Employment Impacts of a Large-Scale Deep Building Energy Retrofit Programme in Hungary

Executive Summary

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CENTER FOR CLIMATE CHANGE AND SUSTAINABLE ENERGY POLICY

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Employment Impacts of a Large-Scale Deep Building Energy Retrofit Programme in Hungary

Prepared by the Center for Climate Change and Sustainable Energy Policy (3CSEP) of Central European University, Budapest, on behalf of the European Climate Foundation.

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In Hungary, buildings are responsible for close to half of energy-related CO_2 emissions. The building sector has been shown worldwide to have the largest cost-effective CO_2 mitigation potential, and this is especially true for Hungary's buildings, which are among the least energy-efficient in the EU. In addition to contributing to climate change mitigation, deep energy retrofits (retrofits that save 75 – 90% of heating and cooling energy consumption of a building) advance a broad array of other socio-economic and political agendas, including improved social welfare and alleviation of energy/fuel poverty, increased energy security, improved health conditions of the population, enhanced market value for real estate, net employment gains, new business opportunities, and improved quality of life.

The goal of the present research was to gauge the net employment impacts of a large-scale deep building energy-efficiency renovation programme in Hungary. The study has been commissioned by the European Climate Foundation, and executed by an international team of leading experts, led by the Center for Climate Change and Sustainable Energy Policy (3CSEP) of the Central European University.

The employment impacts strongly correlate with the dynamics of the investments flowing towards building energy retrofits, therefore the study has investigated the impact of specific renovation scenarios. The scenarios are characterised by two factors: the type or depth of retrofits included in the programme and the speed of renovation assumed (for an overview of the scenario descriptions see Table 1). The focus was on existing residential and public sector buildings, and emphasised scenarios that support "deep" retrofits, which bring the buildings as close to passive house standards (i.e. a consumption of 15 kWh/m^2/year for heating) as realistically and economically feasible. Other scenarios were also examined for comparative purposes.

Name	Scenario	Type of energy-efficiency intervention	Renovation rate, per year
S-BASE	Baseline scenario	No intervention	"Business-as-usual" (1.3% of the total floor area)
S-DEEP1	Deep retrofit, fast implementation rate	Deep retrofit	Around 20 million sqm (eq. to 250,000 dwellings, 5.7% of the total floor area)
S-DEEP2	Deep retrofit, medium implementation rate	Deep retrofit	Around 12 million sqm (eq. to 150,000 dwellings, 3.4% of the total floor area)
S-DEEP3	Deep retrofit, slow implementation rate	Deep retrofit	Around 8 million sqm (eq. to 100,000 dwellings, 2.3% of the total floor area)
S-SUB	Suboptimal retrofit, medium implementation rate	Suboptimal retrofit	Around 12 million sqm (eq. to 150,000 dwellings, 3.4% of the total floor area)

Table 1: Summary of the scenarios covered by the research

The research has demonstrated that up to 85% of Hungarian heating energy use, and the corresponding CO_2 emissions, can be avoided by a consistent and wide-spread deep retrofit programme in the country. The investigation has also highlighted the important risk related to less ambitious renovation programmes. If refurbishments aim at keeping today's retrofit depth such as the one implemented by existing ÖKO, Panel and similar programmes (i.e. reducing around 40% of present energy use in existing buildings on average), this results in a significant lock-in effect. As can be seen in Fig. 1, this sub-optimal renovation scenario saves only approximately 40% of final heating energy use, locking in approximately 45% of 2010 building heating-related emissions – around 22% of 2010 total national emissions – at the end of the programme. This means that reaching ambitious mid-term climate targets, such as the often quoted 75 – 85% reductions that are needed by 2050, will become extremely difficult, and expensive, to achieve.

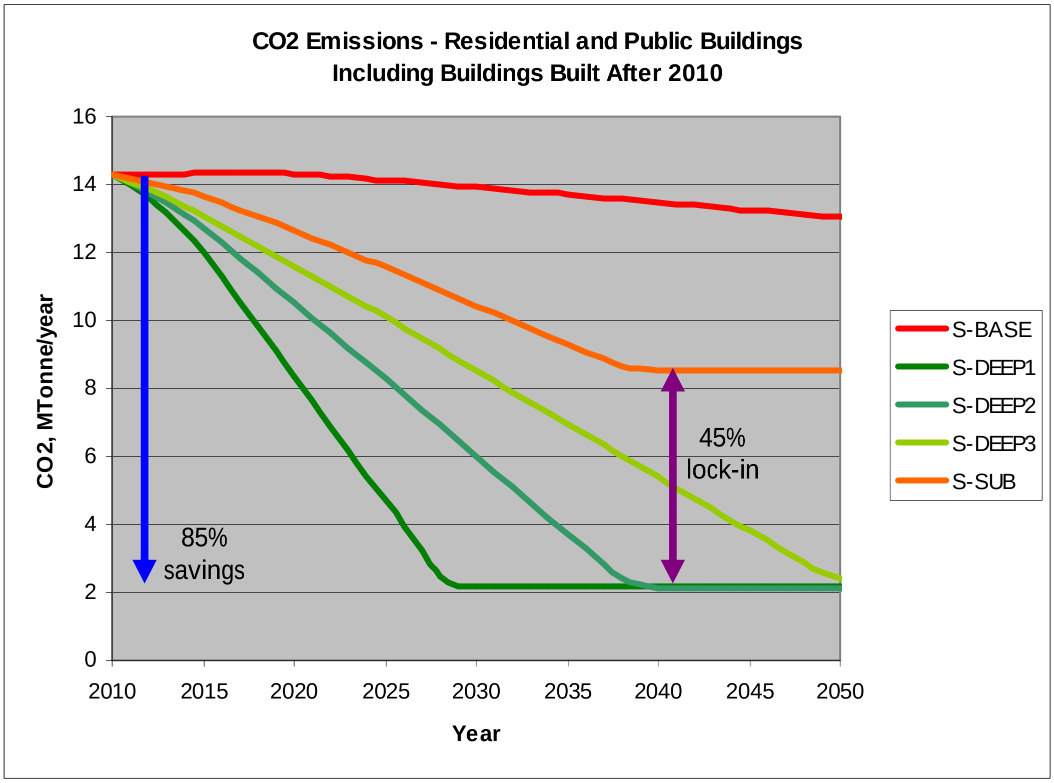

Fig. 1: CO_2 emission reductions of the Hungarian building stock for all scenarios considered in the study

A deep retrofit programme can allow Hungary to significantly reduce its natural gas imports and therefore improve its energy security. By 2030, a deep renovation scenario could save up to 39% of annual natural gas imports (see Fig. 2), and up to 59% of natural gas import needs in January[1], the most critical month from the perspective of energy security. A suboptimal scenario, on the other hand, would result in compromises in terms of energy security enhancements: it saves just over 10% of national natural gas imports, and the peak savings (January import needs) are reduced merely to 18%.

[1] The savings are expressed in terms of the percentage of 2006-2008 Hungarian natural gas imports.

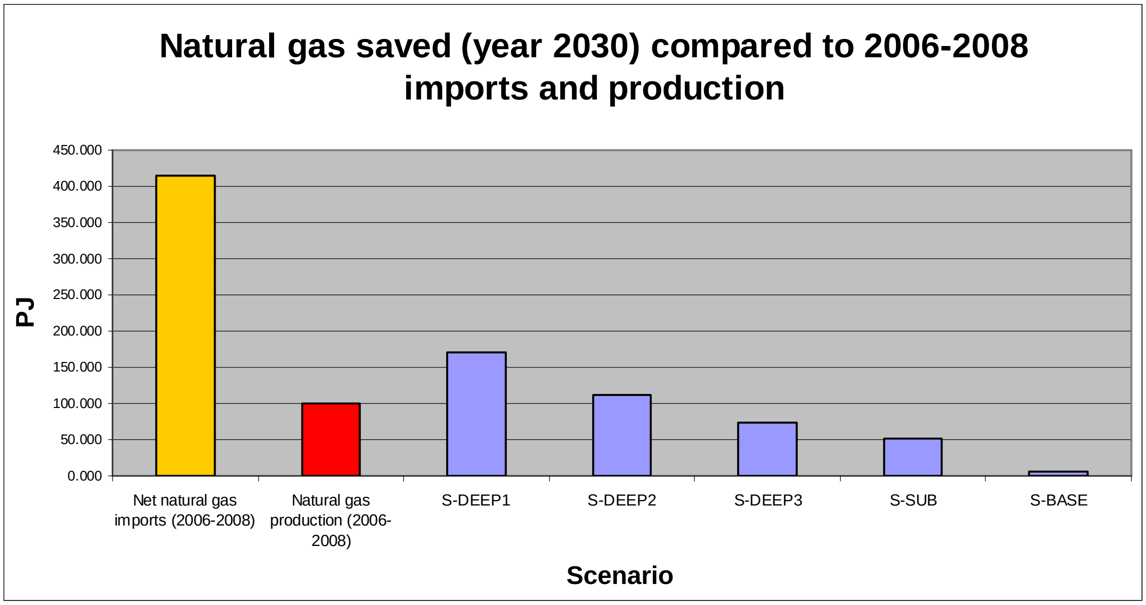

Fig. 2: Natural gas saved in the year 2030 by the retrofit scenarios, contrasted to 2006-2008 total imports and national production

With regard to the employment effects, the results of the study clearly indicate that adopting a high efficiency retrofitting standard close to passive house would result in substantially higher employment benefits than the business-as-usual (not aimed at reducing energy consumption, *S-BASE* scenario) and sub-optimal renovation (the currently applied technology in ÖKO, Panel and similar State-supported programmes, *S-SUB* scenario) alternatives.

In particular, the research (see Fig. 3) has demonstrated that a large-scale, deep renovation programme in Hungary could create by 2020 up to 131,000 net new jobs, as opposed to approximately 43,000 in the suboptimal scenario. The peak figures for the creation of employment happen in 2015, when 184,000 new jobs are created in the most ambitious deep renovation scenario. These figures include the workforce losses in the energy supply sector. It is important to highlight that up to 38% of the employment gains are due to the indirect effects on other sectors that supply the construction industry and the induced effects from the increased spending power of higher employment levels.

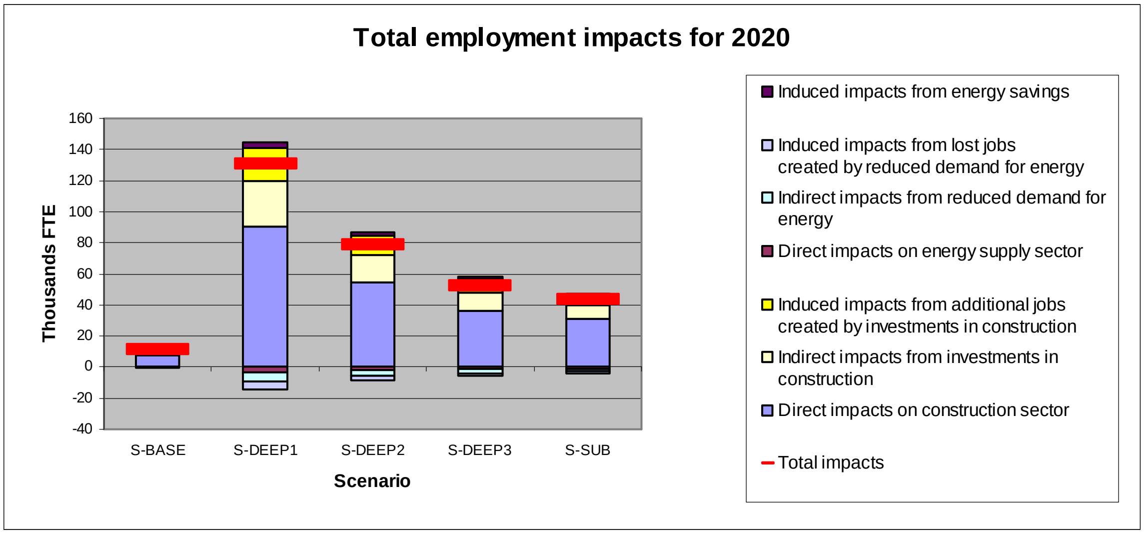

Fig. 3: Total (direct and indirect) impacts for the renovation scenarios. The net impact is marked with the red crossing line.

Building refurbishment activities are also typically much more labour-intensive than other types of climate change mitigation and economic recovery activities, including construction. For instance, the direct employment impacts of deep renovations in the construction industry are around five times higher than those that would be generated in Hungary by the same investment in transport infrastructural developments such as road construction.

From a socio-economic and environmental perspective, it is thus important that the government supports a deep renovation programme rather than a suboptimal one. On the other hand, the corresponding annual investment needs are also significantly higher (up to 4.5 billion Euros/year for *S-DEEP1* in the initial phase of the programme as opposed to 2 billion for *S-DEEP3*, and 2.8 billion vs. 1 billion towards the concluding phases of the programme). These are substantial figures, amounting to several percentage points of the Hungarian national budget. Nevertheless, the research has also found that redirecting the current energy subsidies and making a wise use of available EU funds could potentially make available around 1 billion Euros per year, an amount that by itself practically covers during the first years of the programme the full annual costs of renovating Hungarian buildings at a rate of 100,000 units per year (*S-DEEP3* scenario). In addition, pay-as-you-save schemes, i.e. financial arrangements in which residents cover loan repayments from their energy bill savings, and other innovative financing arrangements, can also significantly reduce the capital or financing burden of the programme. However, the scope of the study could not extend to a comprehensive financial/economic assessment. Further research is therefore recommended for a profound understanding of optimal financing schemes.

From a total cost perspective, a more gradual implementation of a deep renovation programme is much more attractive. Due to the relative inexperience with deep renovation know-how and technologies, initially these will undoubtedly be more expensive than after a learning period when experience accumulates and more mature markets and competitive supply chains are established. A more aggressive renovation programme (i.e., approximately 5.7% of the floor area renovated per year instead of 3.4% or 2.3%) will result in higher overall costs (undiscounted) of renovating the Hungarian building stock: 59 billion Euros for *S-DEEP 1*, 50 for *S-DEEP-2*, and 44 for *S-DEEP3*. On the other hand, the implementation of a more aggressive programme also results in a faster harvesting of energy saving benefits: by 2050, the total accumulated undiscounted benefits of *S-DEEP1* will amount to 97 billion Euros, whereas *S-DEEP2* and *S-DEEP3* can produce 80 and 60 billion Euros of energy savings, respectively. A more gradual implementation is also associated with less intense shocks for the labour market, and can alleviate some of the short-term negative consequences described in our qualitative analysis.

On the qualitative aspects of the new jobs created, the length of the programme ensures that the employment created is long-term, and the fact that the whole building stock is considered for renovation implies that the new jobs are likely to be distributed throughout the country as renovations are usually carried out by local small and medium enterprises.

To create the conditions for a smooth implementation of the programme, the public administration should be decisively involved in the planning and the financing of the retrofit programme, to promote initiatives that would reduce the risks of supply bottlenecks (such as labour, material or finance supply) and in making sure that the renovations deliver the expected energy savings, so as to ensure the financial practicability of the intervention.

Decision-makers of today's Hungary have the possibility to unlock the potential for creating additional jobs while greatly reducing the energy costs of households and public buildings, Hungary's record natural gas dependency and making further contributions to mitigating climate change. Among the options assessed, the results indicate that deep (i.e., passive house-type) renovations are recommended as compared to suboptimal. High efficiency renovations create more jobs, save more energy, reduce more emissions and decrease to a larger extent the energy dependency of the nation.