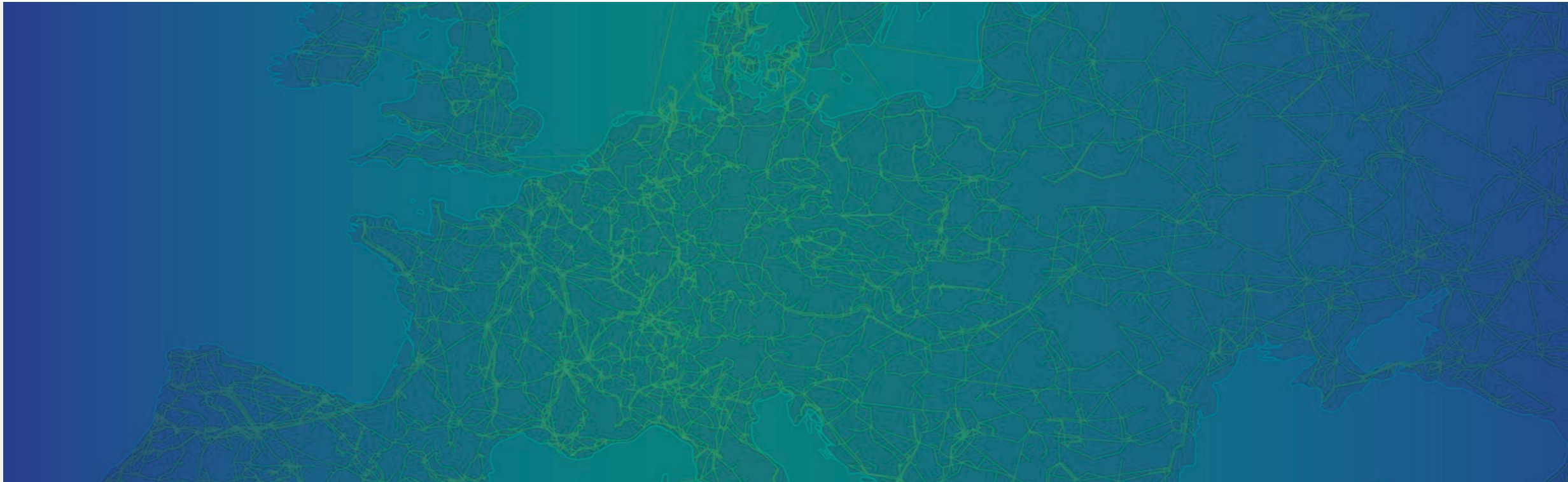


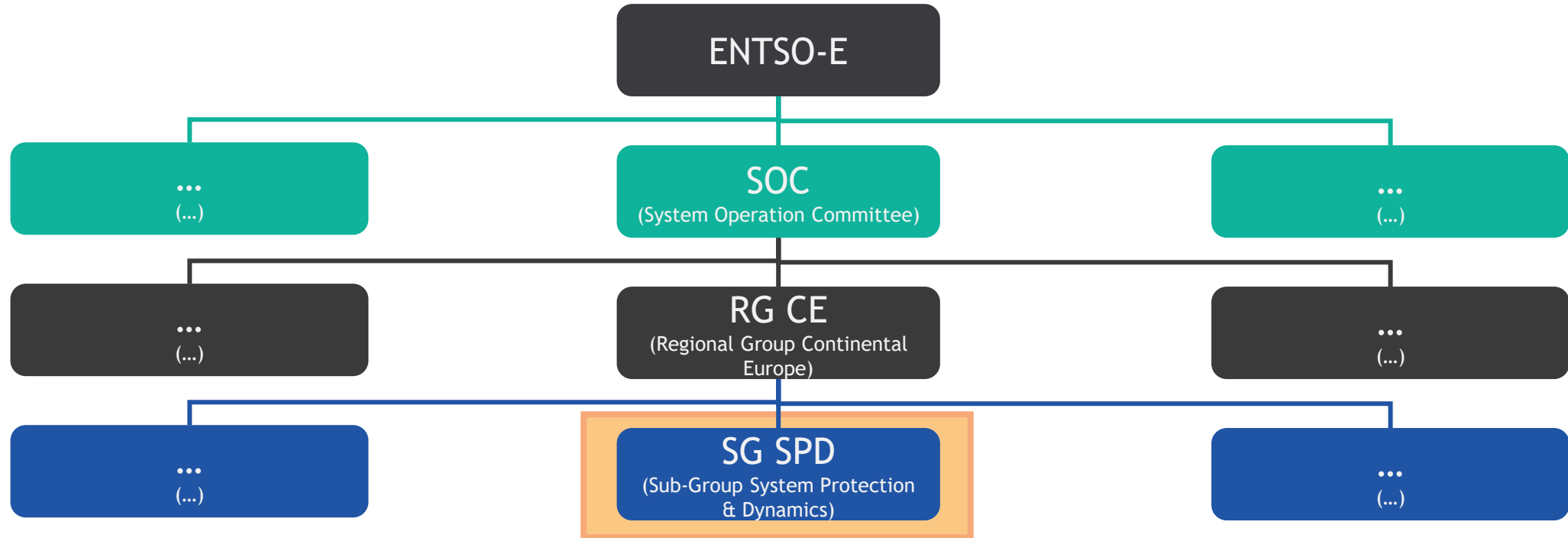
TOP 7: Investigation on Default Underfrequency Support Settings of New Flexibilities in Continental Europe (report)

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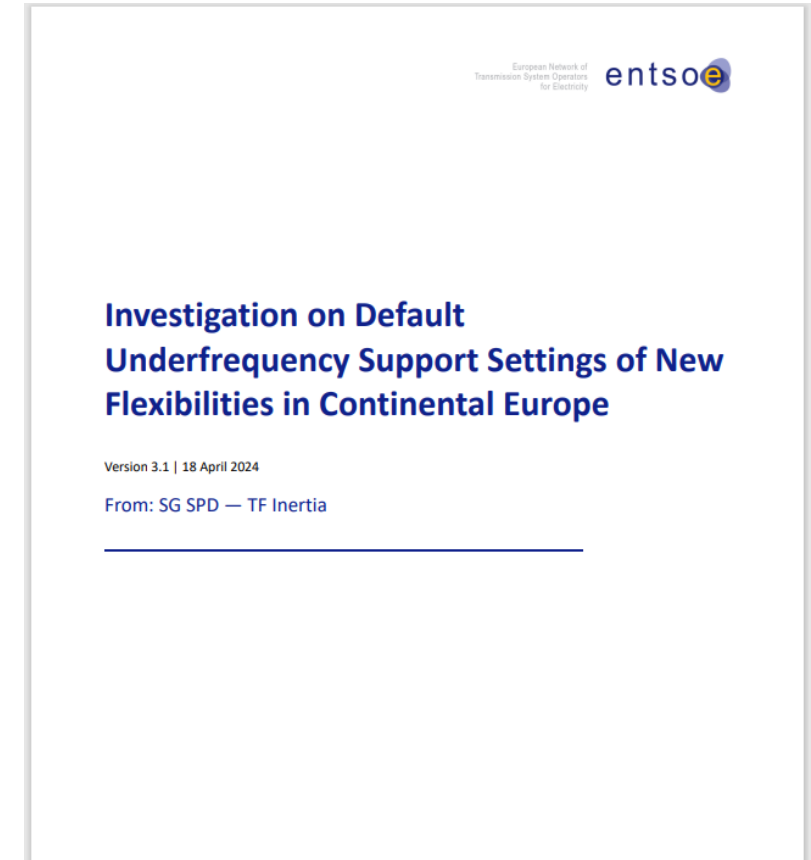
René Suchantke (ENTSO-E) – SPD convenor
Janek Massmann (ENTSO-E) – SPD convenor

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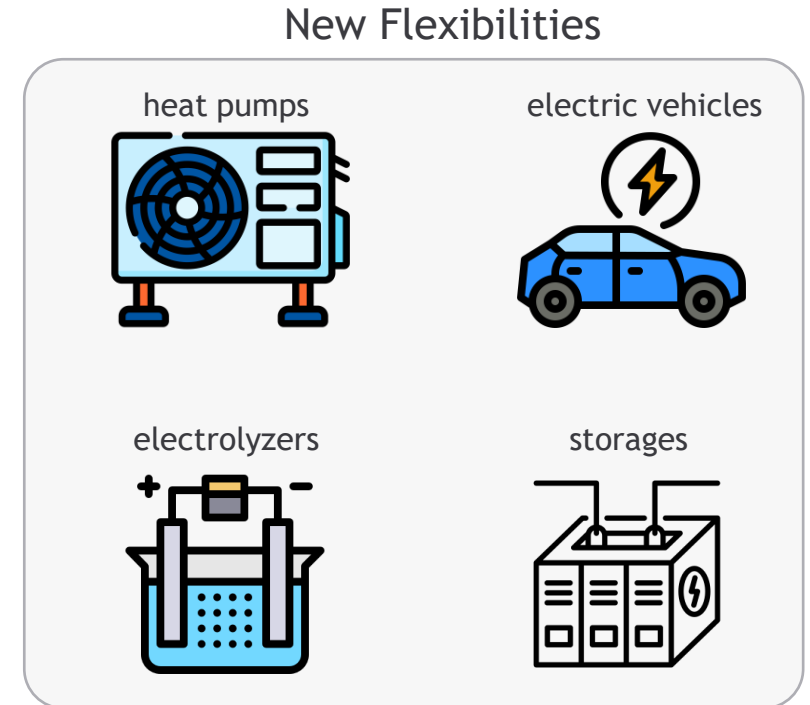
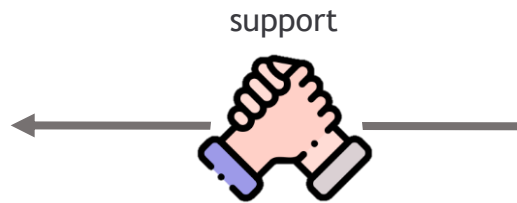
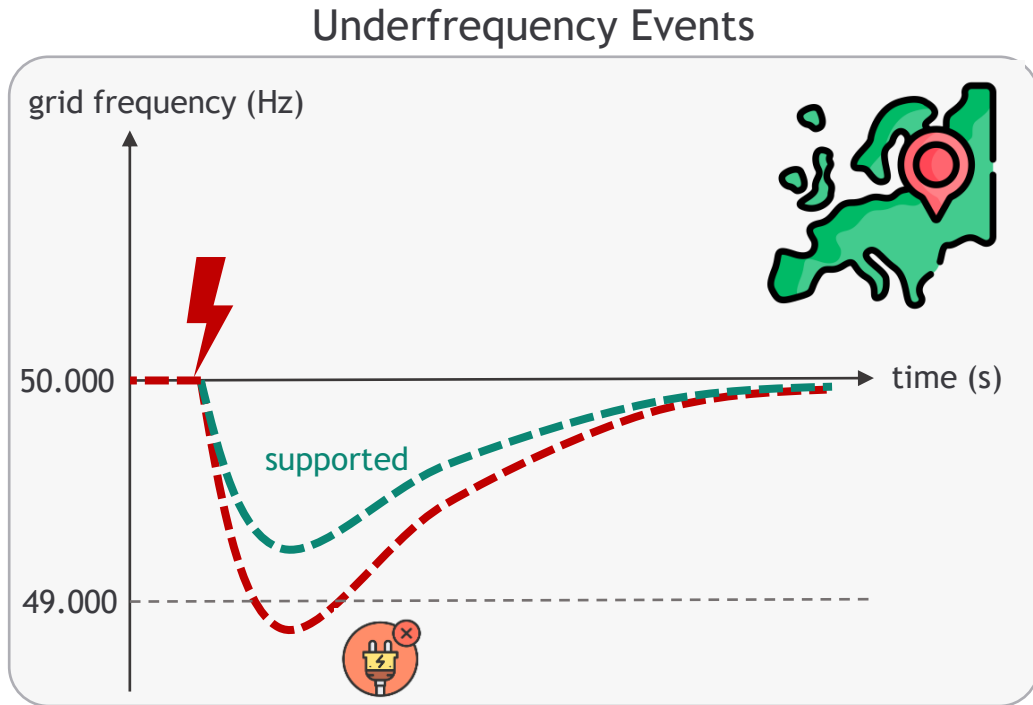


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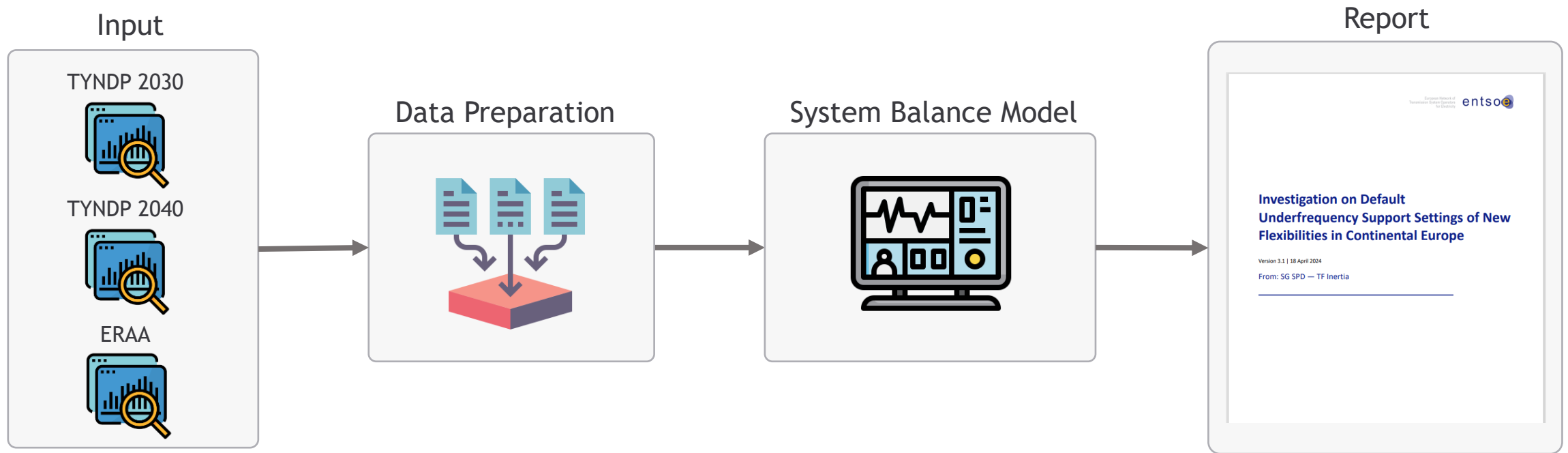
- SPD published an RG CE approved report (25 pages)
- investigations were conducted between 10...12/2023
- [Link](#); publication date: 2024-05-03
- the goal is to, transparently, inform all stakeholders about their impact and expectations



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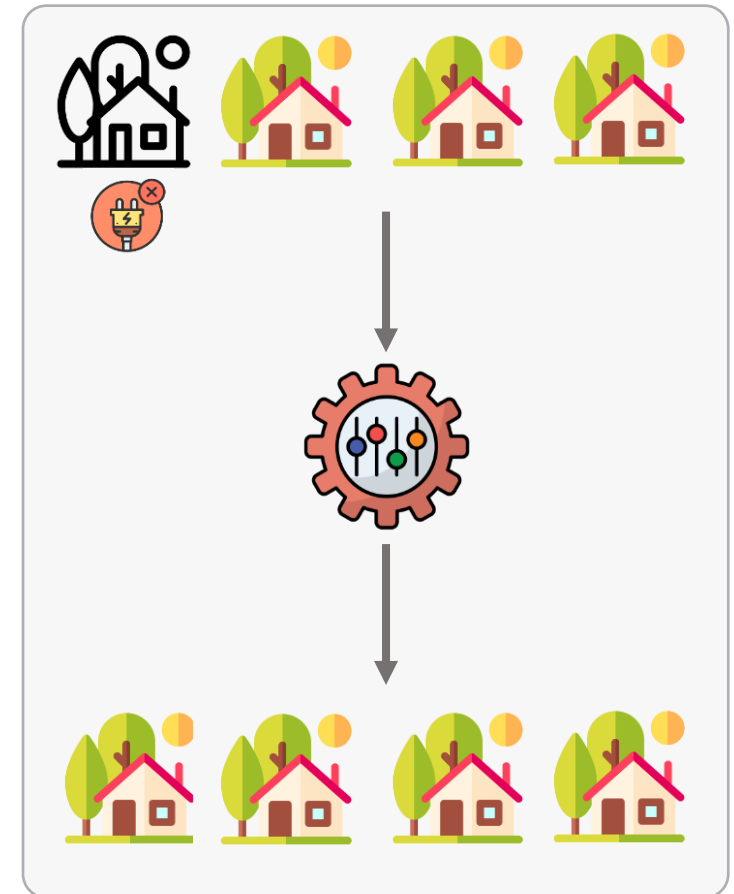


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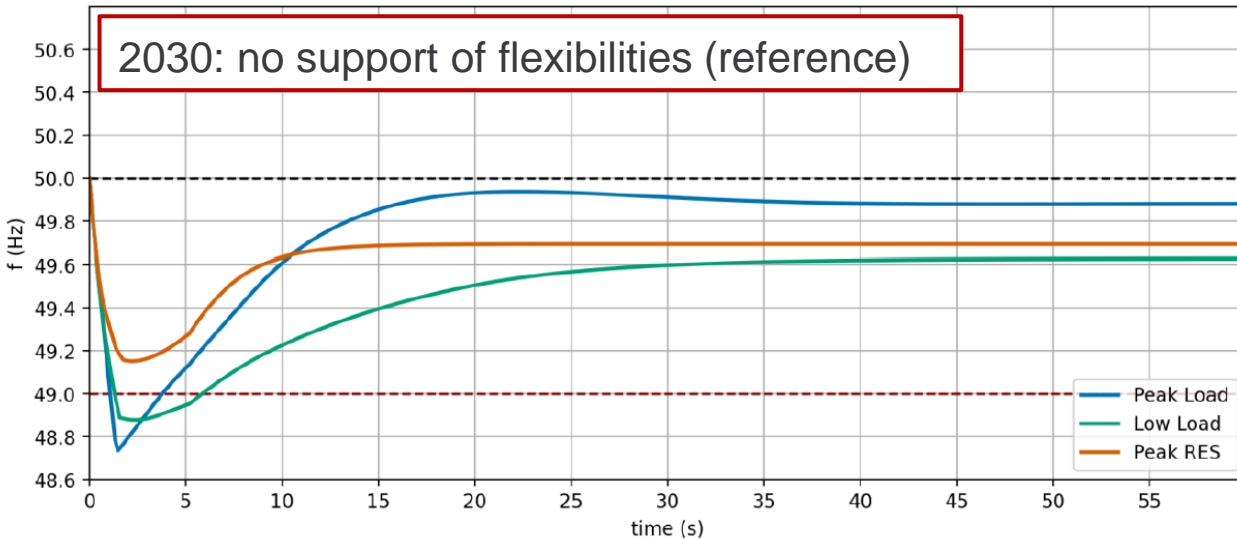
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- almost 100 simulations and more than 10 different sets of underfrequency settings were evaluated
- the goal was to reduce conventional load shedding that leads to disconnection of consumers (blackout) by reasonable default settings of *new flexibilities*
- results and expectations of the behavior of *new flexibilities* was aligned with StG CNC throughout the study
- as *new flexibilities* will strongly penetrate the power system, they also need to support stability of the system



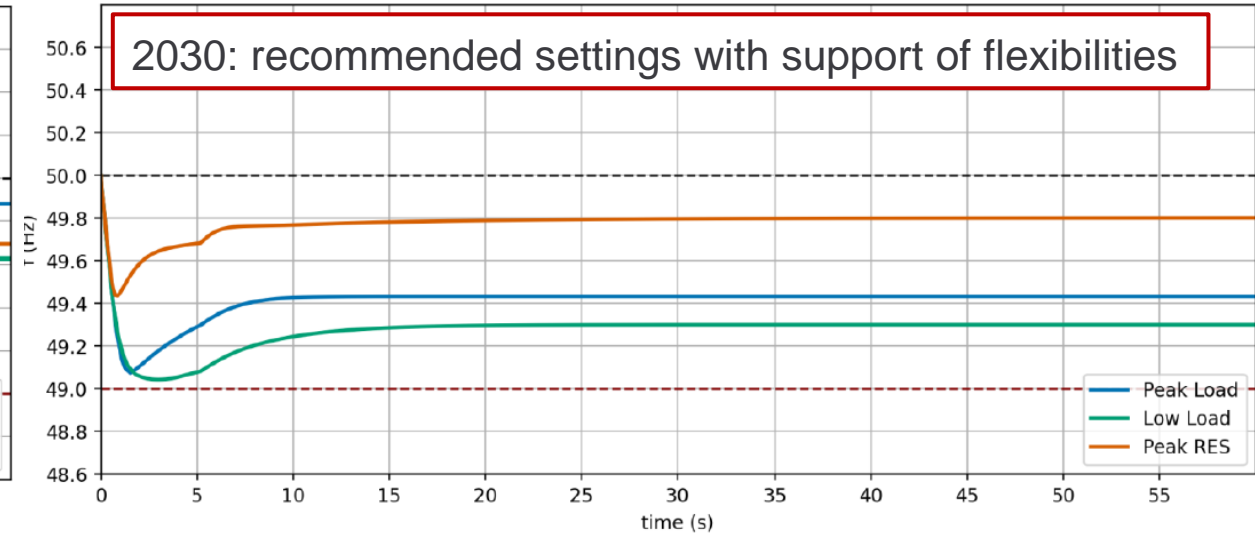
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Sensitivity I - no support of Flexibilities (Reference)



- approx. 50...60 million people could experience a blackout (up to 50 GW demand disconnection)
- risk to have much less conventional load shedding available and hence even lower frequency nadirs and therefore more consumer disconnections

Sensitivity IX - Hysteresis OFF, Droop variable, HP shedding



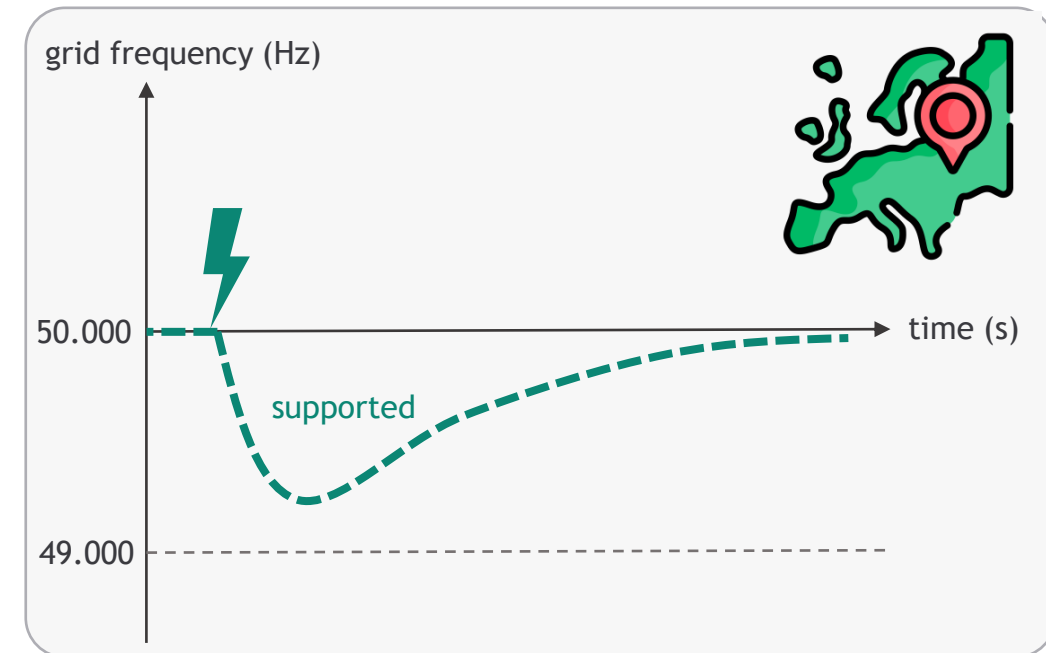
- no blackout

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recommended default settings:

- all *new flexibilities* should perform, if possible, LFSM-UC (linearly reduce their consumption with a droop in case of underfrequency)
- the LFSM-UC static should be 5 % for EVs, heat pumps and electrolyzers; 1.6 % for storages
- if heat pumps cannot perform LFSM-UC or have response times > 500 ms, they shall be shed at randomized frequencies between 49.6 Hz and 49.1 Hz¹
- in case of this randomized sheddings of heat pumps, the total disconnection time shall be < 300 ms

Underfrequency Events



¹...large industrial heat pumps shall perform LFSM-UC

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