



ISNGI 2022

The International Symposium for Next Generation Infrastructure
Session 3D: Infrastructure, inclusiveness and transitions

Country-scale energy infrastructure.

Which societal preferences would most restrict the technical option space?

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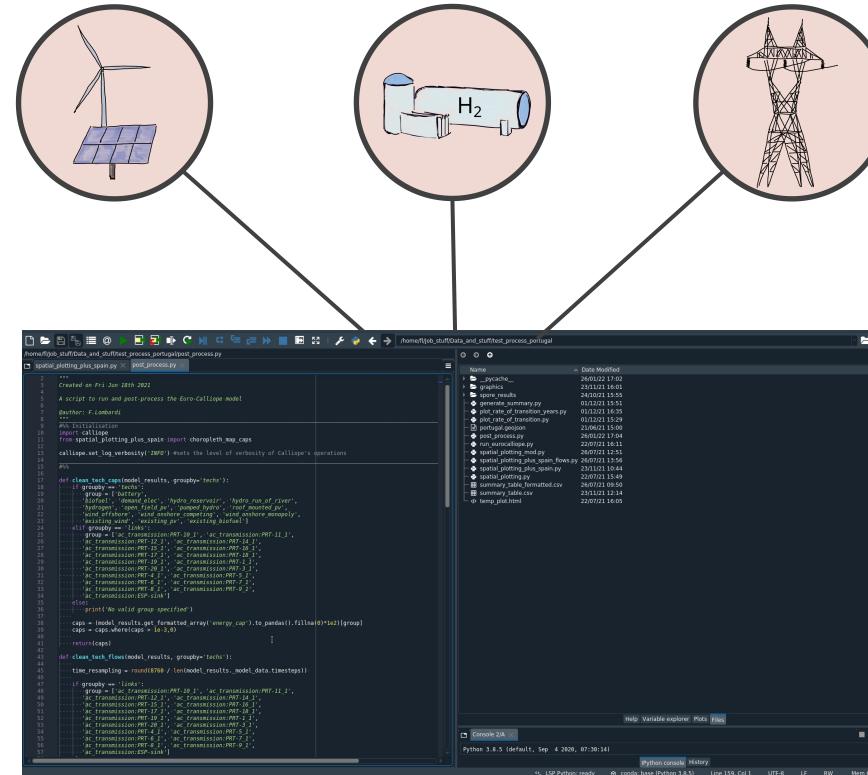


Part A.

Option space? Can't we just find the best solution?

We must deploy new renewable, transmission and storage capacity.
But how much? and where?

The context. Accelerating the energy transition

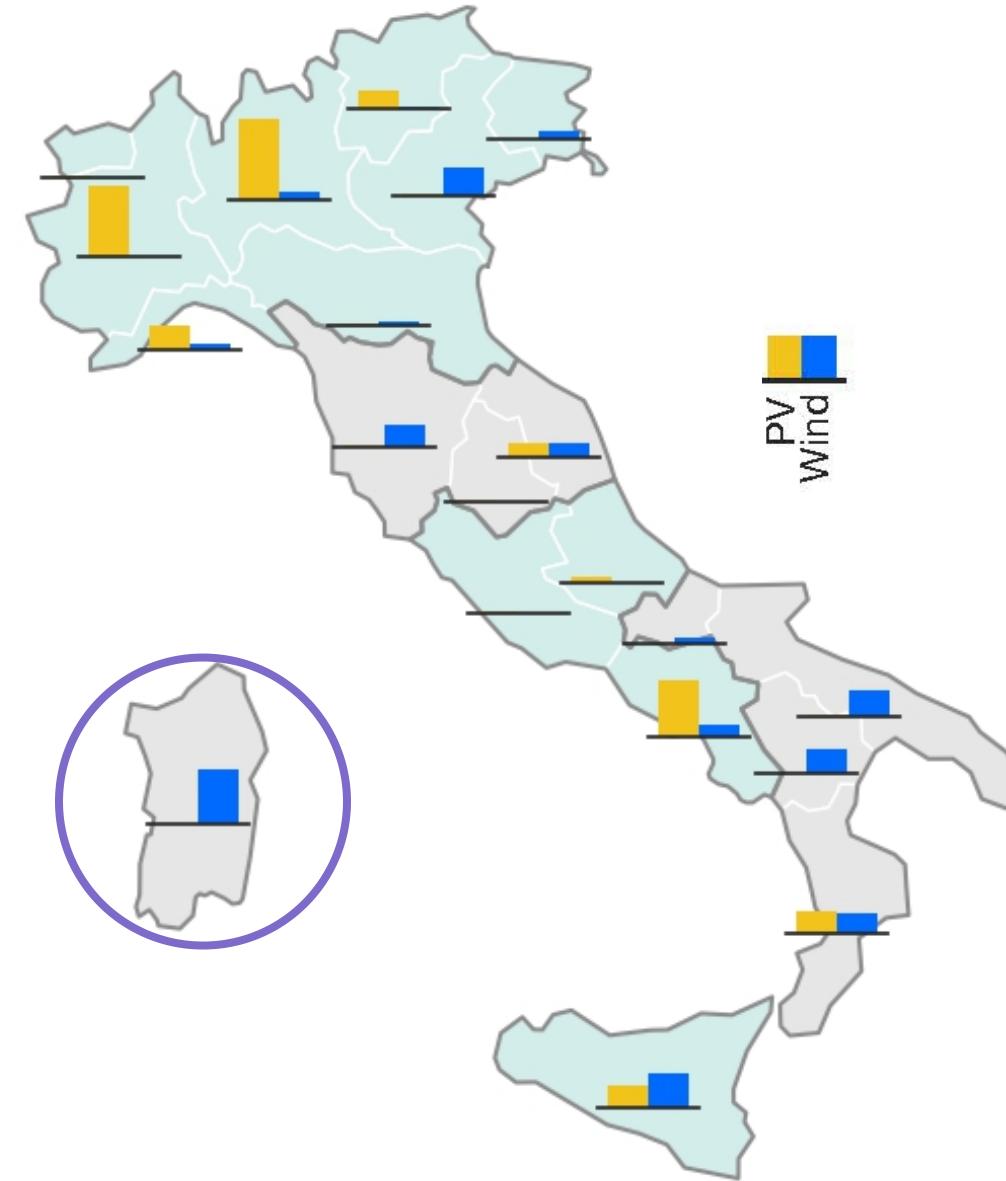


Energy system models provide quantitative insights around such questions.

How? turning those into a mathematical problem, for which an 'optimal' solution can be found

minimum cost

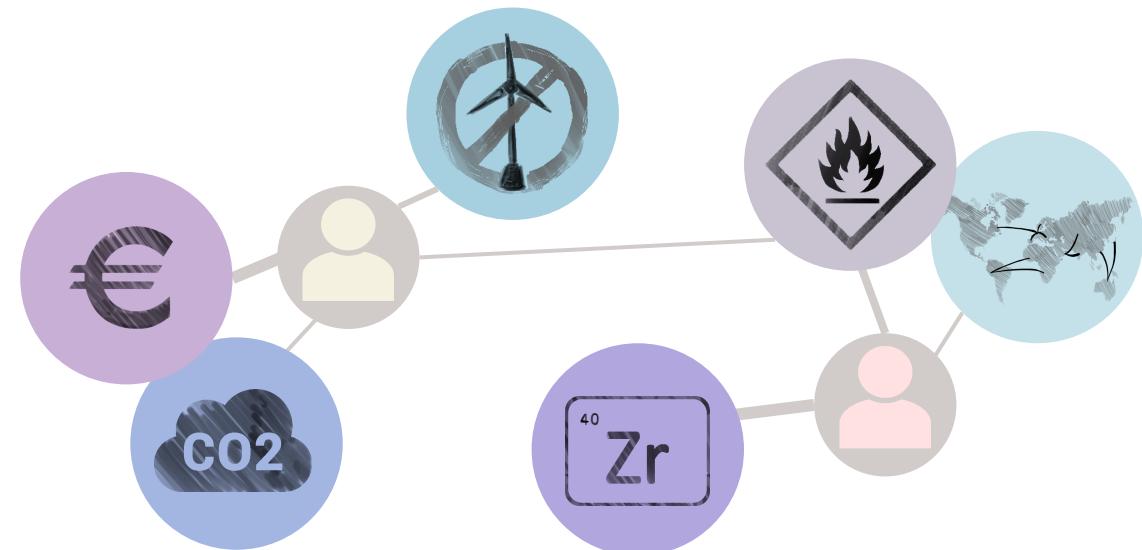
Research gaps. Is cost-optimal actually desirable?



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Two generalisable shortcomings:

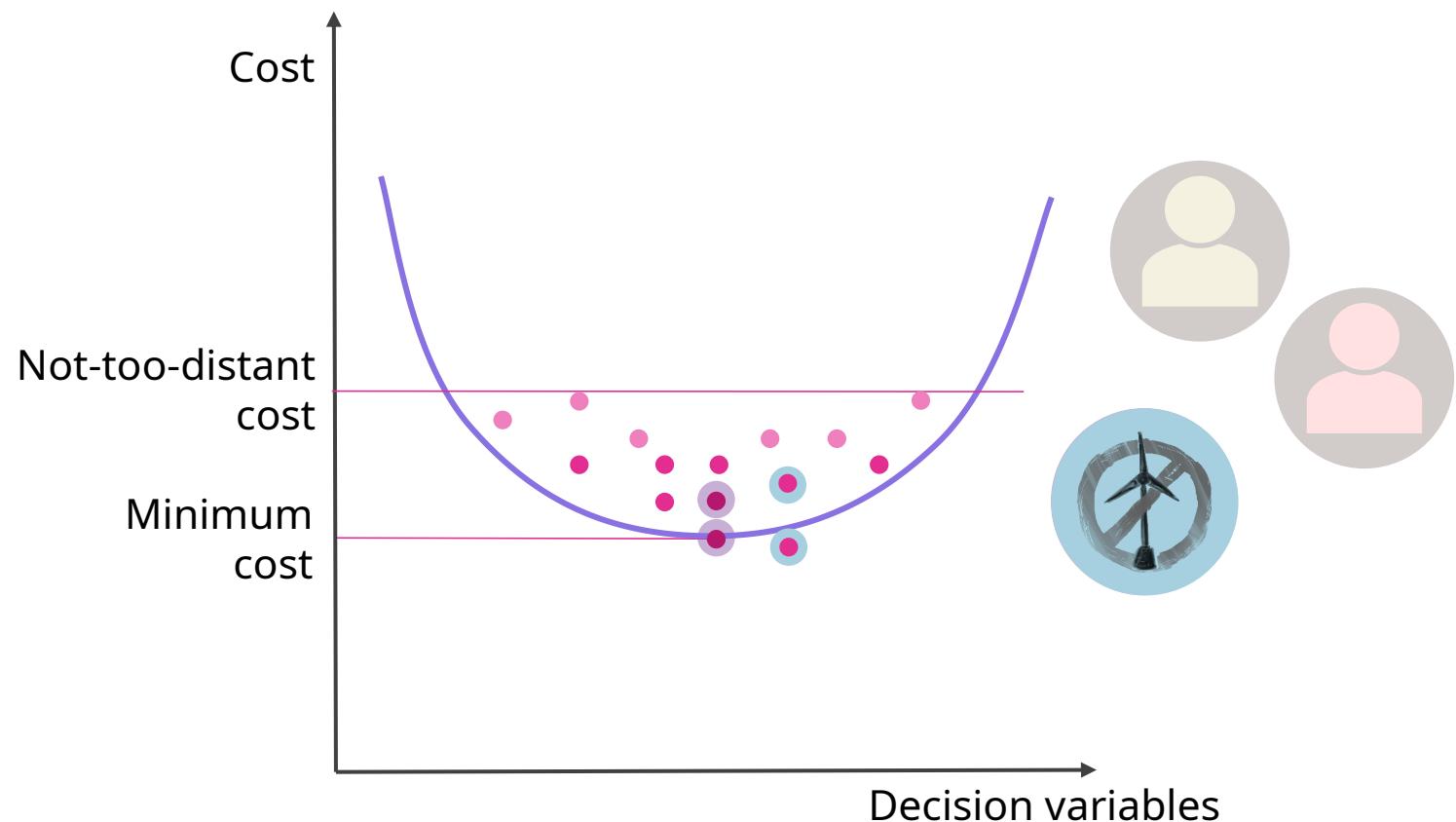
1. Real-world decisions involve much more than economic cost (social acceptance, environmental impact, ...)



Research gaps. Is cost-optimal actually desirable?

Two generalisable shortcomings:

2. It is silly to fixate on the minimum cost considering the uncertainty surrounding all cost assumptions



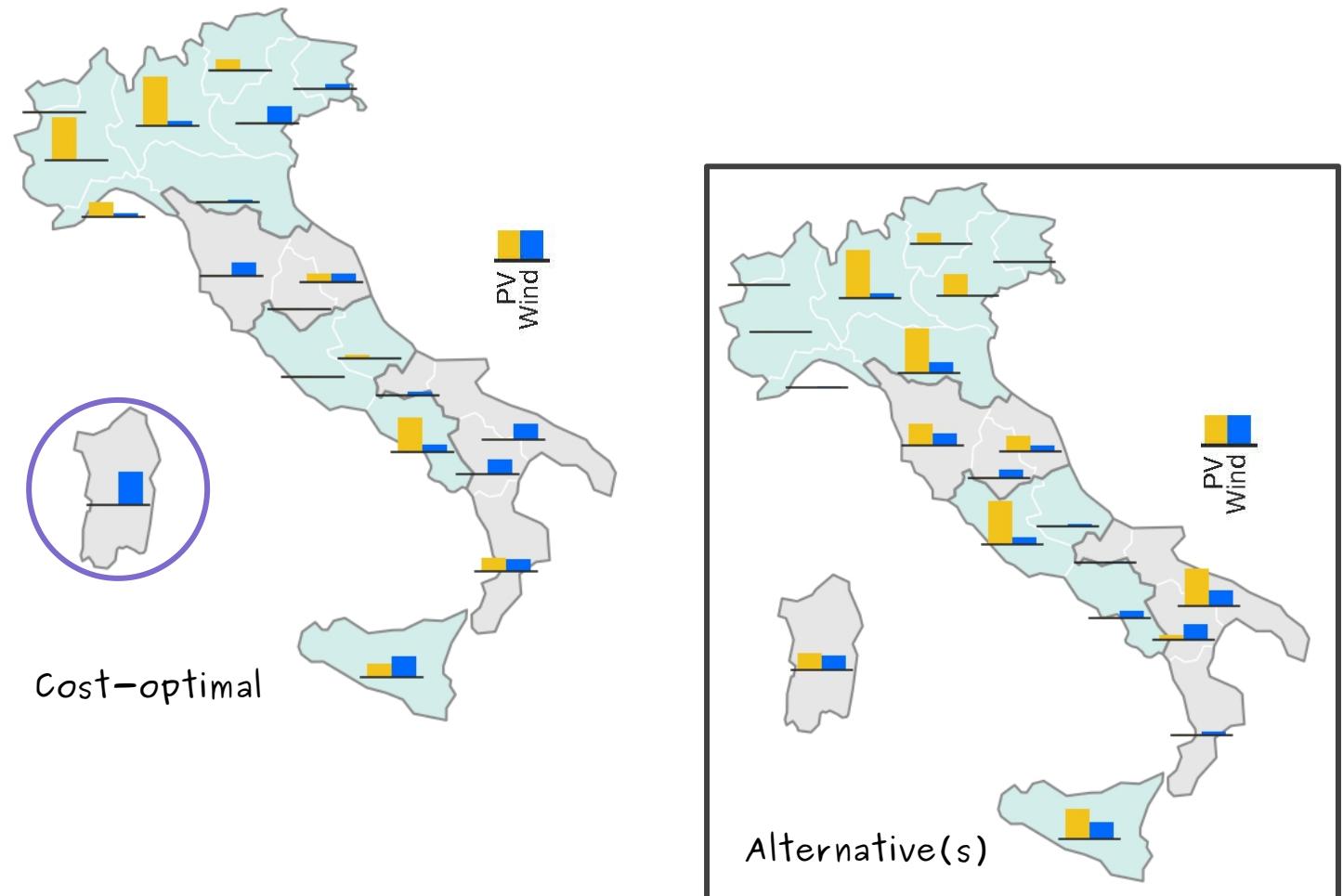
Part B.

Generating alternatives for real-world deliberation

An original development of “Modelling to Generate Alternatives” (MGA) designed for **spatial detail**, computational efficiency and **real-world relevance**

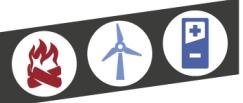
SPORES.

Spatially and technologically distinctive alternatives

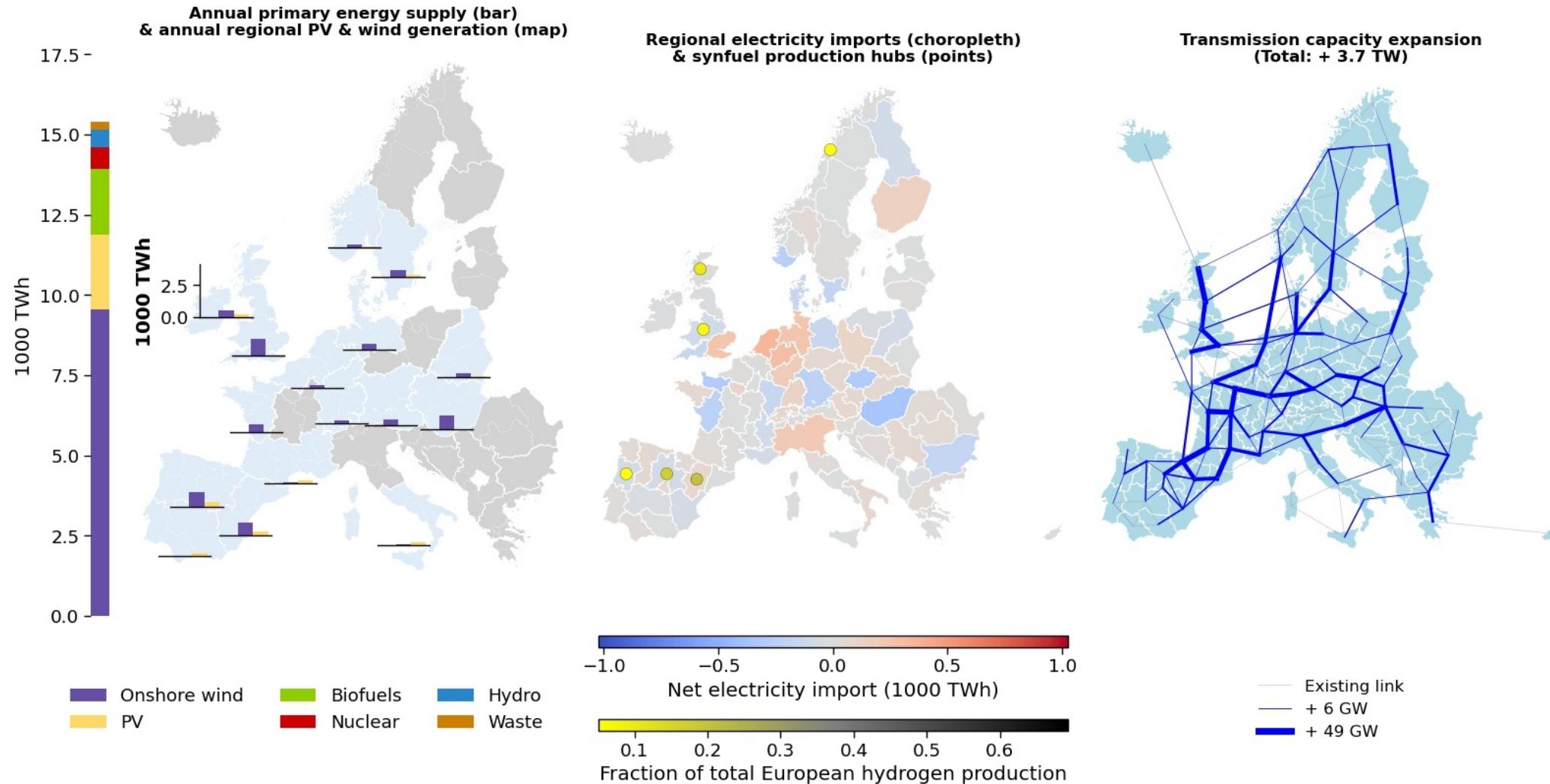


Part C.

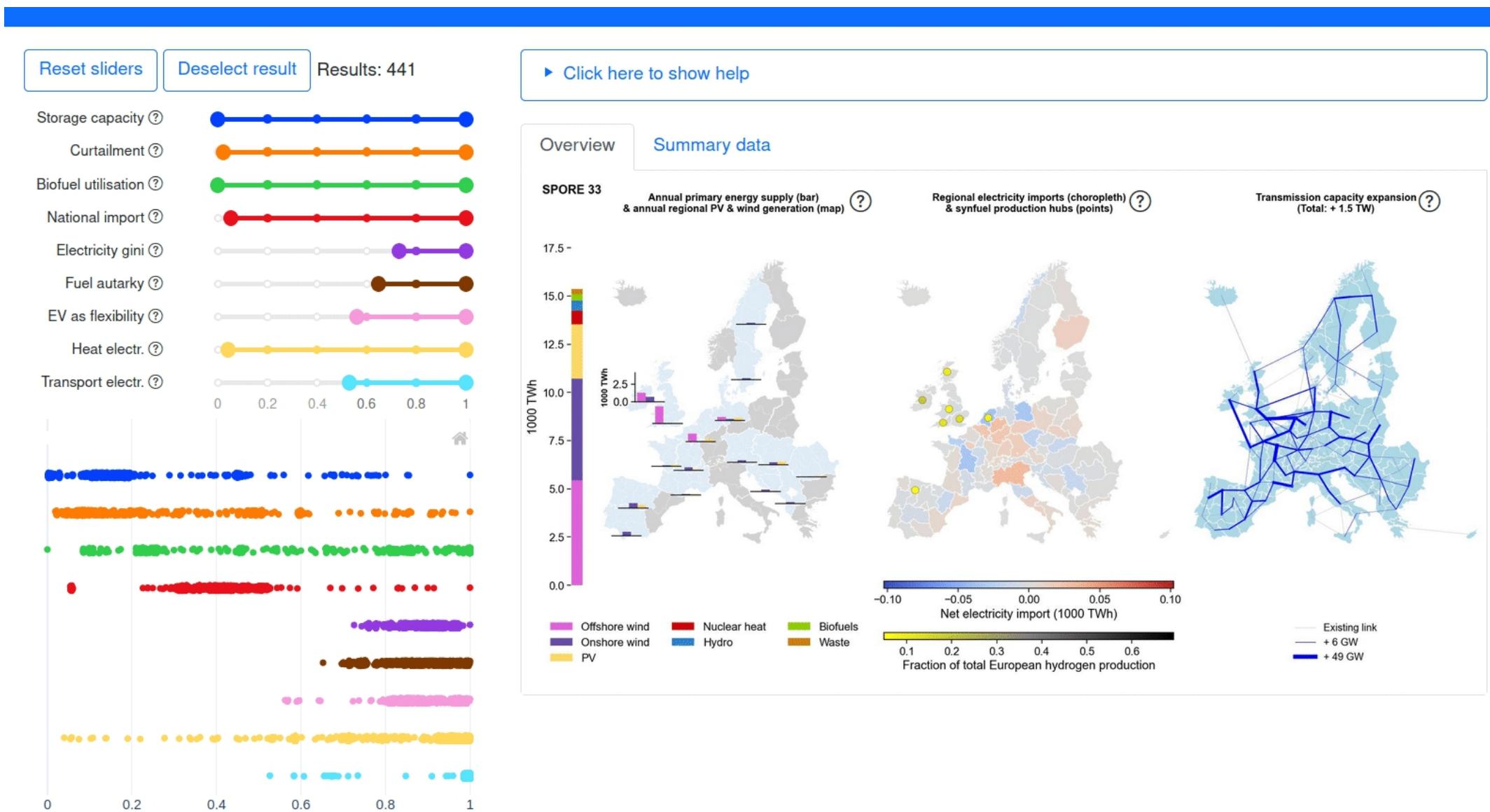
Options for a carbon-neutral, self-sufficient Europe



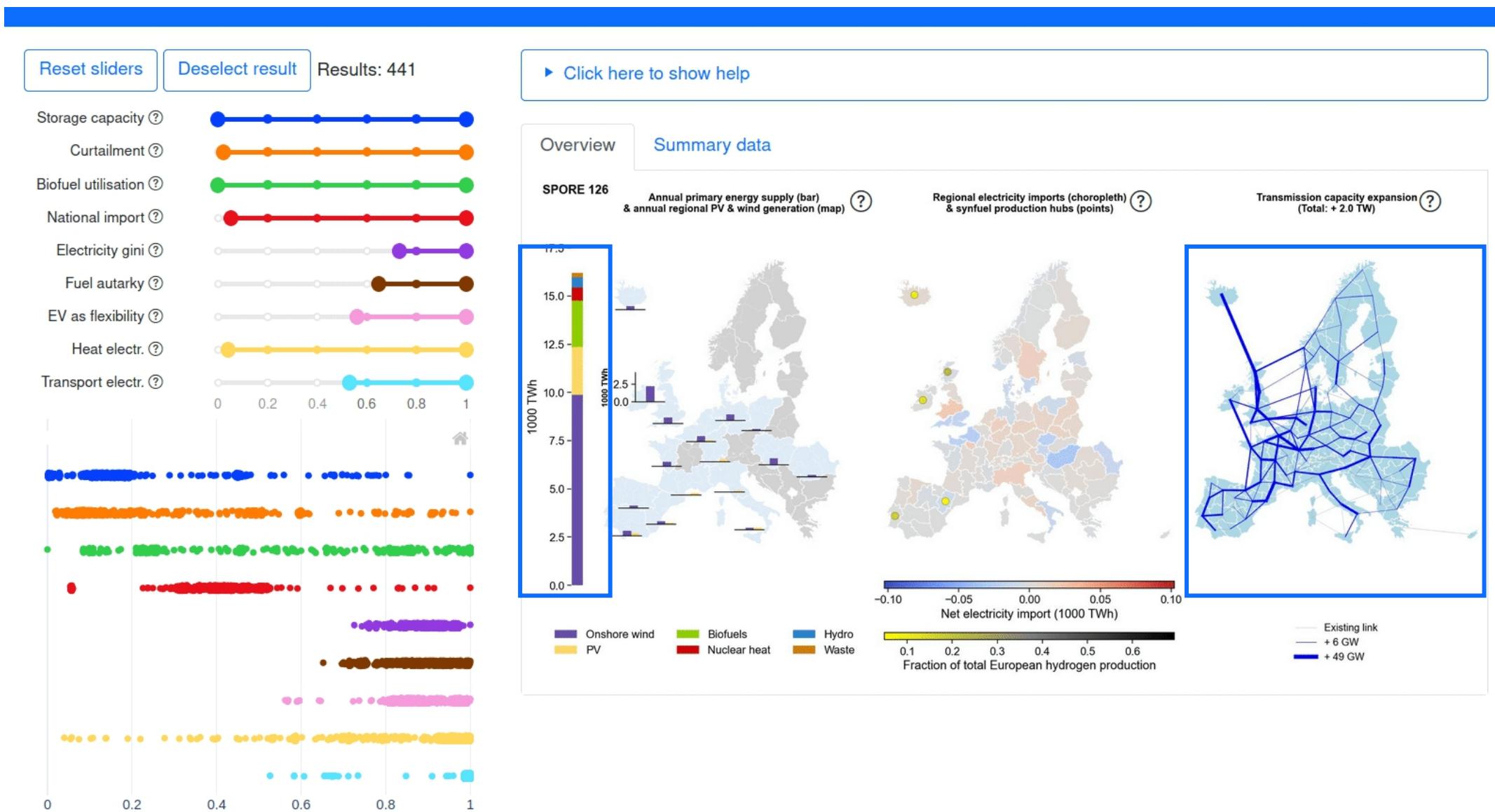
Calliope



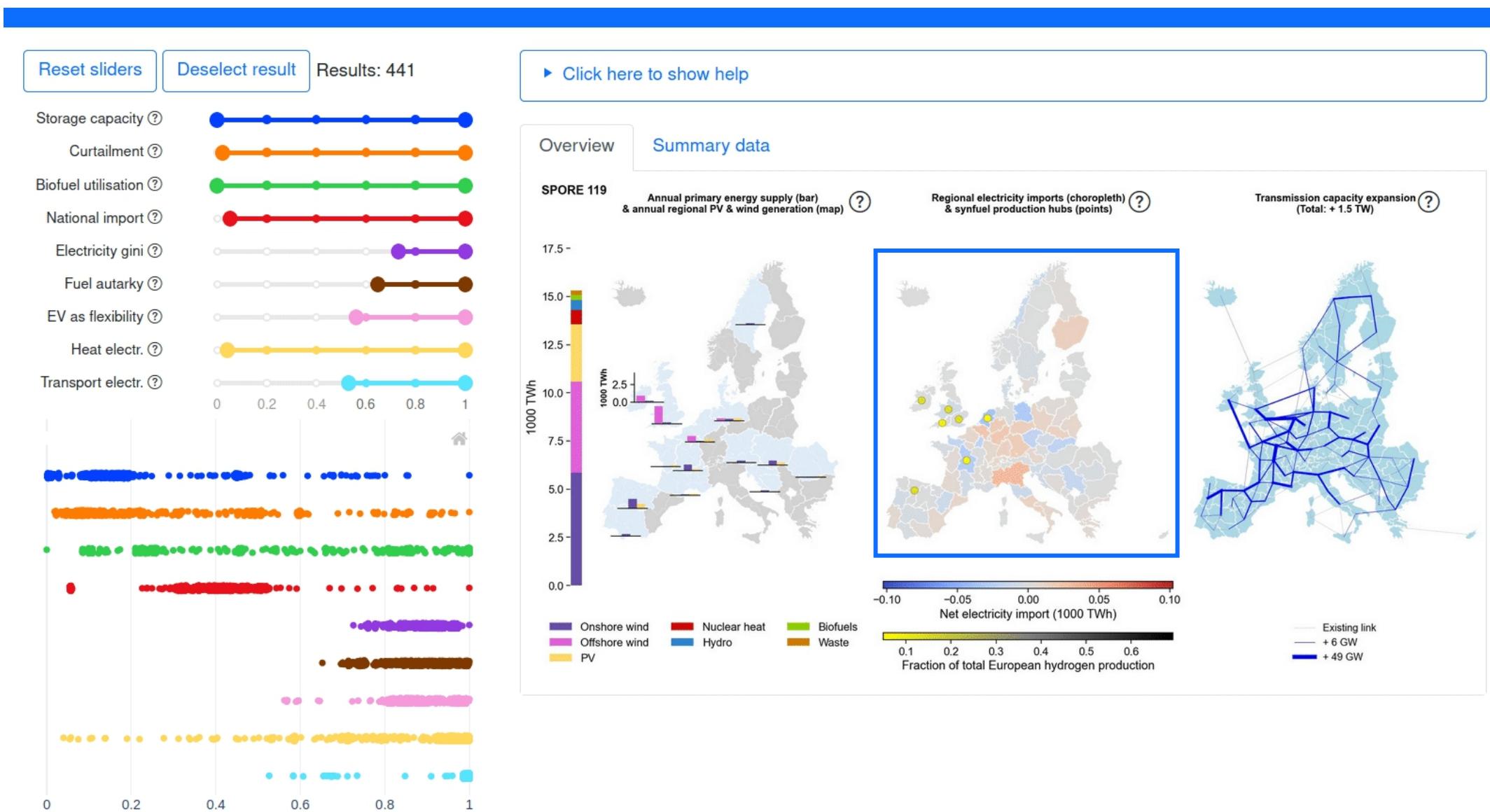
Try out the results explorer yourself: explore.callio.pe



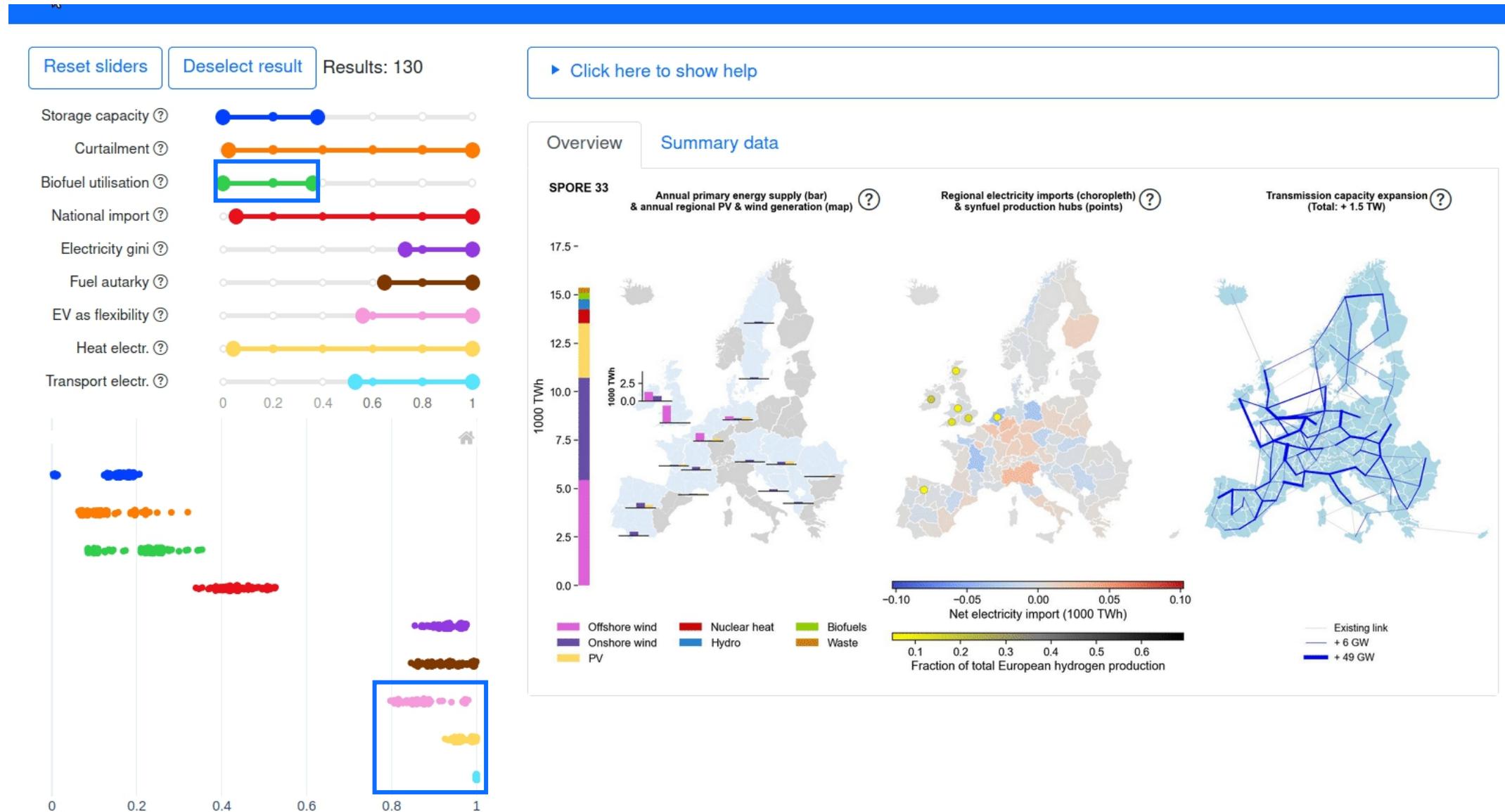
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Thank you. Questions?

The slides and more
material are available at
flombardi.org

1. Cost-optimal infrastructure deployment is not necessarily viable, let alone desirable, in practice. Modellers should provide **alternatives**
2. Flexibility of choice - particularly about spatial deployment - is **substantial**, leaving room for stakeholder discussion
3. Yet, factoring in real-world stakeholder **preferences** may substantially reduce the **manoeuvering space**
4. Communicating and **iterating with stakeholders** such option spaces is key to identifying compromise, practically viable solutions