECUTIVE SUMMARY



MORE EFFICIENT HOMES – MACRO ECONOMIC IMPACTS

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

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Experts involved:
Orsolya Fülöp (economic analysis) – economical analysis, savings potential
Péter Nagy (energy auditor) – building industry data, sector specific investment vector
Krisztina Severnyák (dip. Ach., building energy expert)
Dénes Fellegi - visual support

The research was founded by **European Climate Foundation**, from May to September 2011.

The research and its background can be found and downloaded from the website of Energiaklub Climate Policy Institute and Applied Communications: www.energiaklub.hu

The analysis is greatly based on the results of Negajoule2020 research (Energiaklub 2011). The related data can be found on the website www.negajoule.eu .

ENERGIAKLUB, September 2011

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.

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.

[1] €=HUF292 in September, 2011

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

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.)

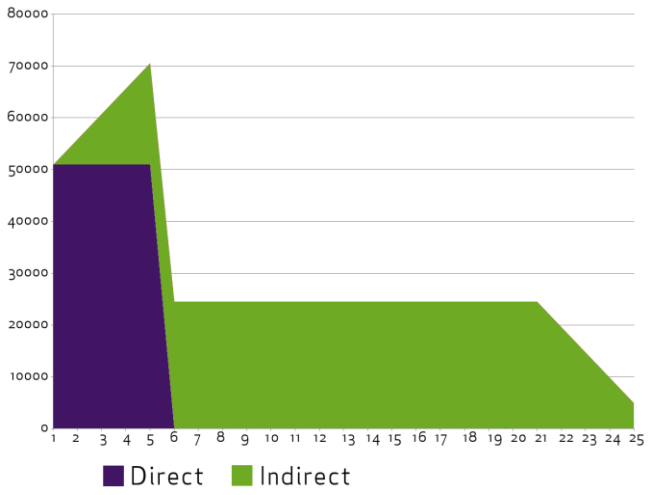

Figure 1: Employment impacts

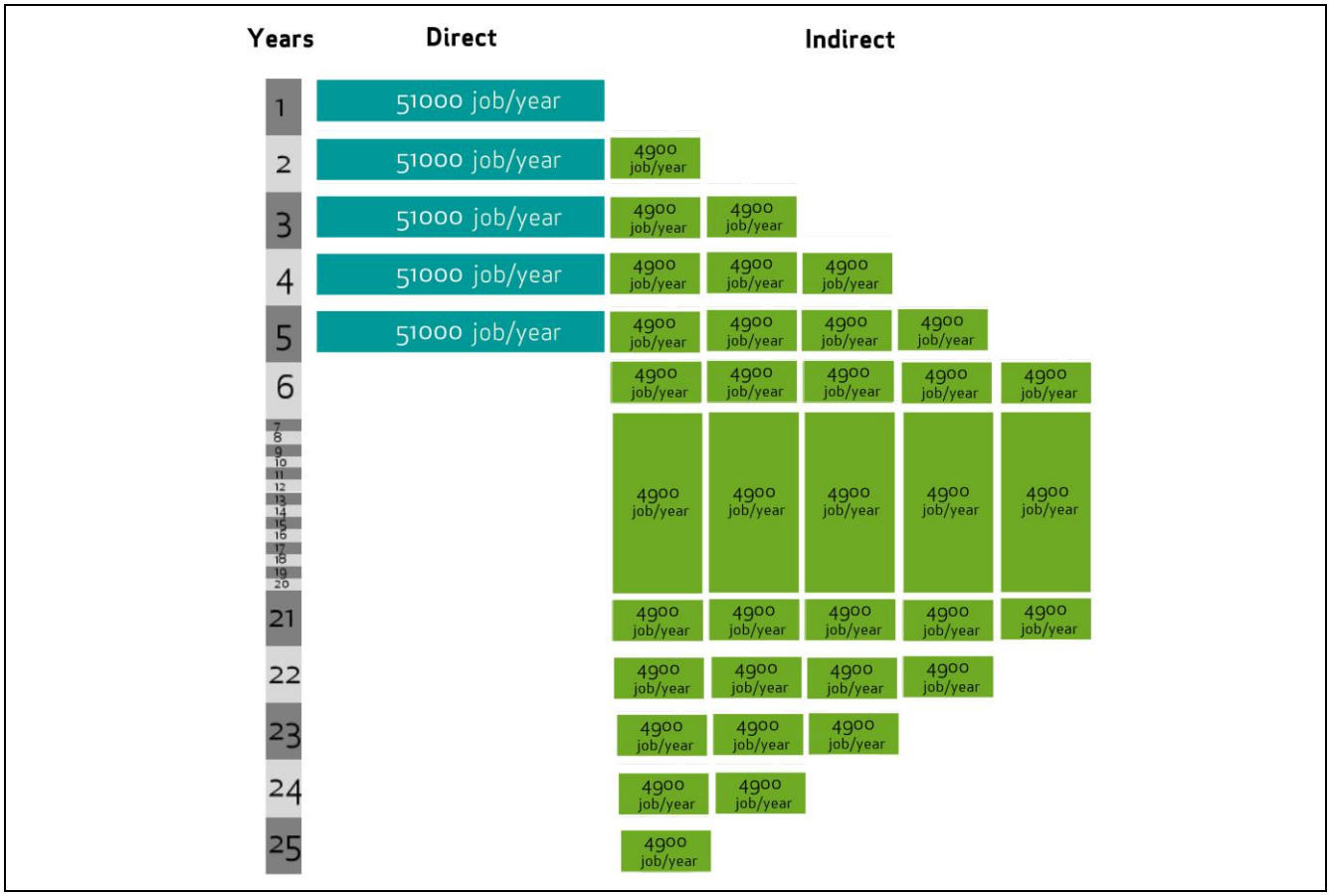

Figure 2: Employment impacts over the 5+20 years of the program

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.

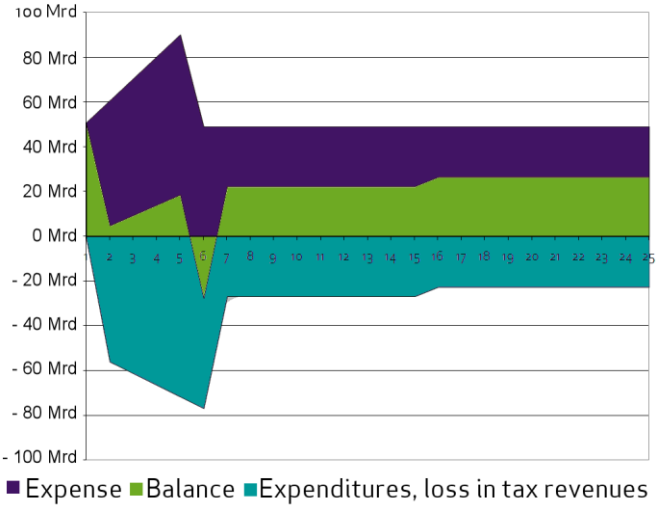

Figure 3: Effect on state revenues

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 roughly 10% - 5,5 billion HUF (18,5m€) 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 2nd year + 20 years
Income tax + social insurance contributions from extra consumption	4,6	15	(+)	From the 2nd year + 20 years
Less VAT from lowered energy consumption	4,5	15	(-)	From the 2nd year + 20 years
Decreased of tax on interest due to the invested savings (0,7 billion per year)	0,7	2,5	(-2x)	From the 1st year
Total	**55,5**	**188,5**		
The balance of state subsidies and tax revenues	**5,5**	**18,5**		

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)	-135
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.

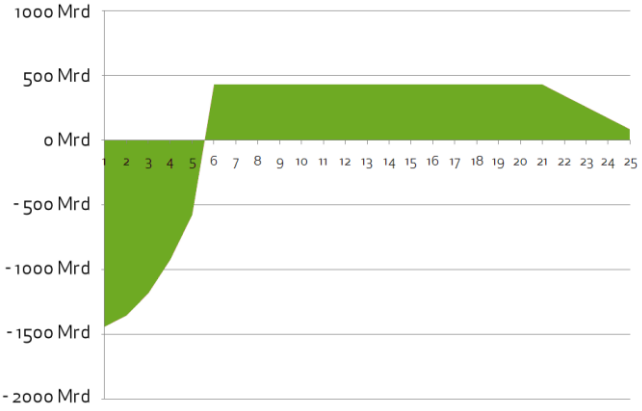

Figure 5: Change in balance of trade

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 aformementioned 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.

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

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.

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