Can we do without nuclear?
Mind the economic conditions of a technological transition

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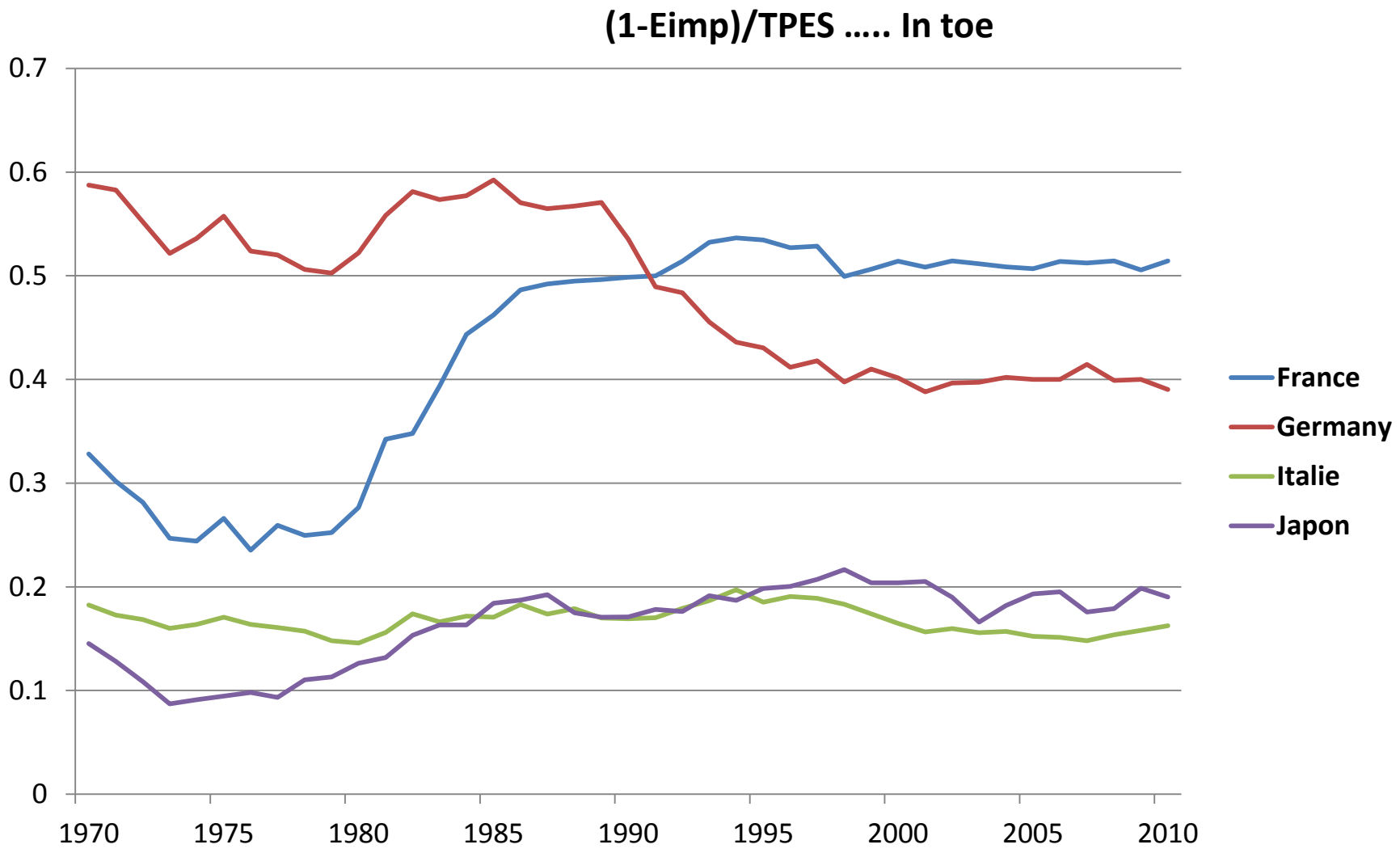
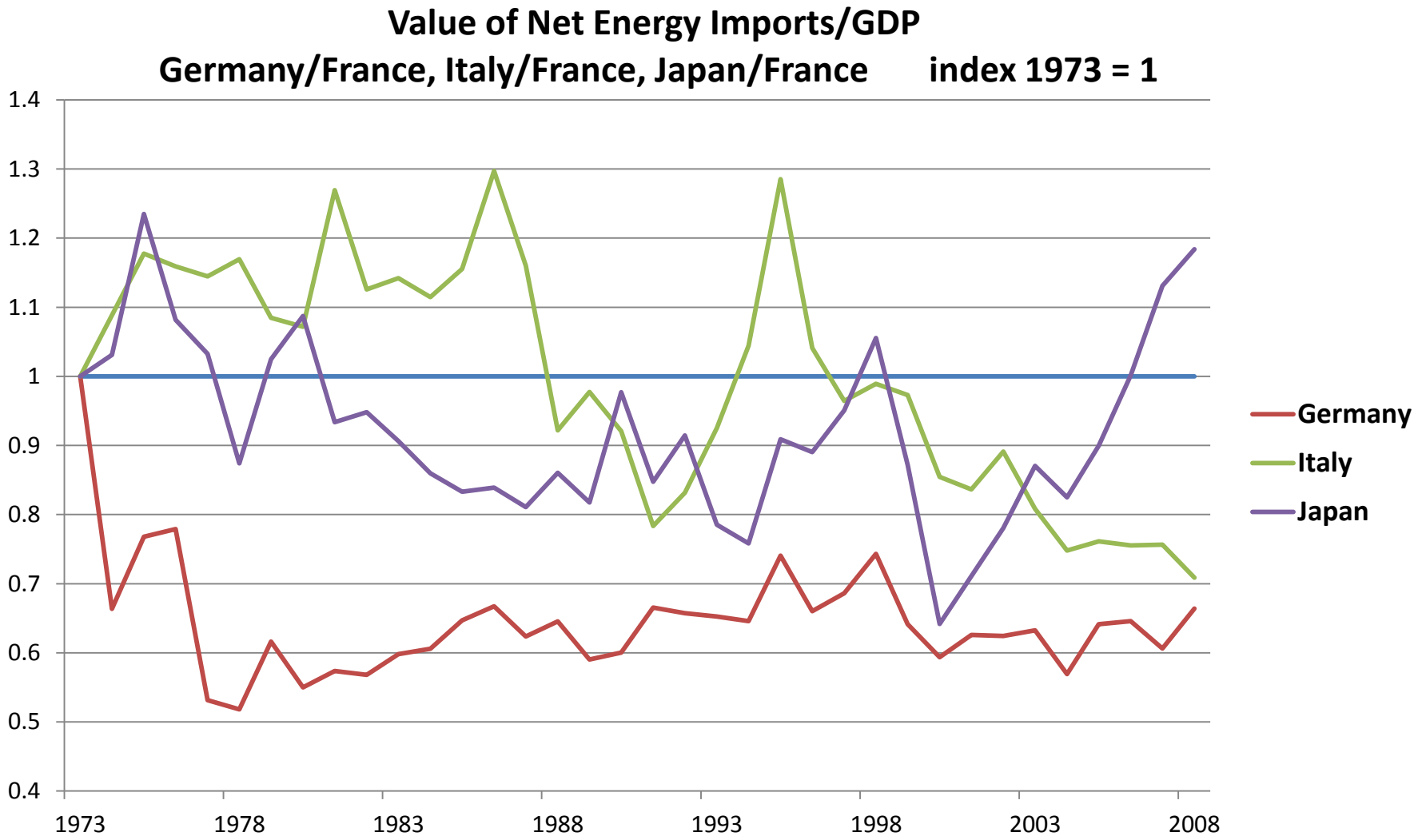
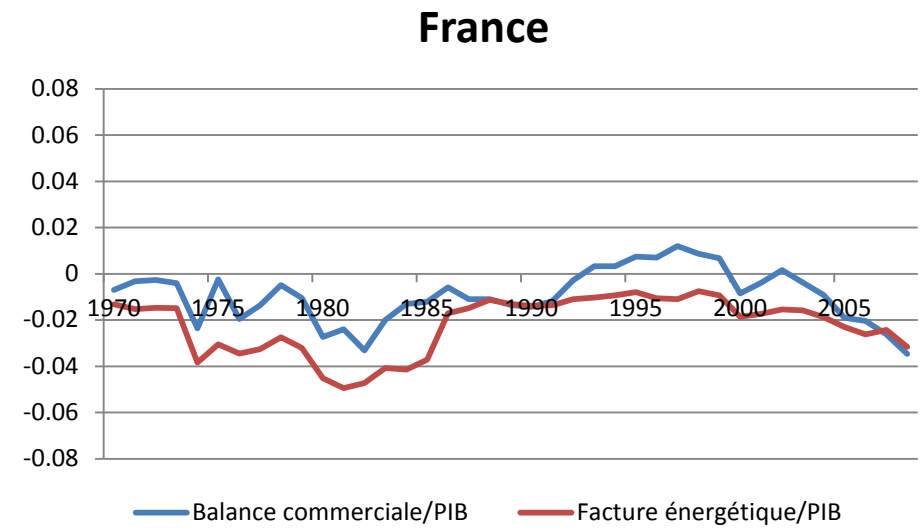
Lessons from the past, why a technical success ….

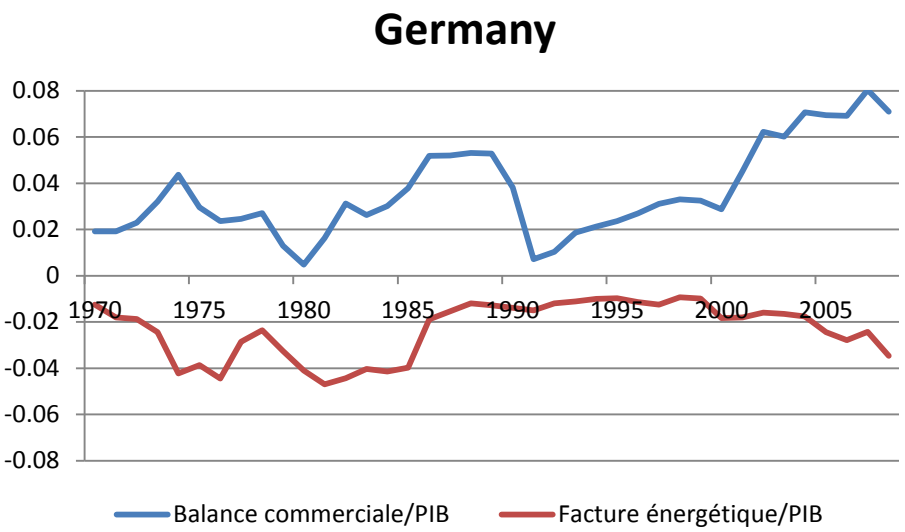


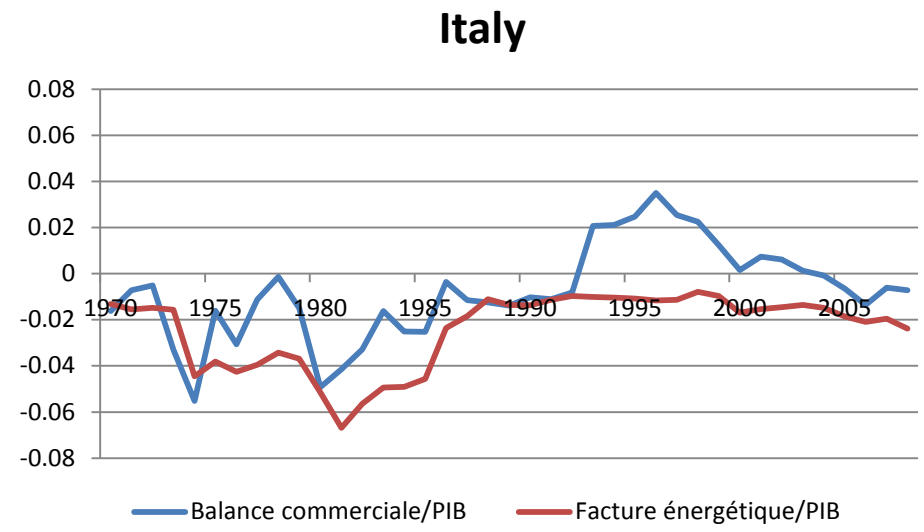
… leads to so ambiguous economic outcomes

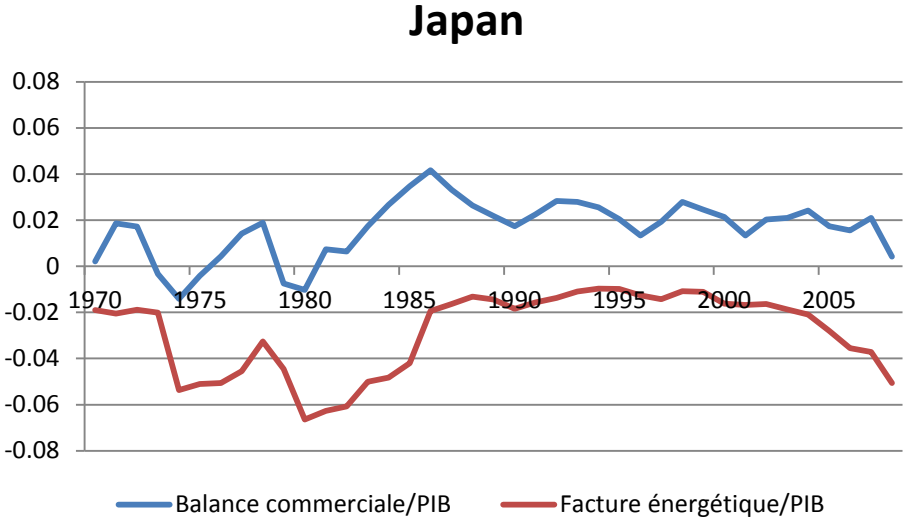


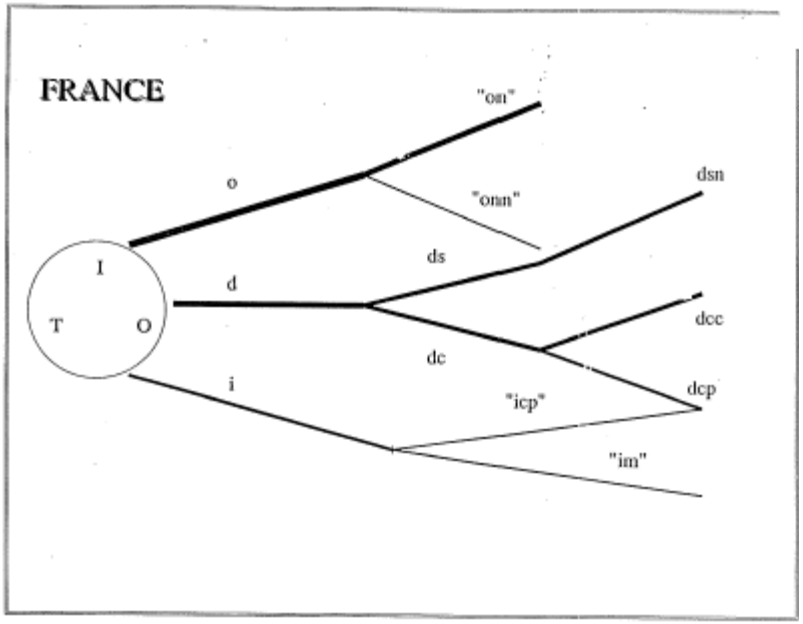
Trade balance *vs.* energy external bill







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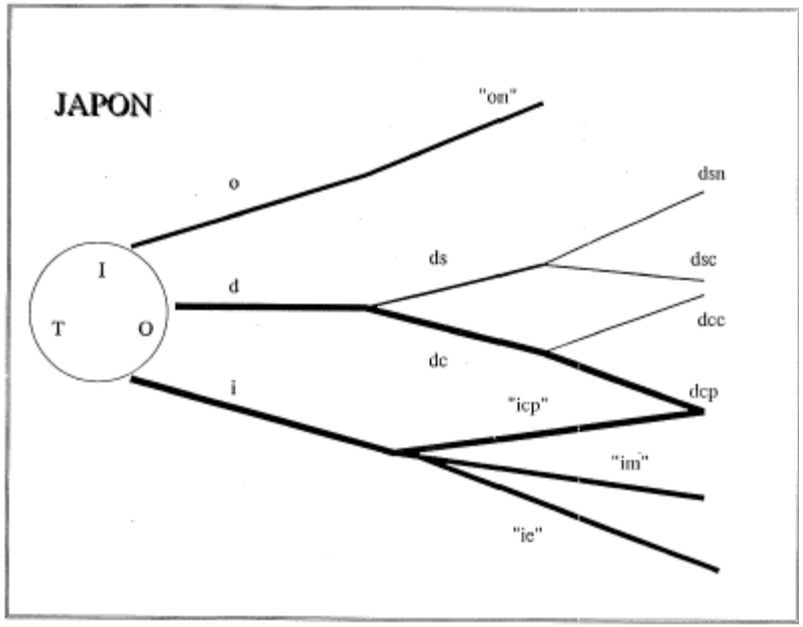
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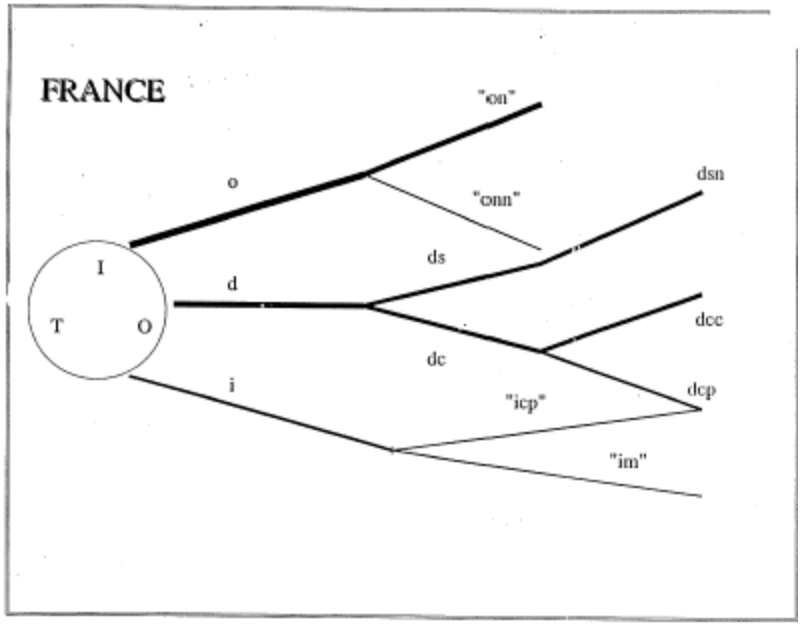
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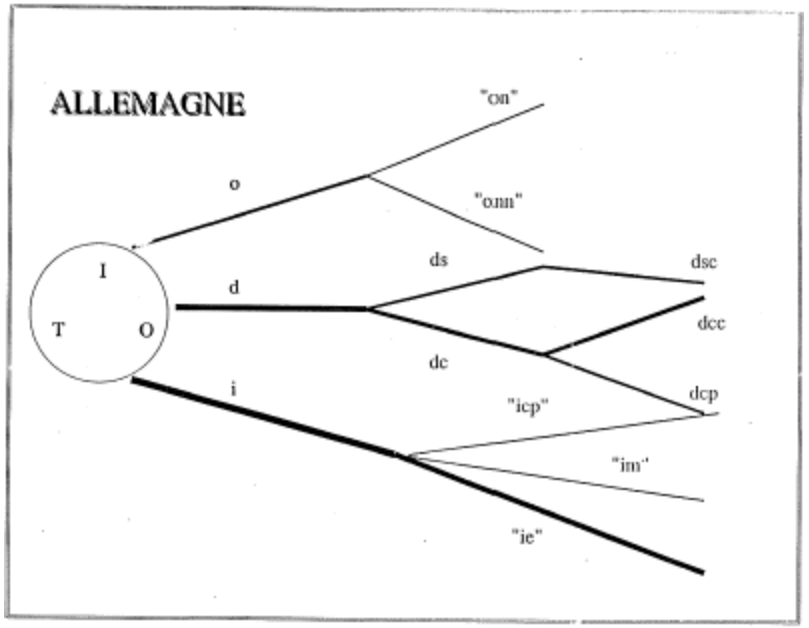
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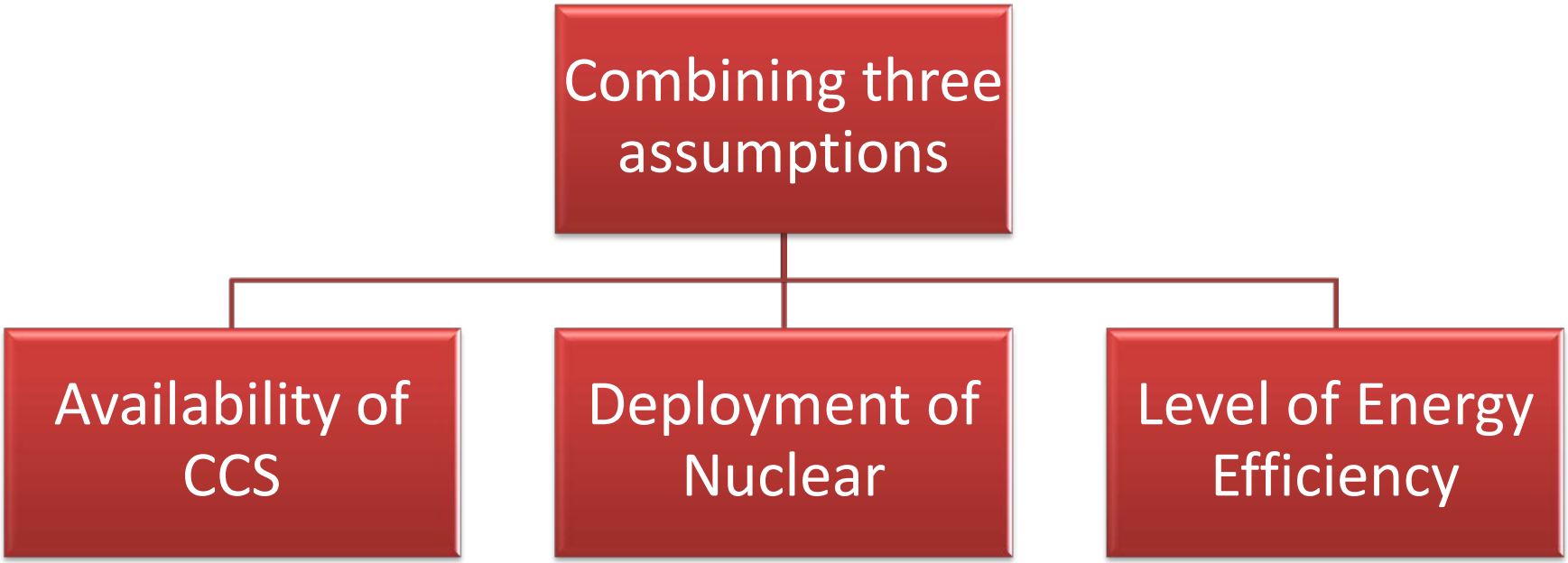
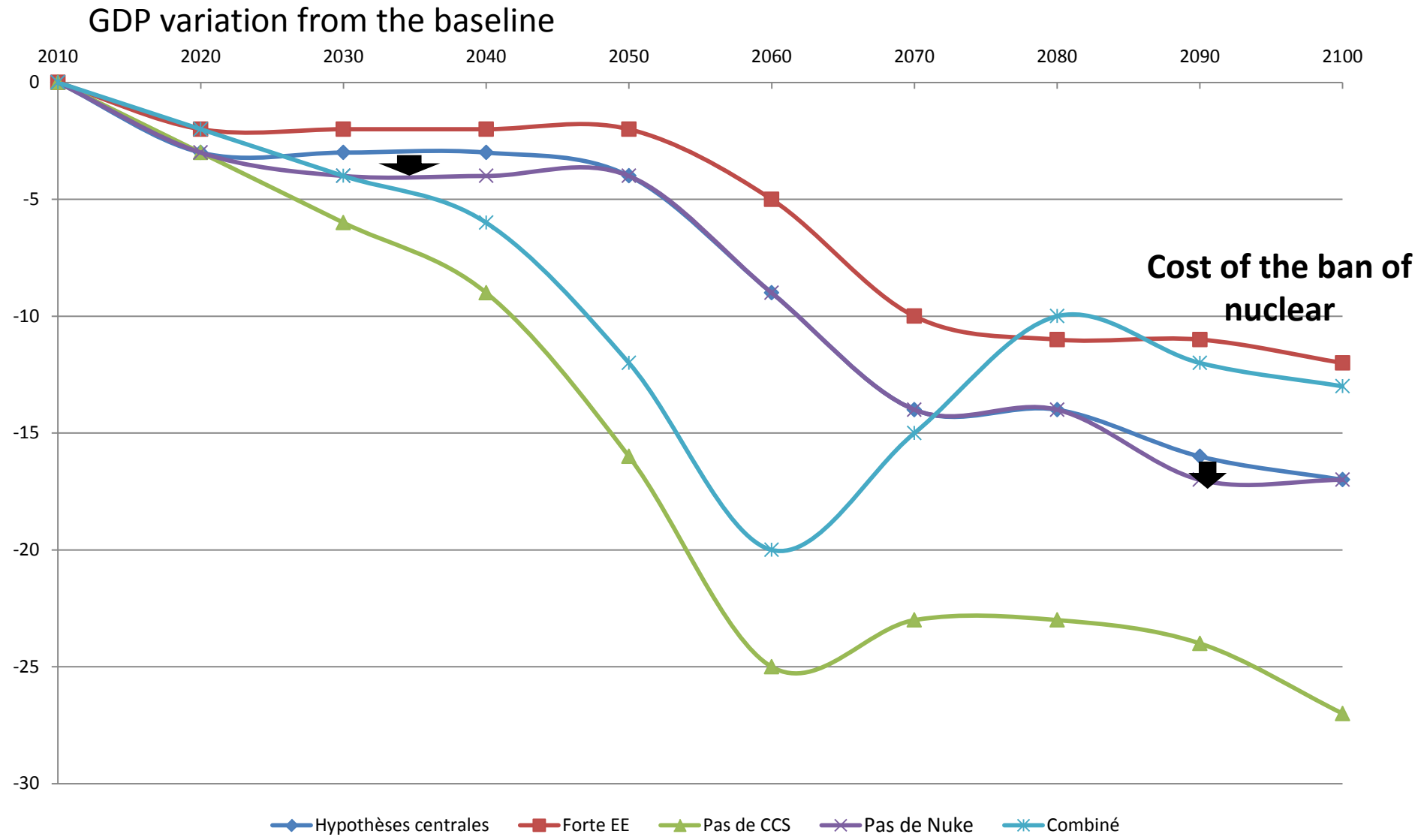
Between technical and economical success, what parameters?

- A ‘electrification nuclear’ a lesser import-substitution effect than the « substititution nuclear »
- Exchange rates variations in $ … and other currencies
- Trade balance surplus and the purchasing power of oil and gaz
- Industrial « strategies », including their impact on energy demand
- A « crowding out effect » ???? … good question but hard to settle

An IAMC exercise: carbon constraints and availability of technological options



A low cost for banning nuclear … even for a 550 ppm all gases Carbon Concentration Target?



Insights for the Future: 'suggestions' from existing world scenarios

- **Can the world « live » without nuclear?**
  - **« likely » yes in the absence of carbon constraint**
  - **« less likely » yes in the presence of carbon constraint … because the political limits to nuclear have already been internalized in baseline scenarios**
- **Will the world « live » without nuclear? This will depend upon decisions in China, India as well as in the US and EU**
- **France, a specific case because nuclear is central in the electrical system**

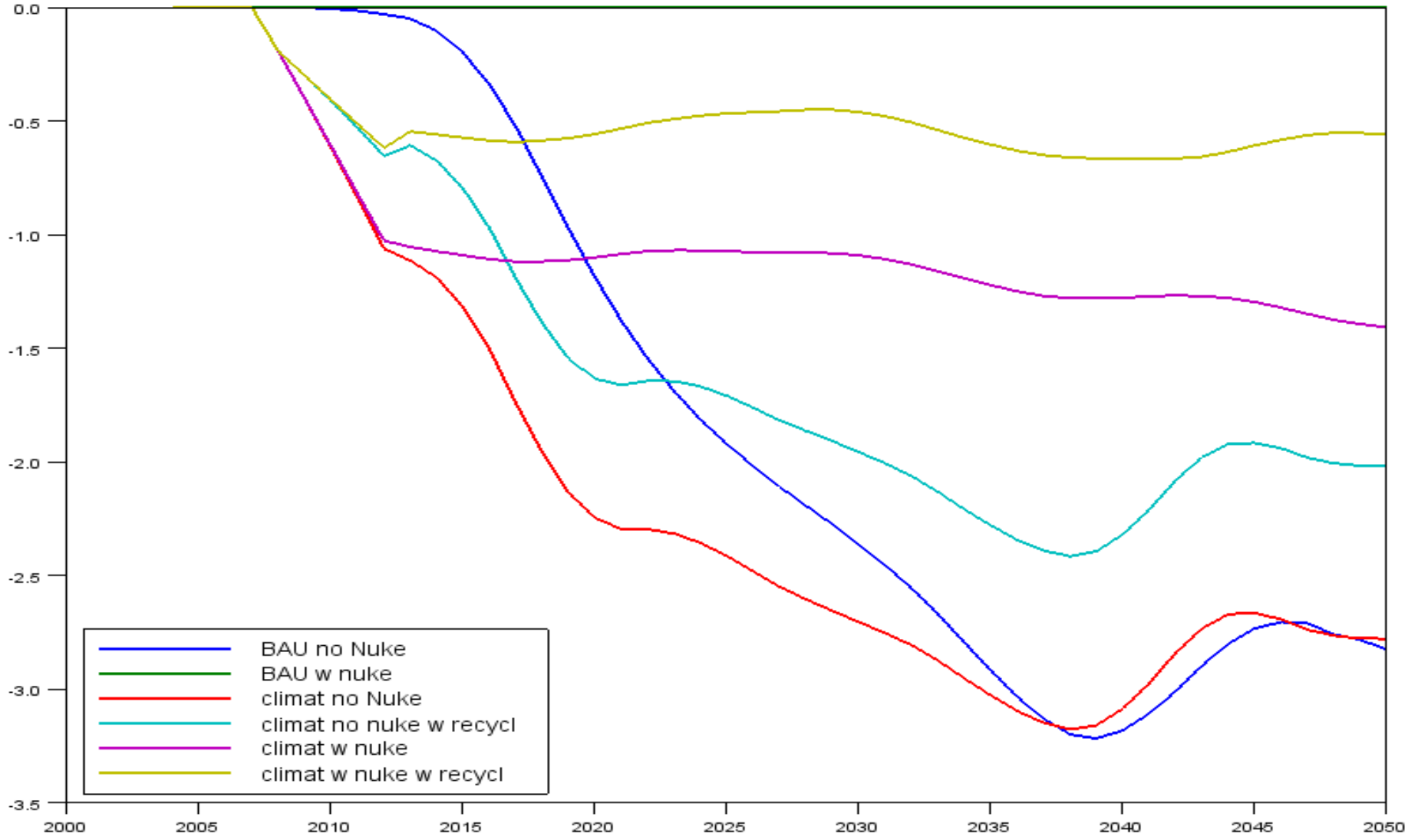
France without nuclear: Let us pick one plausible but arbitrary baseline …. And the « Taxe Quinet »

- **GDP growth rate: ~ from 1,9 % to 1,7 after 2035**
- **Electricity demand: multiplied by 2 in 2050**
- **Emissions over 2010 and 2050 (baseline): 12,4 GtCO2**
- **Share of the nuclear: between 60% and 70%**
- **Energy efficiency set of asymptotes**
- **New and renewable energies: a potential of 30%**
- **Significant infrastructure investments in transport and buildings**
- **Implementation of the Quinet's carbon tax**

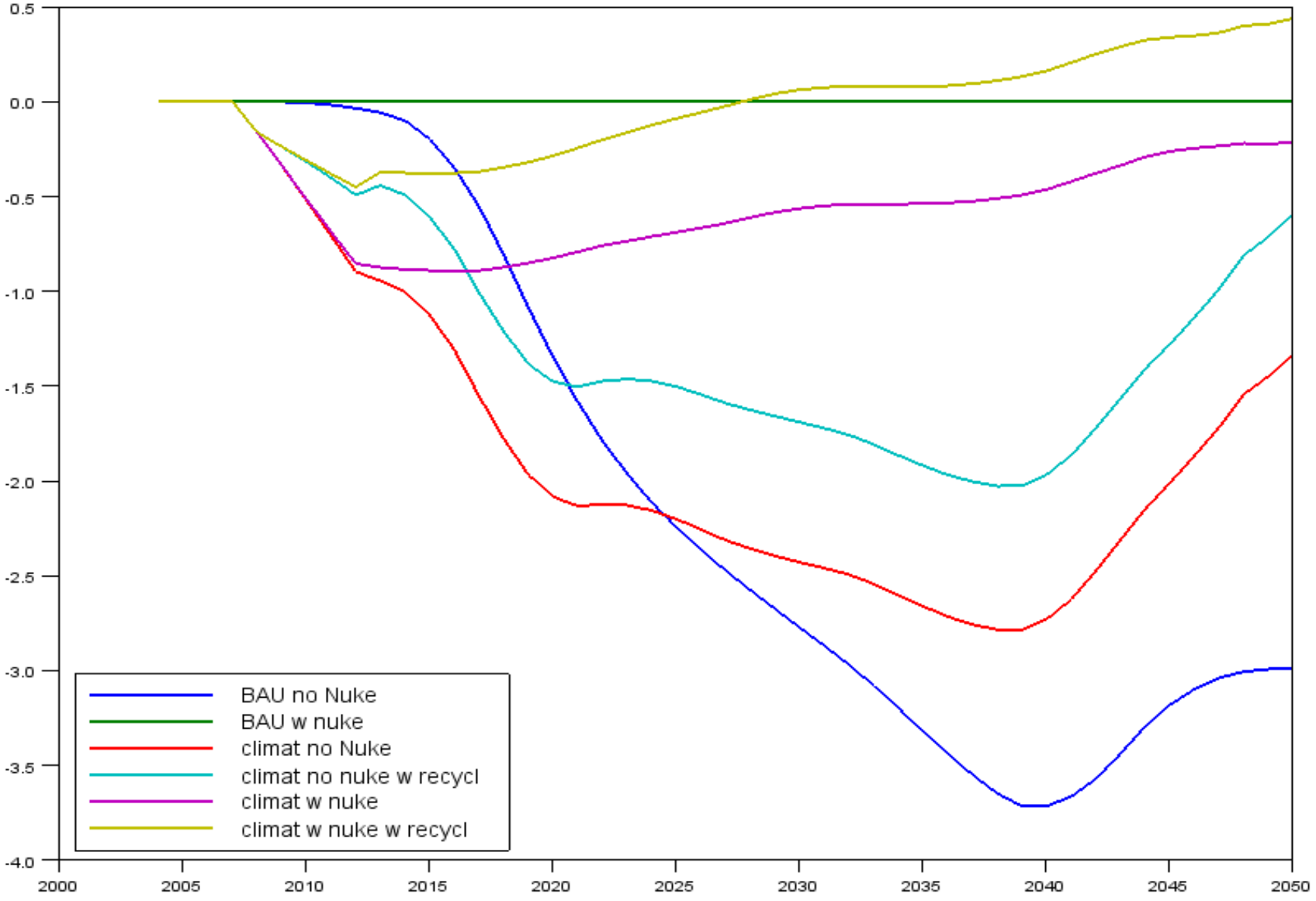
Date	2011	2020	2030	2050
€/tCO_2	32	56	100	200

- **France has a nul external debt and a nul public debt in 2050**

GDP variations from the baseline



GDP variations with fine tuned recycling of the carbon tax



Conclusions: a three step debate to be conducted

- **Are carbon – free no nuke options (including energy efficiency) available the transition technically feasible?**
  - **Highly controversial but, ultimately**
  - **A matter of direction of innovation and of pace of deployment**

- **Economic lubricants matter**
  - **To support the re-direction of microeconomic decisions**
  - **To minimize the social costs of the transition**

- **Societal pre-conditions (not considered in the previous simulations)**
  - **The availablity of skilled labor: does the education system 'produces' enough ingeniers and technicians in the concerned sectors**
  - **Beyond energy efficiency, the consumption styles**