

Is there an optimum scale for energy autarky?

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There have been several efforts aiming at a more holistic energetic autarky for larger energy systems such as municipalities (cf. [1], [2]). Attempts to develop a general framework for energy autarky are mainly qualitative in nature (cf. [3]; [4]). There are some general quantitative frameworks for assessing the level of autarky on the dwelling level [5] but a lack of research into the scale effects on energy autarky. This contribution investigates these effects by extending an existing capacity and dispatch optimization model for m-CHP systems [6]. Stylized demand classes are defined through a combination of scale (number of buildings) and demand types (households, services, industry); thus the optimal sizing and dispatch of heat and electricity systems is determined and generalized conclusions can be drawn about the scale effects on attempts to achieve energy autarky. The results indicate whether there is an optimal scale at which energy autarky could be sensible for domestic buildings.

References

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