

Is energy transition feasible?
Modeling energy and material flows of projected
world evolutions



**THE SHIFT
PROJECT**

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STEEP

Our research team

STEEP : <https://files.inria.fr/steep/en/>

“Sustainability, Transition, Environment, biophysical Economics and local Policies”

- Global systemic risks
- Sociotechnical alternatives



The Shift project : <https://theshiftproject.org/en/home/>

French think tank advocating the shift to a post-carbon economy

- Reports on sectorial decarbonations
- French Economy Transformation Plan



ISTerre :

- Olivier Vidal's team on developing the MATER model on energy and material flows



Context

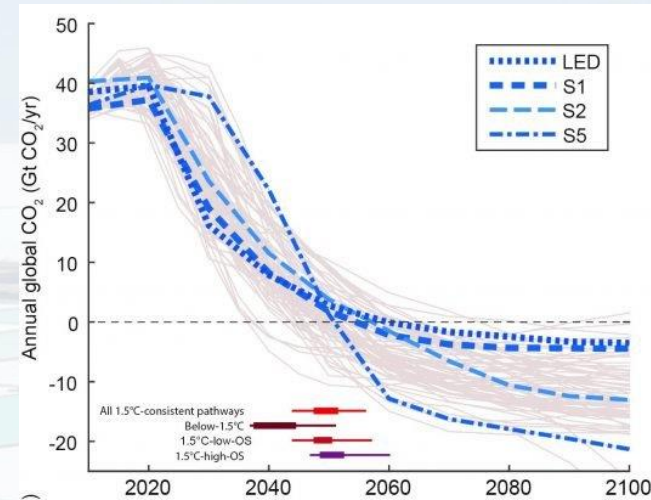
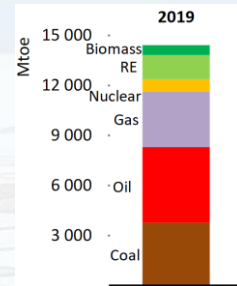
MATER model

MATER submodule

Energy transition and MATER context

Society stakes:

- Energy based society
- Fossil based energy
- Crucial climate stakes



Uncertainties on transition:

- Need to build a new infrastructure, replacing 80% fossils in decades
- Risk of spike in emissions due to raw material needs

Need for scheduling deep evolutions:

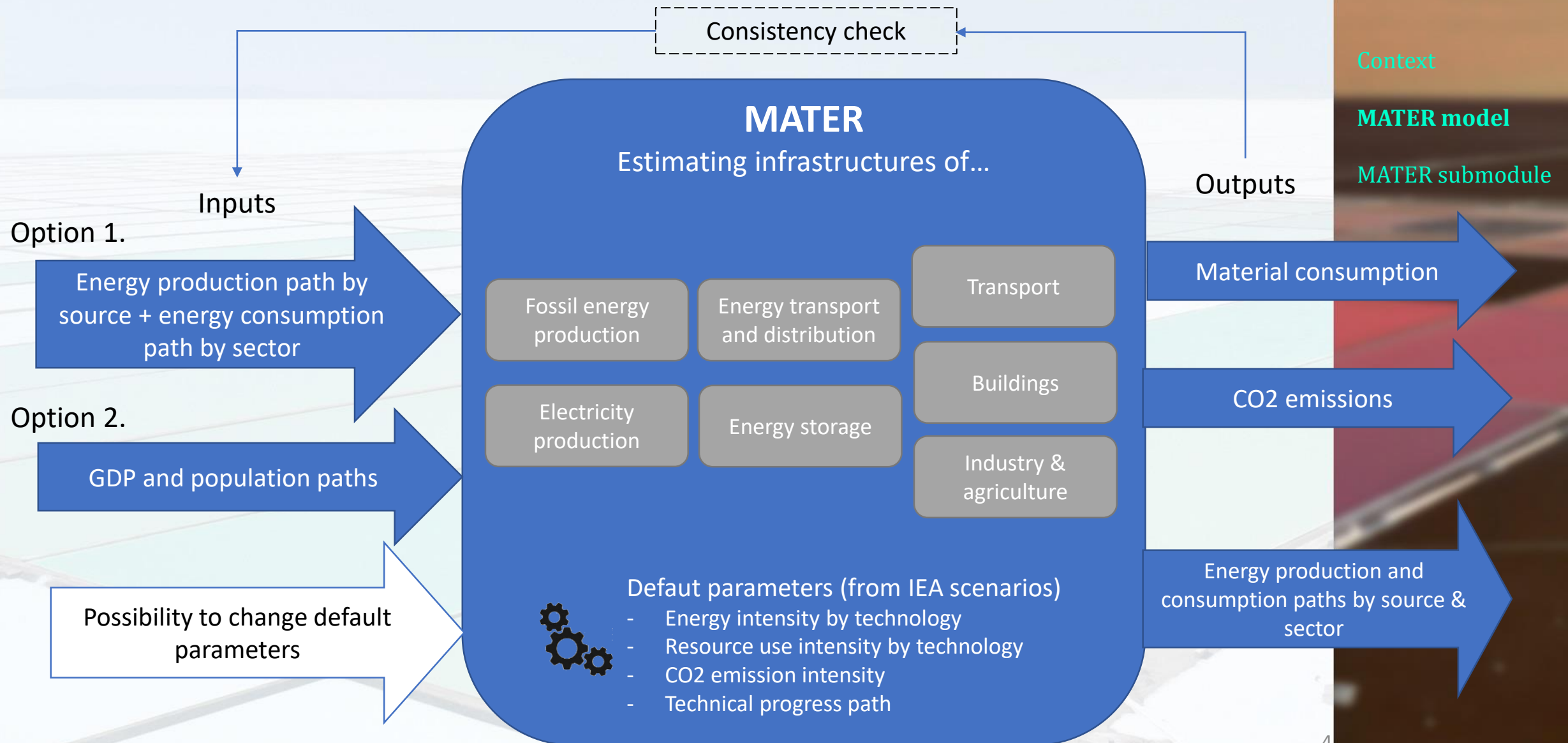
- Great **risks**: Climate destructions, blackouts, net energy, material stresses...
- Need for **credible** dynamic models so policy makers have access to science-based tools in order to planify the transition

Context

MATER model

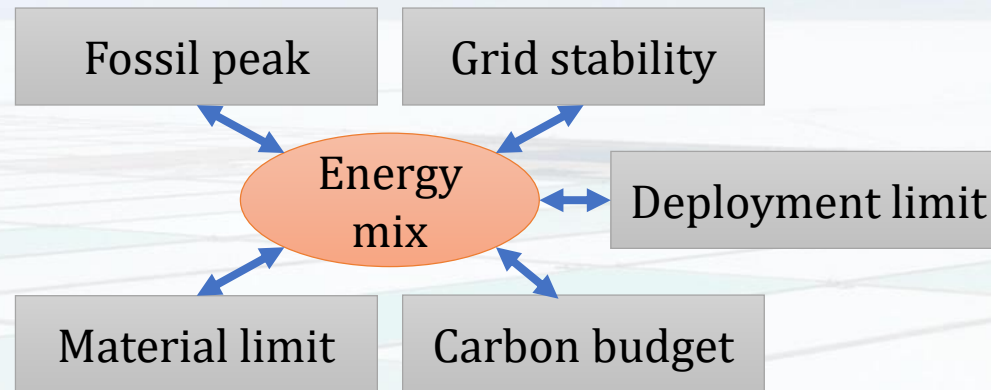
MATER submodule

MATER - General process



MATER submodule objective:

Explore credible energy transition pathways in regard to five constraints



2 sub-objectives:

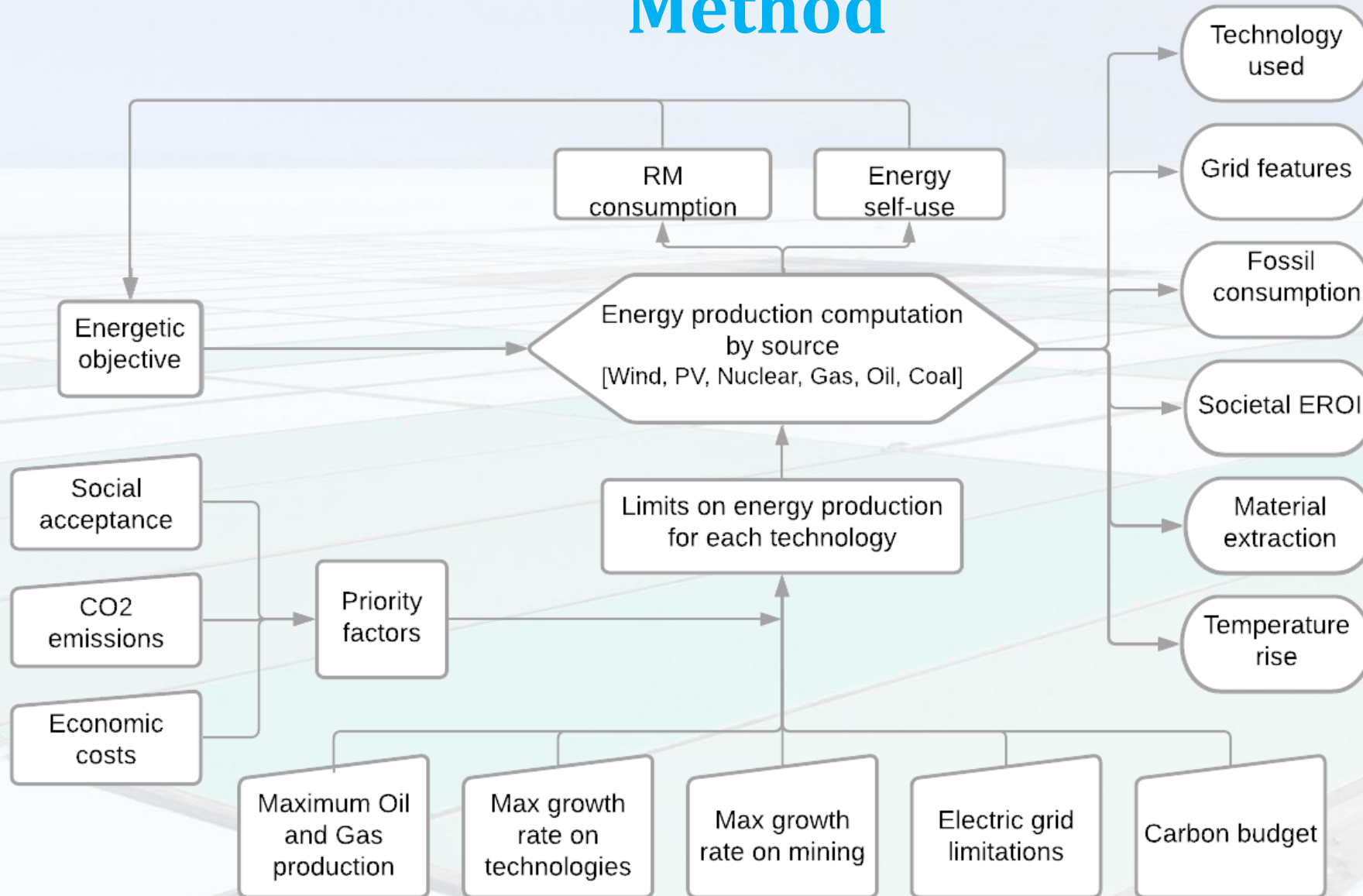
- Compute credible energy transition scenarios
- Evaluate weight of each constraint

Context

MATER model

MATER submodule

Method



Context

MATER model

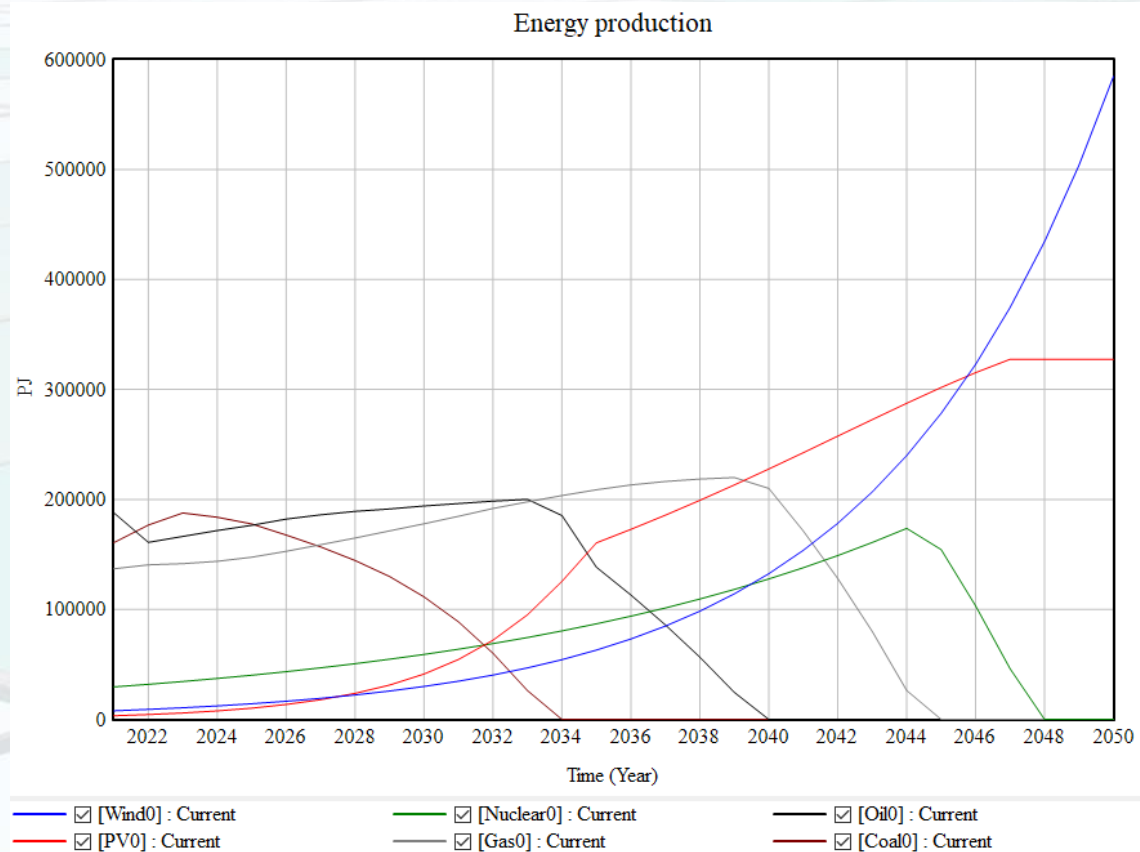
MATER submodule

Analysis

Simulations and interpretations

→ Toward sensitivity analysis

Example of simulation results (not to take as most relevant one nor final results):



Context

MATER model

MATER submodule

Thank you



Context

MATER model

MATER submodule