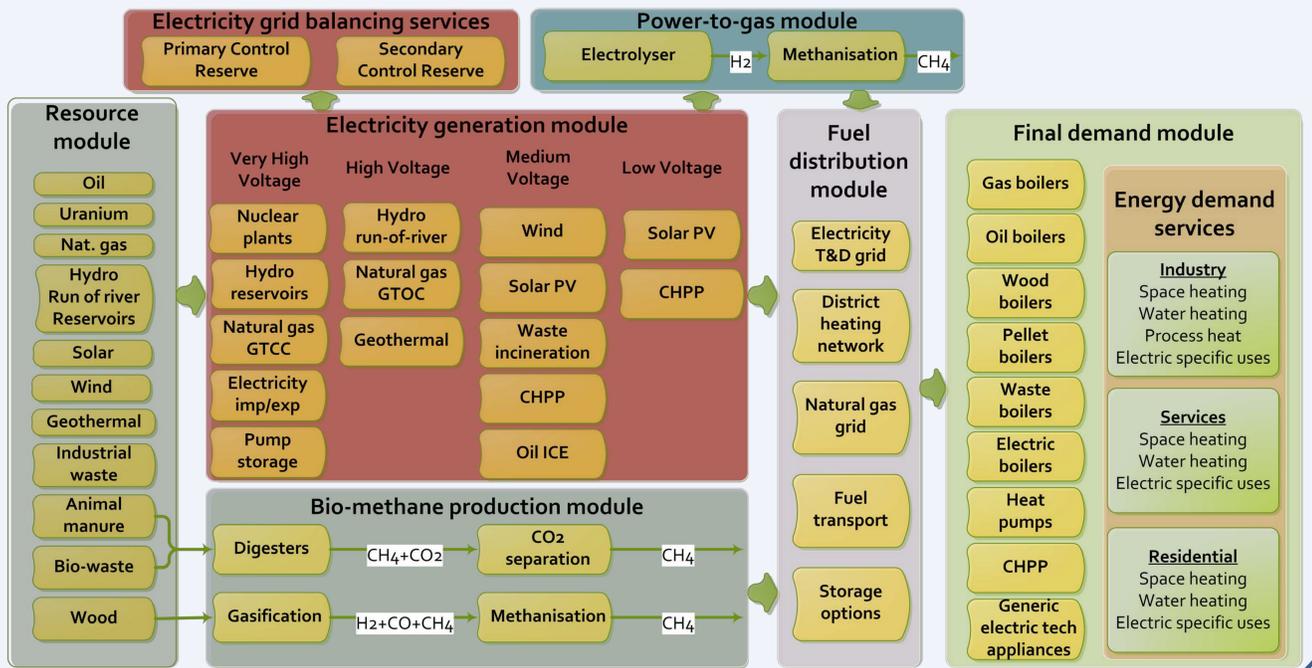


Long-term national electricity and heat supply scenarios*

Evangelos Panos and Kannan Ramachandran

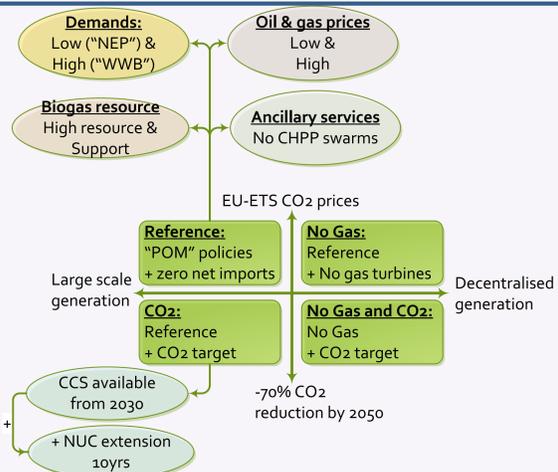
The Swiss TIMES Electricity and Heat Model (STEM-HE)

- Long term horizon (2010-2100) with hourly time resolution
- Representation of Swiss electricity and heat systems
- Endogenous demand for grid ancillary services
- Range of biomass production and usage pathways
- Number of electricity and heat storage options (e.g. pumped hydro, compressed air energy storage, batteries, hot-water)
- Simple power-to-gas module

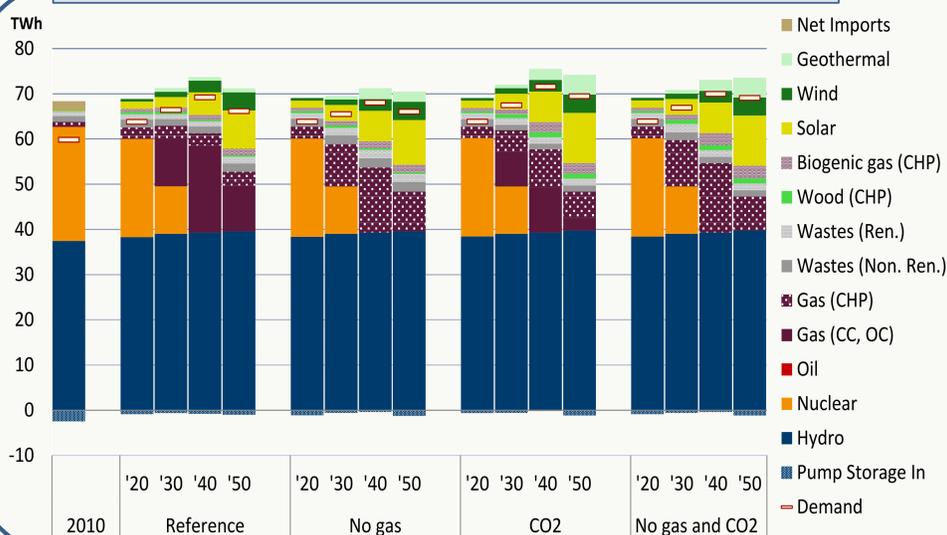


National scenarios

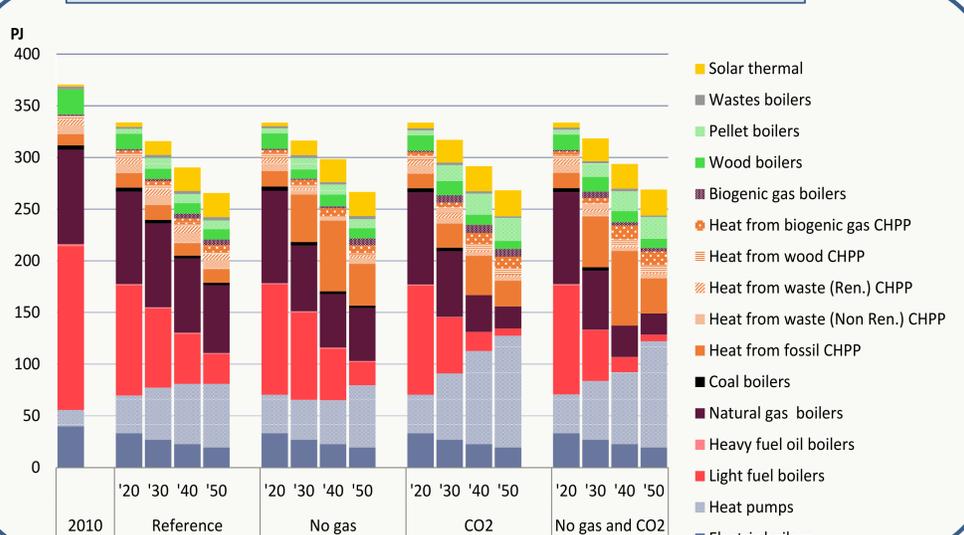
- Four core scenarios across two main axes:
 - a) With and without investment in large gas power plants
 - b) Climate change policy intensity
- Range of scenario variants to understand the key drivers influencing the penetration of CHPP



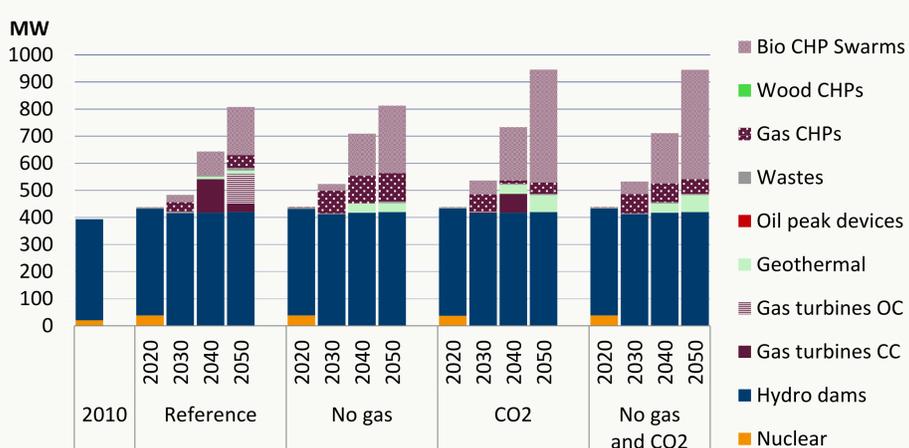
Electricity generation mix



Heat supply mix (in all sectors)



Secondary positive reserve



Conclusions

Key drivers:

- Natural gas and CO₂ prices
- Grid balancing demand
- Electricity and heat demand

Competition:

- Large power plants
- Gas, wood/pellets boilers

Synergies:

- RES raise demand for grid balancing
- Possible synergies with heat pumps

Difference in biogenic CHPP penetration from Reference levels (=100%, red circle)

