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# ELECTRIFICATION PATHWAYS FOR DISTRICT HEATING IN LATVIA

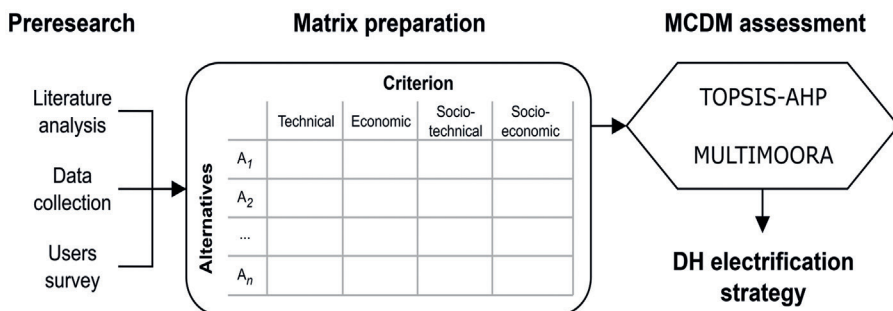
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**Abstract** – District heating (DH) in Latvia has a strategic role. It accounts for more than one third of final energy consumption and relies mainly on biomass. In line with diversification principles, rapid electrification is required to modernize the sector and enhance sustainability. Available electrification options for DH can be classified by device category (heat pumps or electric boilers), by capacity and grid connection type (high-capacity at the transmission grid or medium and low-capacity at the distribution grid), and, for heat pumps, by specific technology (air-to-water, ground-to-water, water-to-water). Combinations of these options constitute alternatives that must be evaluated to provide decision-makers and stakeholders with a scientifically grounded strategy. For the evaluation, a multi-criteria decision making (MCDM) assessment was selected, specifically TOPSIS-AHP and MULTIMOORA methods, with sector experts involved to assign certain criterion values and weights. TOPSIS-AHP is suitable because AHP elicits transparent and consistent expert weights, while TOPSIS ranks alternatives by distance to positive and negative ideal solutions, handling benefit and cost criterion with simple normalization. MULTIMOORA complements this by providing three complementary operators that mitigate scale effects and enable a robustness cross-check of the ranking. Although technologically simpler and higher-capacity options, such as large-scale electric boilers, are in theory more affordable and yield greater economic benefits, the authors expect that, in the Latvian context, the most suitable option will be a lower-capacity and more widely deployable solution, driven by the constraints faced by DH operators in technology choice.

**Keywords** – Decarbonize heat; district heating; electric boilers; heat pumps; MCDM; power-to-heat; SDG 13; socioeconomic; sociotechnical



Methodological framework for the assessment of DH electrification alternatives using TOPSIS-AHP and MULTIMOORA

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