

# ***RESIDENTIAL PV MARKET PROSPECTS IN HUNGARY – MARKET SIZE ESTIMATION AND EVALUATION FRAMEWORK***

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## **Overview**

Solar photovoltaic capacities have gained significant presence in the electricity mix of various countries worldwide and in the European Union as a renewable solution for generation. At the same time, decentralized power generation – from any resource or by any method – has also emerged to become a possible pathway to make energy systems more ecologically sustainable and to turn the energy industry into a local business. Both objectives can be approached by the settling of small-scale photovoltaic plants. Although the photovoltaics have already been spreaded in similar countries, Hungary's PV boom is still ahead of us. This paper examines the future potential of PV capacities in the Hungarian generation mix, concentrating on small-scale units planted and operated by residential prosumers. The paper's goal is to identify the main qualitative and quantitative drivers of the customer's decision, whether or not to plant a household PV. The quantified drivers go under a sensitivity analysis, which gives some possible scenarios about the market potential of these units in the next 5 years. Taking into consideration the customer's decision motivator factors and other influencing drivers, Hungary's case and the applied market potential estimation model can be applied to other markets as well.

## **Methods**

In order to recognise the market situation, I applied a modified PESTEL analysis for the Hungarian electricity market. The market size estimation model has 3 levels. The first layer contains the business situation analysis itself. The second layer is the identification and segmentation of the potential customers on the residential market. The third layer calculates economic returns for the specific segments by a tailored Net Present Value model. The scenarios are compared by Internal Rate of Return. A modest economic return is considered to be a prerequisite in order to wider mass market penetration. Regarding macro conditions and the risk level of the investment, the investment is recommended financially above the IRR of 8%, and especially recommended above 12%. This third layer contains sensitivity analysis, which shows the key economic drivers (regulation inputs, state subsidies, technology prices, etc.). The third layer takes behavioural issues into account: in a CEE country, the investment returns are by far the largest decision factor, when a consumer considers installing an own small-scale PV system.

## **Results**

The analysis has shown that PV installation can be a beneficial option currently mostly for the larger (consumers with a consumption of over 6.500 kWh/year) residential consumers. However, the sensitivity analysis has shown that in the next five years, the number of households with prosperous investment prospects will be significantly higher. The development of the investments' pay-off is connected to the further decline in the price of the technology and some favourable or incentive regulatory changes. It has also come out, that the lack of direct state subsidy is not an undoubtedly negative effect, because in only a few years the technology can be competitive without any subsidy; stable long-term regulatory is much more important from the country's side. Beyond economic pay-off, the people's lack of trust in the long-term stability of regulation is the largest obstacle to the widespread penetration of small-scale residential PVs.

## **Conclusions**

The main drivers of the economic return are state subsidy, investment costs (technology and installation costs) and regulatory issues (prescribed selling price, feed-in-tarif, taxes, etc.). These factors will define the constraints of mass market penetration in the next 5 years. However, small-scale PVs may be a viable solution to achieve the country's renewable generation goals and to establish decentralized production.