THE POSSIBLE ROLE OF UNDERGROUND CARBON STORAGE IN MITIGATING CLIMATE CHANGE IN HUNGARY

Written By: Peter Kardos

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EXECUTIVE SUMMARY

The possible role of the technology referred to as CCS in mitigating climate change has already been intensely debated over long years. Several researches have been performed regarding the domestic possibilities; however, such a comprehensive examination has not yet been put through which analyses the technology group in the aspect of national efforts made for mitigating climate change.

It can easily be conceded that CCS cannot be part of a sustainable energy system. On the one hand it is based on depletable resources (coal, lignite, natural gas and mineral oil), and on the other hand we burden the following generations with serious problems by passing onto them the storage facilities loaded with CO_2.

The lack of available practical and economical experiences makes it significantly more difficult to assess the possible role of CCS. At its current level the technology is very much undeveloped; furthermore only ten fully comprehensive projects are running globally. The implementation of the European pilot projects is significantly overdue, according to estimations the soonest date of their launching is only around 2014-15. Consequently the measurement data derived from the operative

circumstances and the practical knowledge about efficiency, carbon use, environmental impacts and last but not least exact specific costs will only become available in the second half of this decade. Only afterwards will it be possible to perform detailed technical and economical calculations in relation to the technology.

Until these data become available, we can only rely on estimations. When taking into consideration the estimations regarding the specific costs, we can experience extreme deviations dependant on the utilized technology and the geographical/geological characteristics. Consequently the values derived this way vary on a wide scale: the most comprehensive analyses calculate with a cost of 24-90 €/ton, which generally increases the cost of energy production by 50-100%. The basic reason for the deterioration of the remuneration indicators is that the capturing of CO_2 during the energy production process considerably weakens the efficiency, which in turn forces power plants to increase their coal consumption. Due to the current market incapacity of the technology these projects will not become viable for a good while unless significant governmental support is ensured.

Regarding the timing we also have to face the fact that by the time we will possess substantive data necessary for decision-making in the second half of the decade, it will be too late, as we are supposed to be over the emission peak before 2015, which, according to the IPCC report, is necessary for successfully tackling climate change.

When examining the Hungarian scope it is clear that the unexplored storage potential might even be utterly considerable; however, for the time being there is no reliable information in relation to its exploitability, thus presently the magnitude of the exact storage capacity is also unknown.

National experts estimate the specific cost of CCS at 50-100€/ton. Let us suppose that, calculating at a minimum value, this additional specific cost of 50€/ton is integrated into the overheads of the presently operating fossil power plants. This way it would be necessary to calculate with a 50% increase of costs in the case of natural gas and with a 100-130% increase in the case of lignite or coal.

The national spread of CCS is influenced basically by two factors: on the one hand by the specific cost of the technology calculated under market circumstances, and on the other hand by the modification of the specific costs of other carbon-dioxide averting options (e.g. renewable energy sources). In order to explore these, three possible scenarios have been examined.

According to the CCS-Max scenario CCS would come into general use in Hungary from 2025. This technology could be in use for approx. 20-50 years, consequently, in spite of the idealized 30 €/t specific cost, its role will only be transitory.

The technology is already considered as only a transitory solution in the CCS-bridge scenario, only to gather ground effectively after 2030. In the case of gas-turbine power plants without governmental dotation the 50 €/t specific cost renders likely the market advantage for a 5-20 years period.

The No-CCS scenario demonstrates that even if the usage of CCS in big volume is set aside in the following decades, social costs will not increase, as the potential of renewable energy sources and improved energy efficiency ensure cheaper and multifaceted possibilities.

Thus, the analysis of the three scenarios examining the national spread of CCS shows that the initiation of the projects without significant governmental subvention can by no means be expected before 2025-30 in Hungary. Furthermore the plans realized later on will lose their contingent competitiveness in a short time against the possibilities offered by renewable energy sources (see Figure no. 1.)
According to the opinion of Energiaklub the role of CCS in the coming up decade can only be marginal. Thus the resources intended to be expended on CCS should rather be invested into the proven tools, e.g. improving energy efficiency and the widespread use of renewable energy sources, which also contribute to the realization of sustainable energy production and use.

Even in spite of the uncertain factors it is clear that due to the high specific costs, CCS can take on an important role only with significant governmental intervention. Such intervention, however, requires strategic decision-making, in which case the most important question is whether the supportive attitude towards CCS would cause a "stoppage" issue on the long term. In other words, does the (possibly overdrawn) confidence in CCS or the slowing down of the de-carbonization due to the initiation of CCS investments not lead to the need of significantly greater efforts related to reducing emissions in the future than compared to the originally required efforts without CCS?

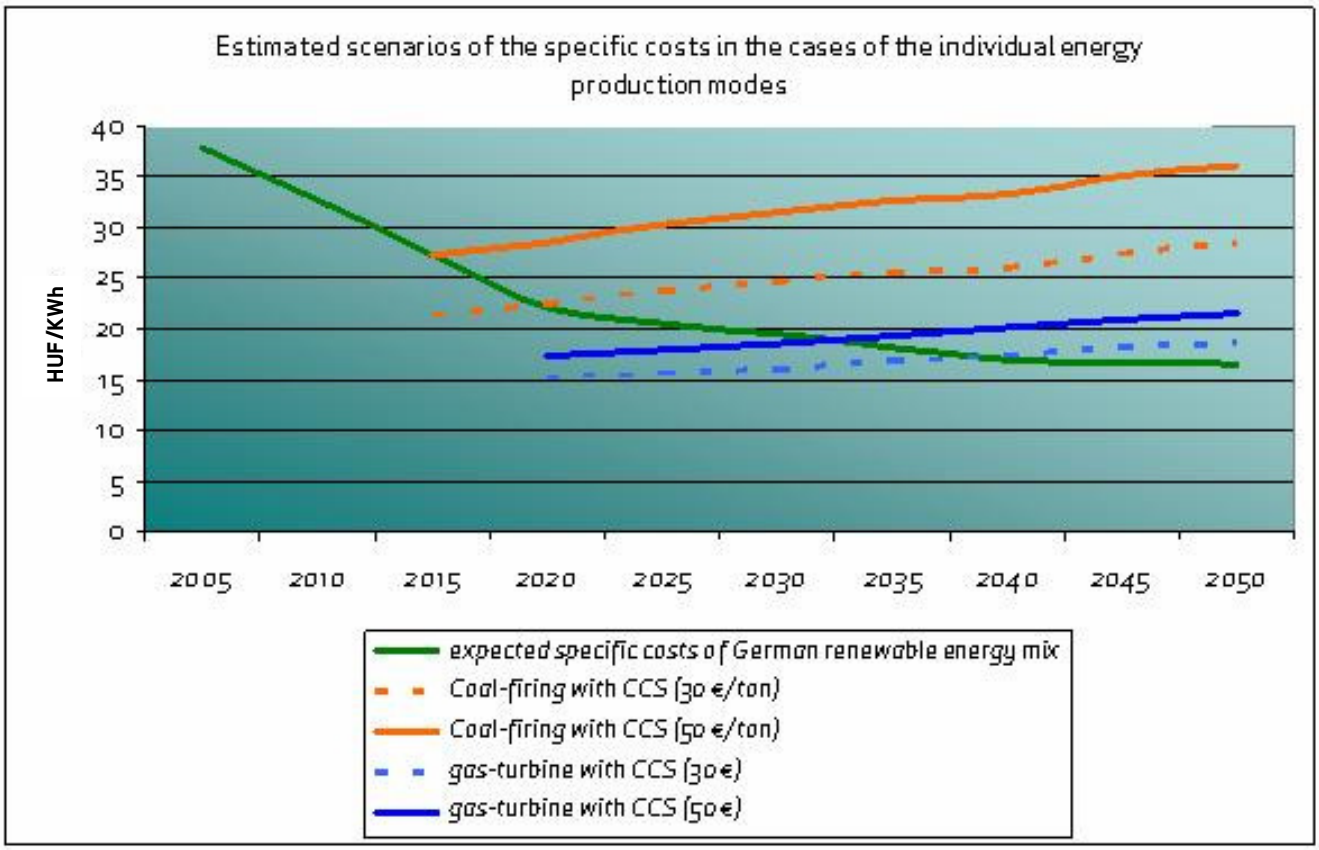

Figure no. 1

Specific costs of the German renewable mix, furthermore the estimated development of the expected specific production costs of the national coal and gas fueled power plants in the case of 30 and 50 €/ton CCS costs with national adaptation (amended with own data). In the case of the national energy mix it is necessary to calculate with somewhat larger values, as the German mix contains the offshore wind turbines as well.