

Flexible heating and cooling and geothermal energy storage as an enabler for decarbonized integrated energy systems

FLXenalber



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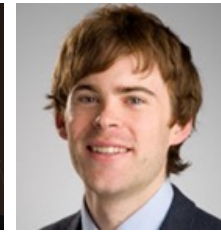
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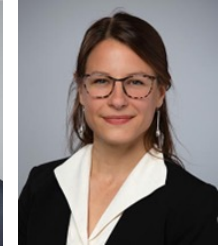
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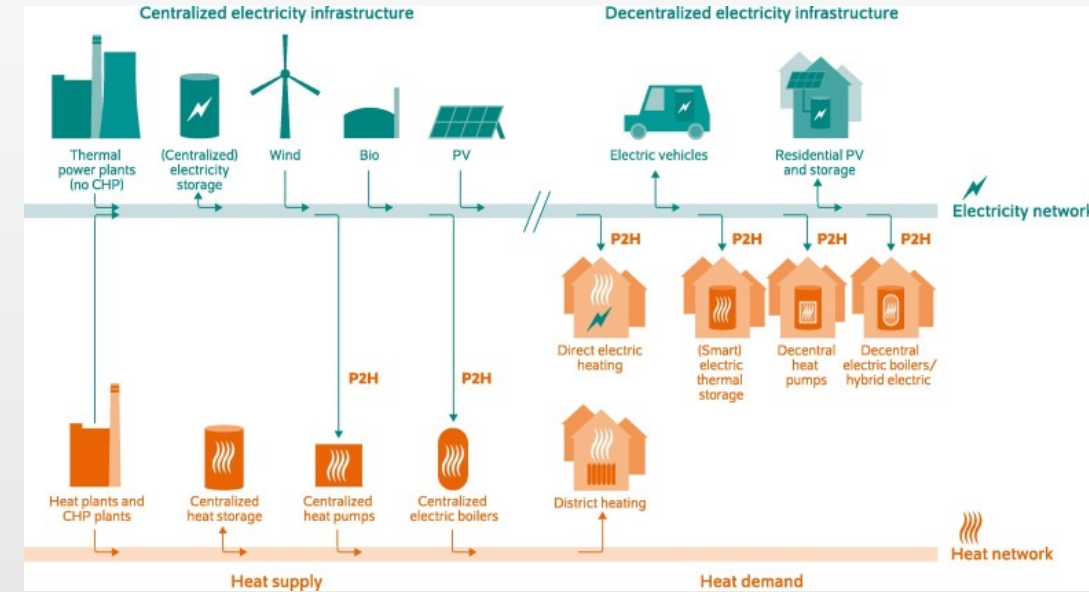


Jeff Pepin



Two challenges – one solution

- Challenges:
 1. Urgent demand to decarbonize the fossil-fuel dominated heating sector
 2. Significant amount of end-user flexibility will be required in the future to enable increased share of variable renewable energy sources
- Solution
 - Decarbonized heat supply through flexible **power2heat (heat pumps)** integrated with **thermal energy storage**
- How to impact it?
 - Map the heating and cooling resources that can provide flexibility in the power grid at **local, regional and national level**
 - **Demonstrate and quantify** the impact on the energy system in the transition to a fossil-free energy system



Badami, M., & Fambri, G. (2019). Optimising energy flows and synergies between energy networks. *Energy*, 173, 400–412.

Solution to be provided

- Hypothesis: Sector coupling and integration of TES and geothermal resources can **accelerate and reduce the costs** of transition into a fully decarbonized energy system.
- Solution: Use energy system optimization models to demonstrate and quantify **the impact of flexible heating and cooling solutions** at different levels, from energy communities to national scale in accelerating and reducing the *costs* of the transition into a fossil-free power system.

