Open source models urbs & rivus

Operations research models for energy system planning and operation

Johannes Dorfner

Institute for Renewable and Sustainable Energy Systems
Technische Universität München

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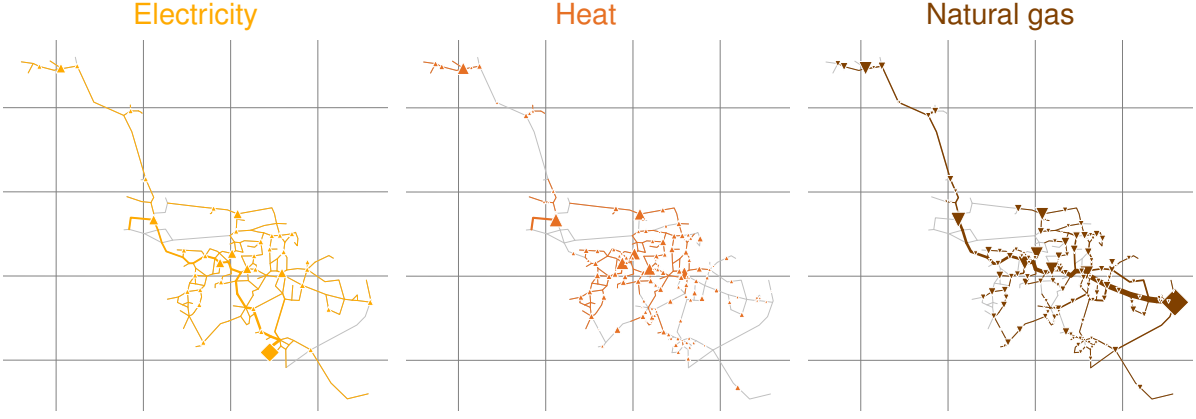
Exemplary result of model **rivus**

Network capacities (lines) and conversion unit capacities (symbols) for a Bavarian town

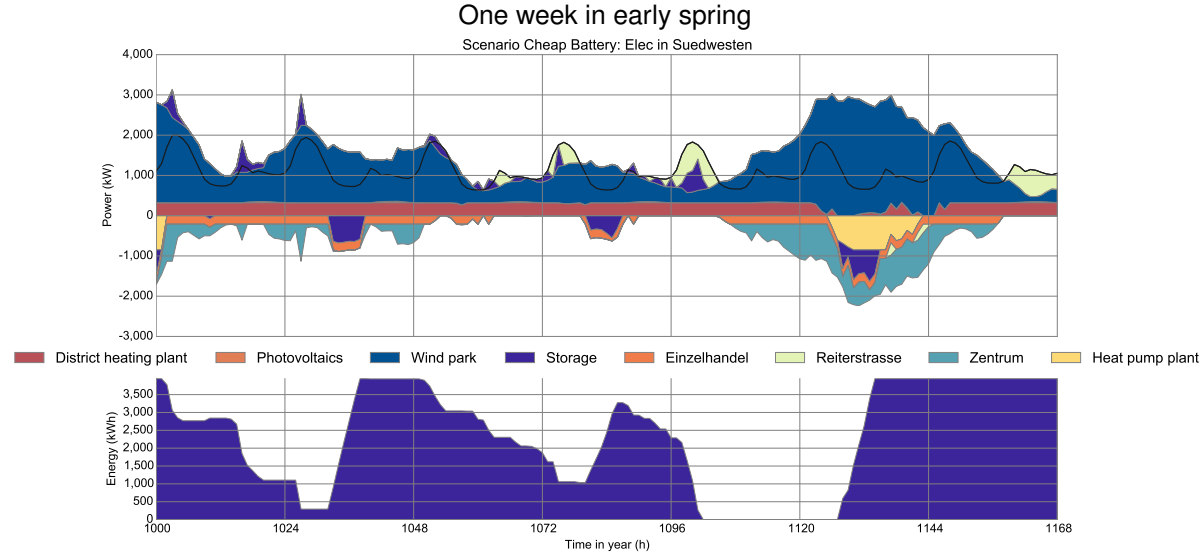


Green field planning of energy conversion and transmission capacities:
Full electric grid, full gas grid; heat mainly generated locally from gas

`https://github.com/ojdo/rivus/runhg15.py:scenario_no_electric_heating()`

Exemplary result of model **urbs**

Electricity generation for a district (*Südwesten*) in the same Bavarian town



`https://github.com/tum-ens/urbs/rivhg15.py:scenario_cheap_battery()` on branch `haag15`

Conclusion

What to remember?

Outline open source energy system models with shared design
the usual LP/MILP optimisation for minimum cost energy supply

Technical written in the increasingly popular Python/Pyomo/Pandas stack
focus on simplicity (< 2 kLOC each, including plumbing)

Reproducibility browse or try it out for yourself
`https://github.com/tum-ens/urbs` (stable)
`https://github.com/ojdo/rivus` (beta)

Essentially, all models are wrong, but some are useful.

– George E. P. Box (1919–2013)