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# TECHNO-ECONOMIC MODEL OF DISTRICT HEATING ENERGY HUB: THE CASE OF LATVIA

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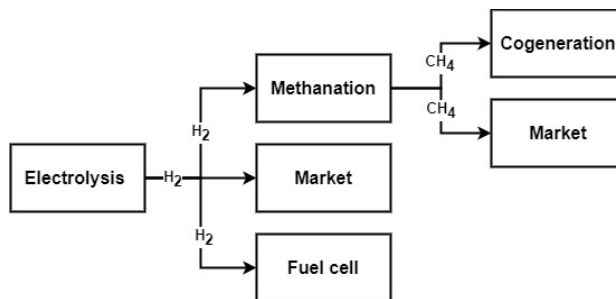
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**Abstract** – Up to 60 % of Latvia’s energy resources are used as fuel for district heating systems. Heating sector is an important emitter of greenhouse gases – especially carbon dioxide. Therefore, reduction of carbon emissions of district heating systems are crucial in Latvia’s decarbonization efforts. One of the solutions is integration of energy hub in the district heating network. There are many types of energy hubs, and the most suitable solution must be found in each case. A goal of this study is to find the best solution for Latvia’s district heating systems to achieve decarbonization and use of green (renewable) hydrogen. This coincides with European Union’s plans to increase the use of green hydrogen not only in industrial and residential application, but in heat production as well. To facilitate the plans of the European Union and Latvia’s decarbonization needs, a mathematical model made in Microsoft Excel is used as a method to explore the techno-economic aspects of the energy hub and its integration in the district heating system. Several alternatives are considered, and green hydrogen is used in all of those. Results show the economically most feasible alternative. Calculations are made on an annual term basis, considering such factors as electricity and district heating price, required capacity of electrolysis apparatus for hydrogen production, etc. From the model some results are apparent – the price of electricity has a sizable impact on the economic feasibility of the project, and the best use for green hydrogen economics-wise may differ throughout the year as the price of electricity, hydrogen, district heating and methane gas change.

**Keywords** – Centralized heating; decarbonization; green hydrogen; renewable energy; renewable hydrogen; sustainable energy system



Microsoft Excel techno-economic model scheme.