

## Positive Energy Districts in the Swedish Energy System

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**Abstract :** The European Union is introducing the positive energy district concept, which has the goal to reduce overall carbon dioxide emissions. Other studies have already mapped the make-up of such districts, and reviewed their definitions and where they are positioned. The Swedish energy system is unique compared to others in Europe, due to the implementation of low-carbon electricity and heat energy sources and high uptake of district heating. The goal for this paper is to start the discussion about how the concept of positive energy districts can best be applied to the Swedish context and meet their mitigation goals. To explore how these differences impact the formation of positive energy districts, two cases were analyzed for their methods and how these integrate into the Swedish energy system: a district in Uppsala with a focus on energy and another in Helsingborg with a focus on climate. The case in Uppsala uses primary energy calculations which can be criticised but take a virtual border that allows for its surrounding system to be considered. The district in Helsingborg has a complex methodology for considering the life cycle emissions of the neighborhood. It is successful in considering the energy balance on a monthly basis, but it can be problematized in terms of creating sub-optimized systems due to setting tight geographical constraints. The discussion of shaping the definitions and methodologies for positive energy districts is taking place in Europe and Sweden. We identify three pitfalls that must be avoided so that positive energy districts meet their mitigation goals in the Swedish context. The goal of pushing out fossil fuels is not relevant in the current energy system, the mismatch between summer electricity production and winter energy demands should be addressed, and further implementations should consider collaboration with the established district heating grid.

**Keywords :** positive energy districts, energy system, renewable energy, European Union

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