Open energy system modelling for climate scientists and others

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Climate forecasting for energy workshop

Imperial College London

University of Reading

EPSRC
Engineering and Physical Sciences Research Council

Mathematics of Planet Earth

S2S4E
Climate Services for Clean Energy

openmod
open energy modelling initiative

Energy system models come in many forms and can be classified on a number of axes

Selected classifications of energy system models

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SCOPE

electricity, transport, agriculture, industry —————— electricity only (power system models)

CO2 policy models   grid operator models

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countries & days, coarse approximation ——————— very high

long-term scenario / planning · detailed grid models, e.g. frequency, alternating current

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agriculture, industry   system models)
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- Optimisation
- Agent-based

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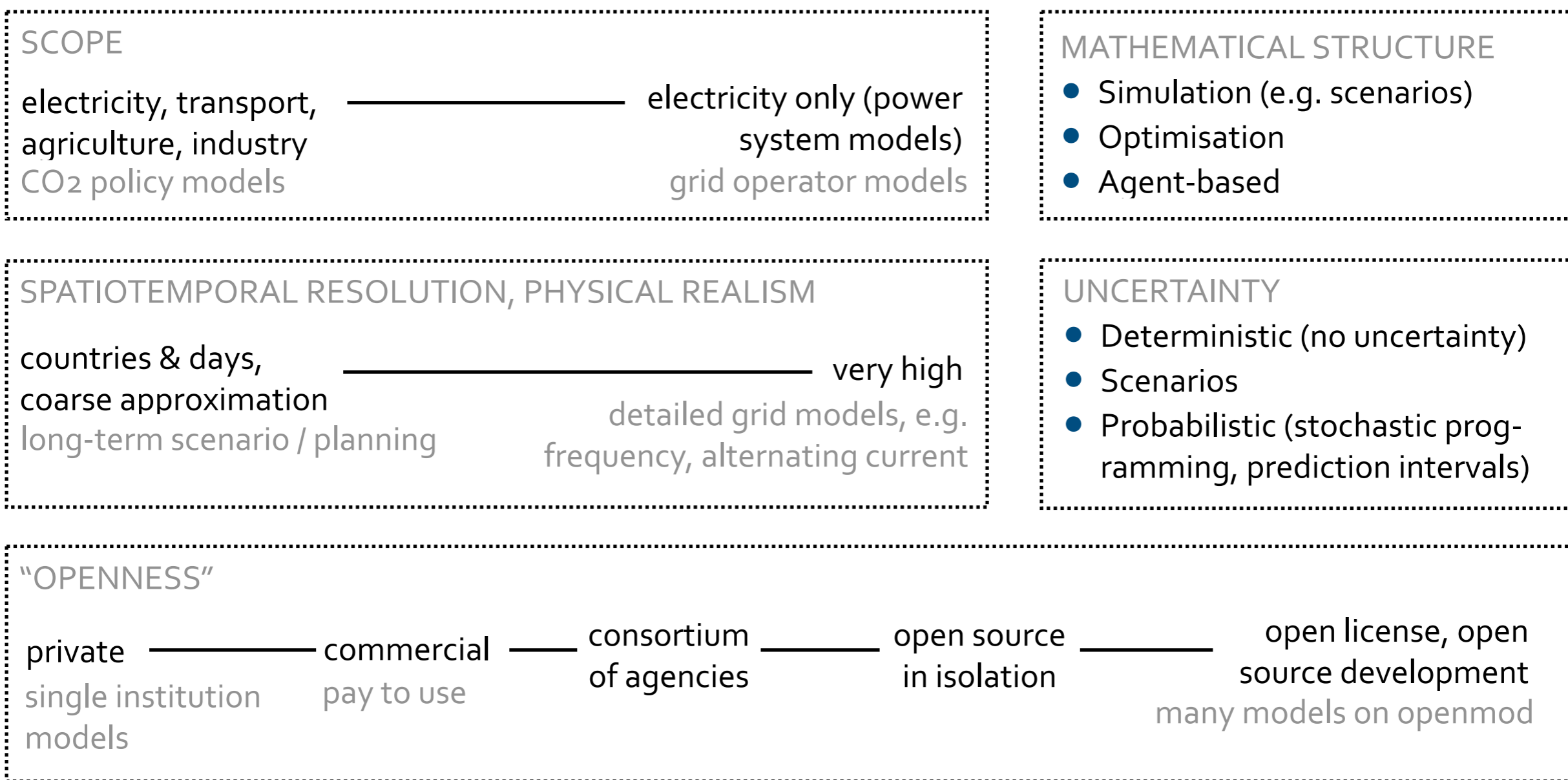long-term scenario / planning   detailed grid models, e.g. frequency, alternating current

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"OPENNESS"

private ——— commercial ——— consortium of agencies ——— open source in isolation ——— open license, open source development

single institution models

pay to use

many models on openmod

Popularity of open energy modelling is increasing, and communities are growing

Selected resources for finding open energy models and data

openmod — open energy modelling initiative

Home   Wiki

About
We are a grass root initiative of modellers from various universities and research institutes across the world.

Aim
Open models and open data will advance knowledge and lead to better energy policies. Open up energy models improves quality, transparency, and credibility, leading to better research and policy advice.

View manifesto »

Activities
The openmod initiative is a network, an interest group, and a platform. We exchange ideas and source code, lobby for policy support for open projects, and actively share data, code and knowhow.

View Projects »

Connect!
- Join our mailing list
- Join our discussion forum
- Add/find open-data and open models on the wiki
- Write us an e-mail: mail[at]openmod-initiative.org

Open energy system models
From Wikipedia, the free encyclopedia

For sources of the open data required for open modeling, see open energy system databases.

For broader coverage of this topic, see energy modeling.

Open energy system models are energy system models that are open source.[a] However, some of them may use third party proprietary software as part of their workflows to input, process, or output data. Preferably, these models use open data, which facilitates open science.

Energy system models are used to explore future energy systems and are often applied to questions involving energy and climate policy. The models themselves vary widely in terms of their type, design, programming, application, scope, level of detail, sophistication, and shortcomings. For many models, some form of mathematical optimization is used to inform the solution process.

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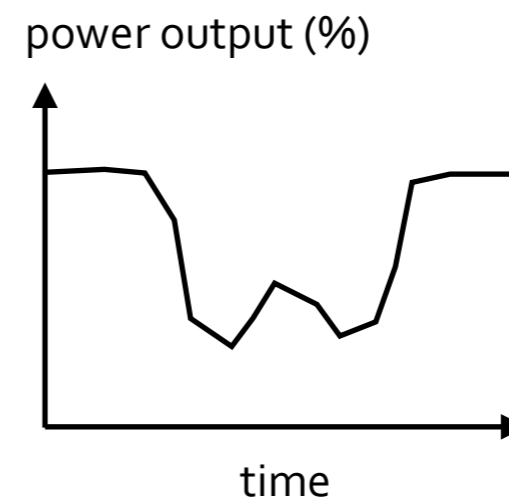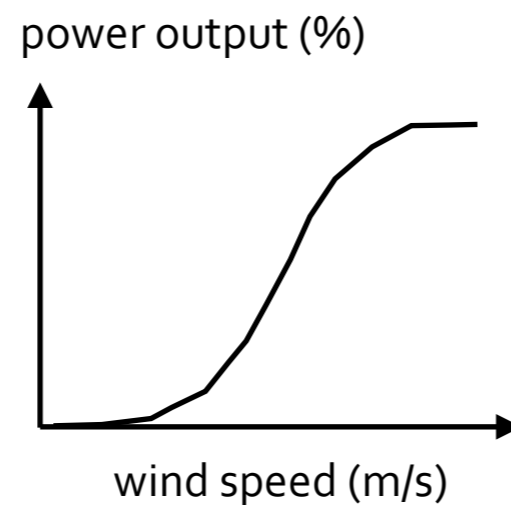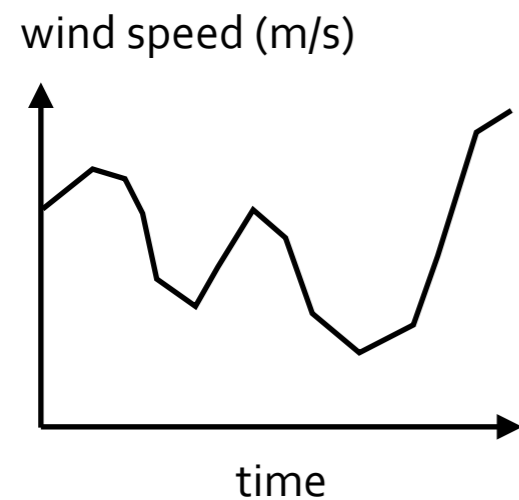*For a list of models that utilize open energy system data, see open energy system models.*

Open energy system database projects employ open data methods to collect, clean, and republish energy-related datasets for open use. The resulting information is then available, given a suitable open license, for statistical analysis and for building numerical energy system models, including open energy system models. Permissive licenses like Creative Commons CC0 and CC BY are preferred, but some projects will house data made public under market transparency regulations and carrying unqualified copyright.

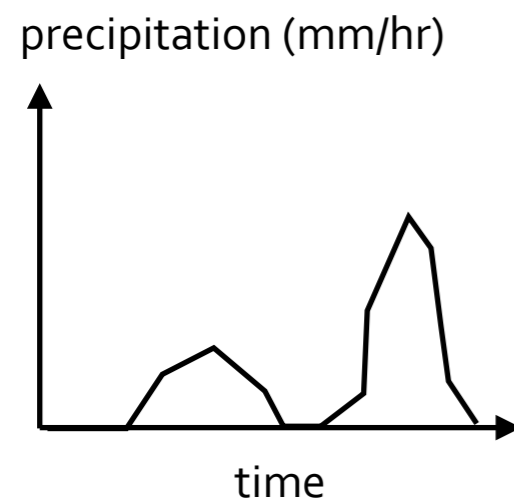# Climate data is converted into energy-relevant time series for use in energy system model

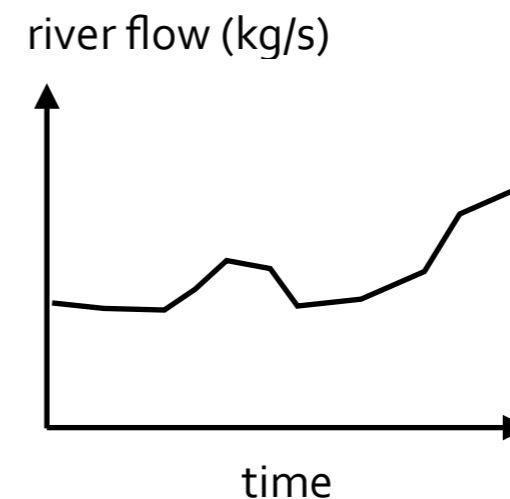Weather / climate data → Preprocessing to energy data → Energy system model

- **Wind power**

wind speed (m/s) — time → power output (%) — wind speed (m/s) → power output (%) — time → Insert into energy system model at wind farm location

- **Hydro power**

precipitation (mm/hr) — time → river basin topology → river flow (kg/s) — time → Insert into energy system model at hydro plant location