C3S Energy Operational Service

Energy Modelling Platform for Europe

19 May 2020

Online

Climate Change

Alberto Troccoli and the C3S Energy Team

twitter

#C3S_ENERGY

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C3S Energy Rationale: Developing a Climate Service with and for Energy Industry stakeholders

We'd like more than just capacity factors; we'd need W, MWh, MJ, etc. – so we can also easily compare demand with supply

Can we bridge the communication gap between climate and energy, and involve a wider community in the conversation – policy makers, strategists, but also students

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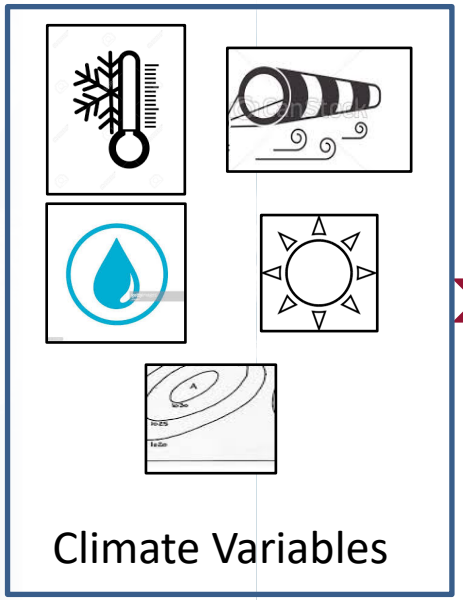
C3S Energy in a Nutshell

PAST — Reanalysis

'PRESENT' — Seasonal Forecasts

FUTURE — Climate Projections

1979 — Present — +6 months — 2100



Climate Variables

Electricity demand

Wind power production

photovoltaic production

Hydro production

Energy Indicators

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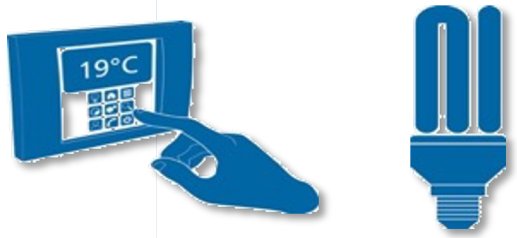
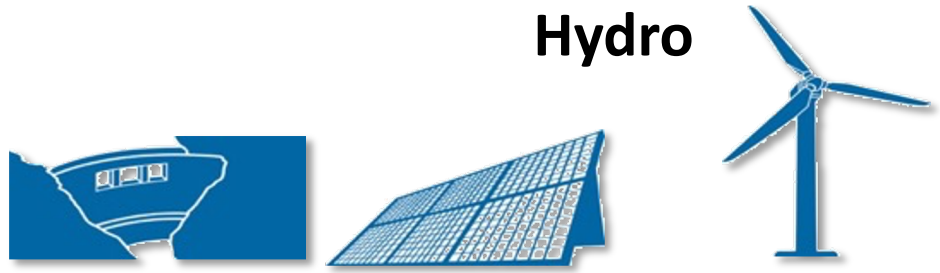
C3S Energy models strategy

Electricity Demand



Generation from Wind Solar PV Hydro



The energy conversion models are chosen to be applied for:

- Three different kinds of input climatic data covering 1979 to 2100 with different time resolutions
- Any location in Europe even if no specific information is available (installed systems or time series of generation)

➔The flexibility of the conversion models is favoured over accuracy

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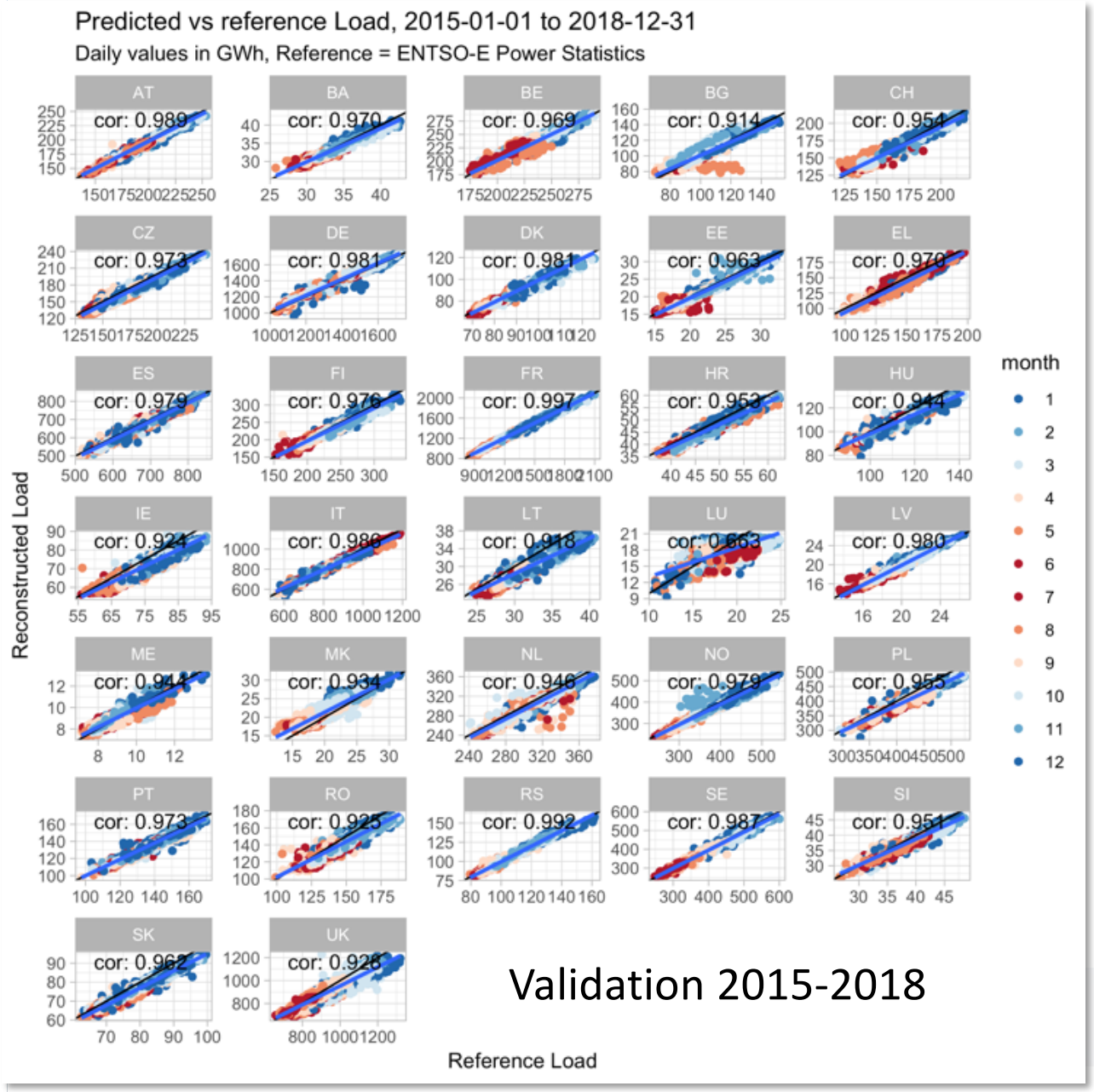
Electricity Demand: Global Validation



Validation 2015-2018

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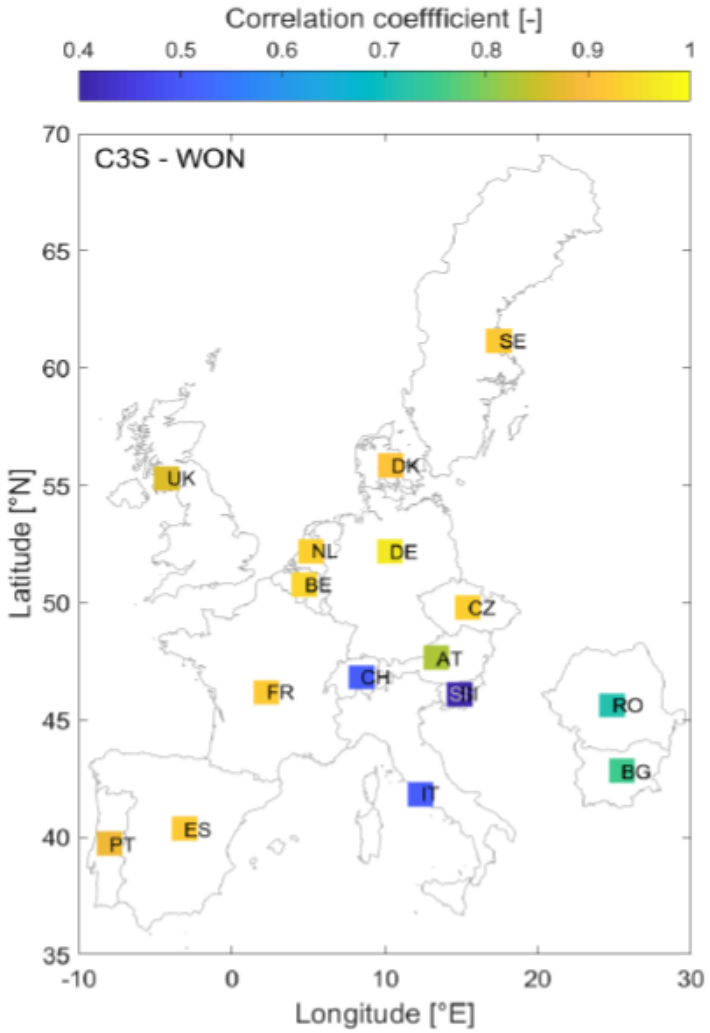
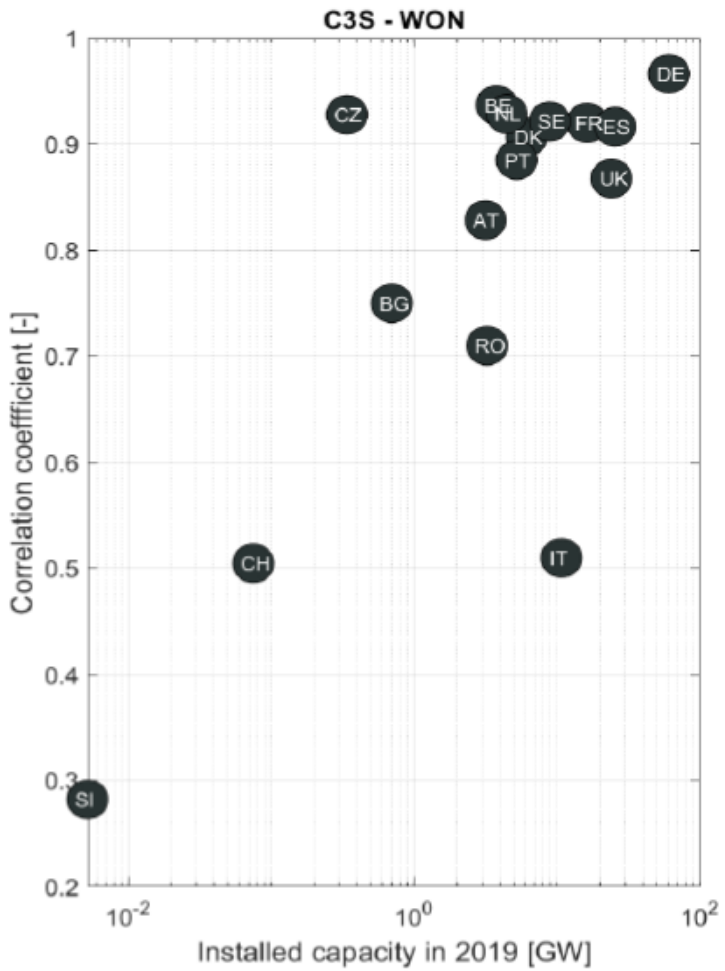
Wind Power: Validation

Spatial dependency of the correlation between simulated and reference





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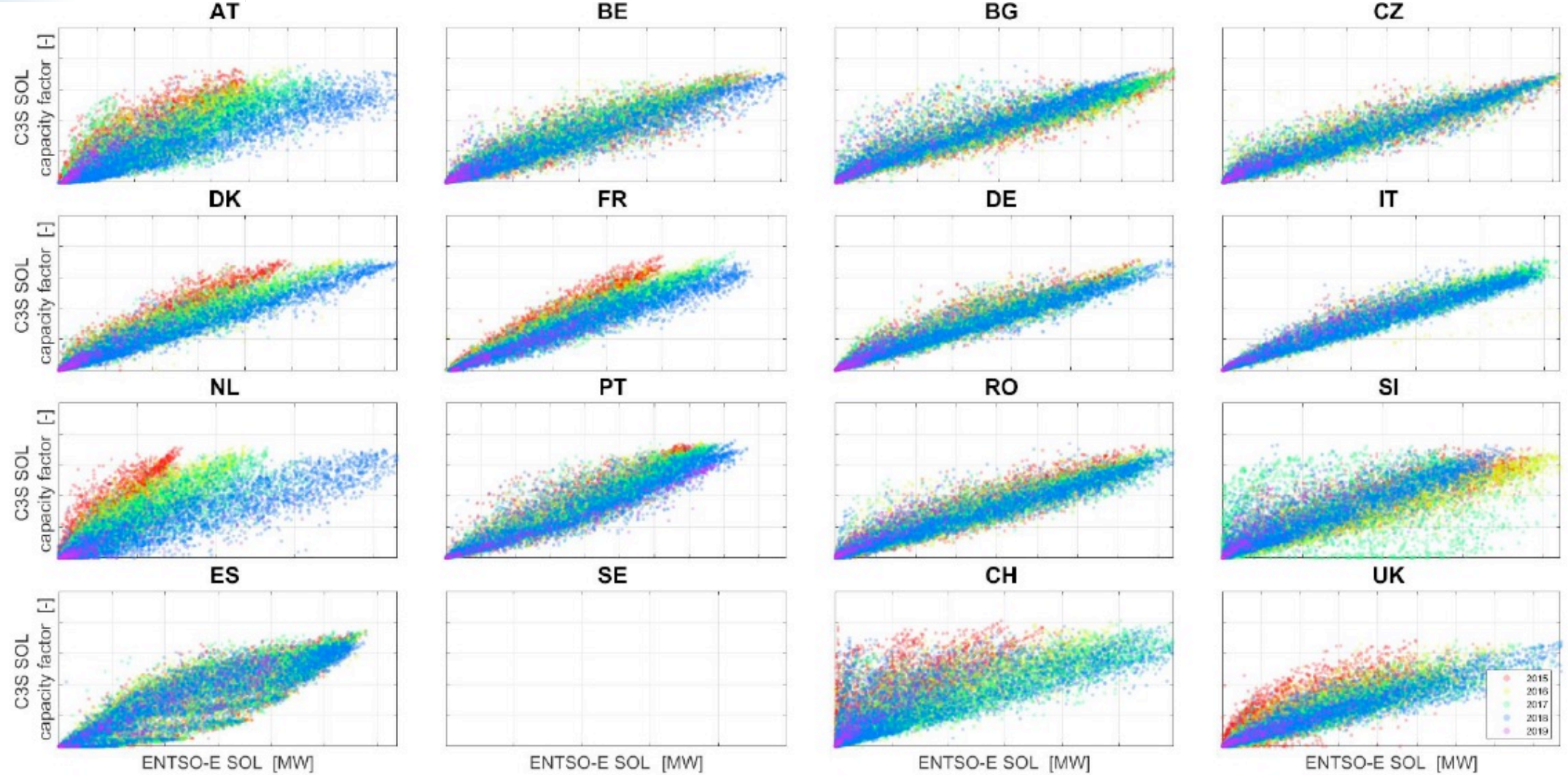
Solar Power: Validation

Scatter plots of the simulated against reference power production



Hydropower: Validation

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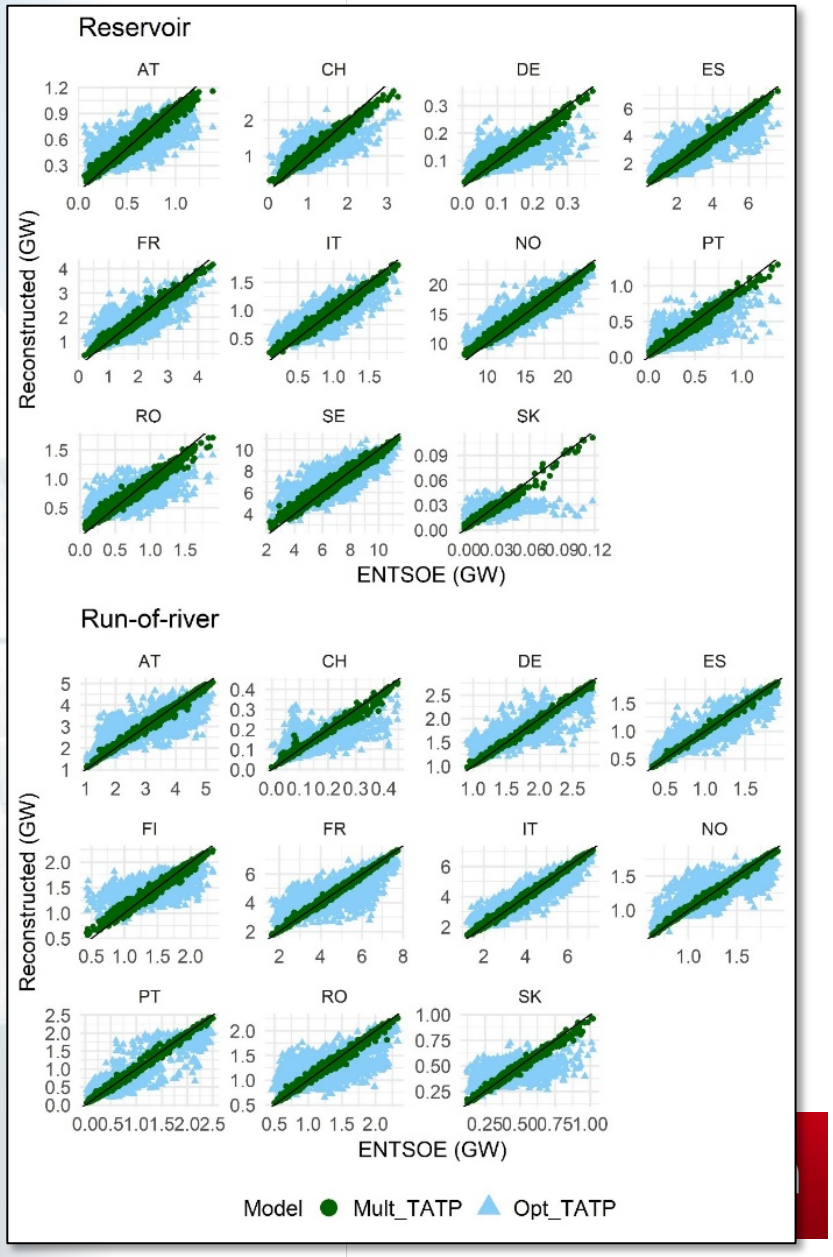

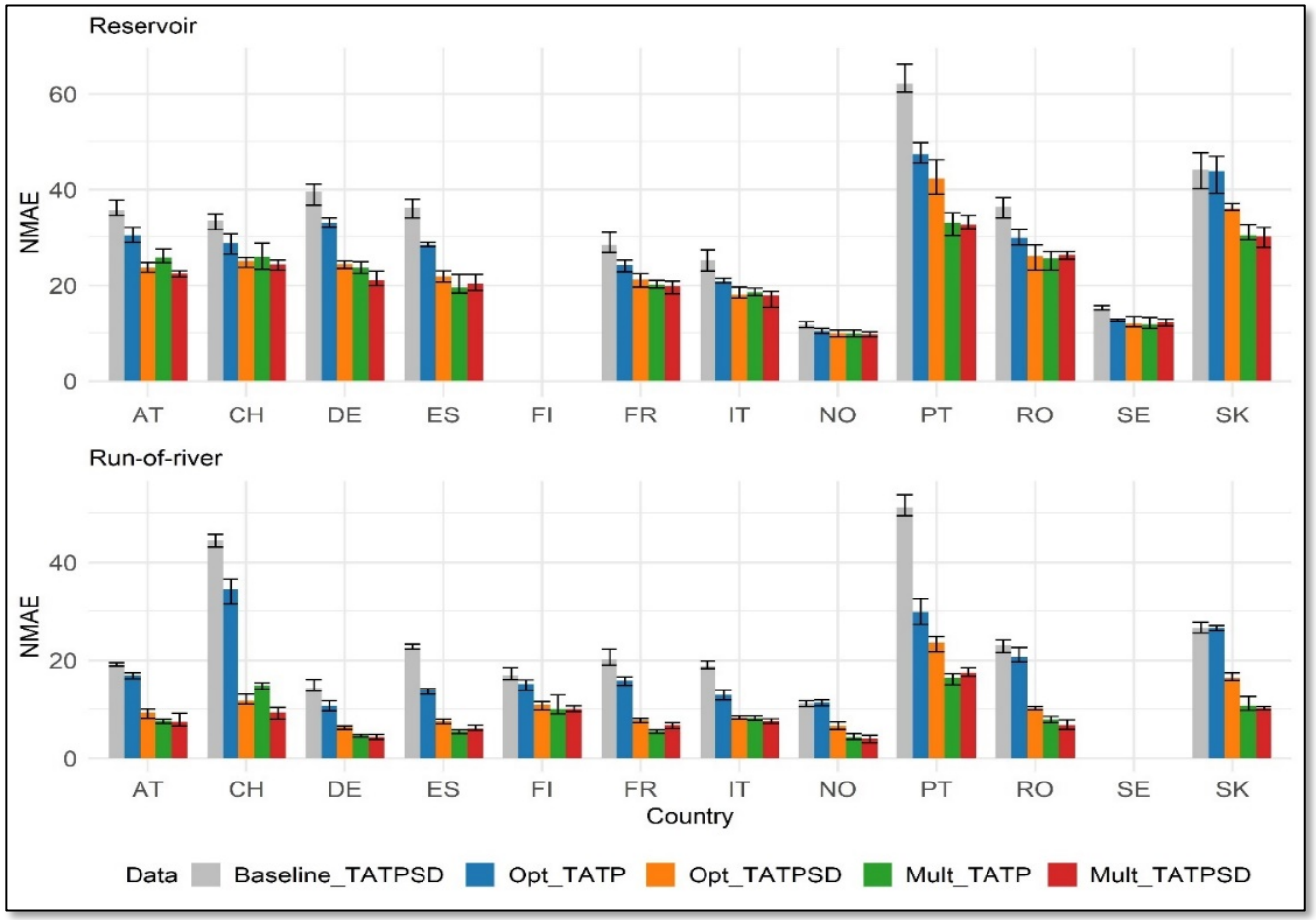

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Energy modelling summary

The objectives of C3S is to produce a dataset of plausible energy indicators in Europe for all energy sources and different climate datasets.

- The validation confirms that the simulated data are plausible
- The validation is hindered by uncertainty in the reference data
- An update of the models is needed to improve the simulations
- Strong need for data QC and homogenization in energy databases to help progress in energy modelling and climate related studies

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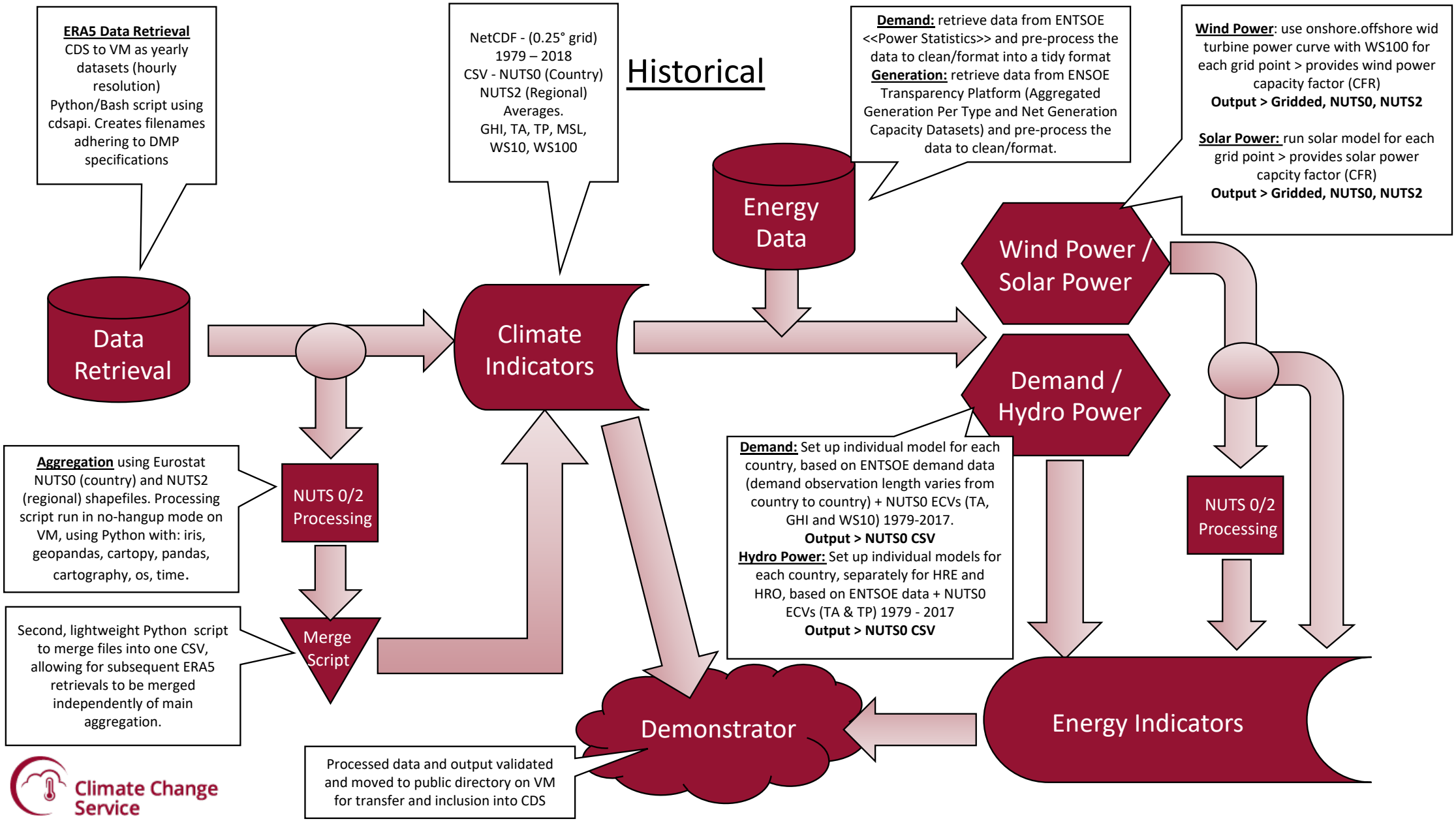
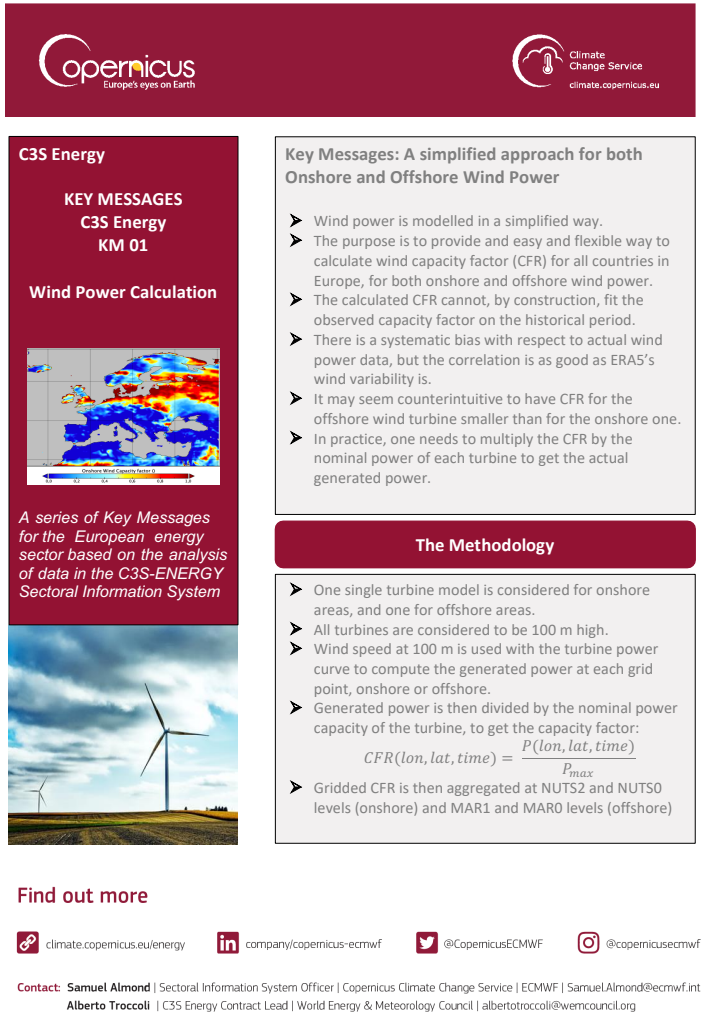
C3S ENERGY Workflow – Historical stream



Climate Change Service

Comms and documentation

- Communication with stakeholders:
  - Social media (Twitter, LinkedIn)
  - Tech blogs
  - Six webinars (list on next slide)
  - Advisory Board meetings
- Documentation:
  - Variable Fact Sheets, Data quality assessment, Methods & Limitations, Bias adjustment, User guide for seasonal forecasting
  - Case Studies & Key Messages
  - FAQs, Tutorial videos, Blogs, Team stories



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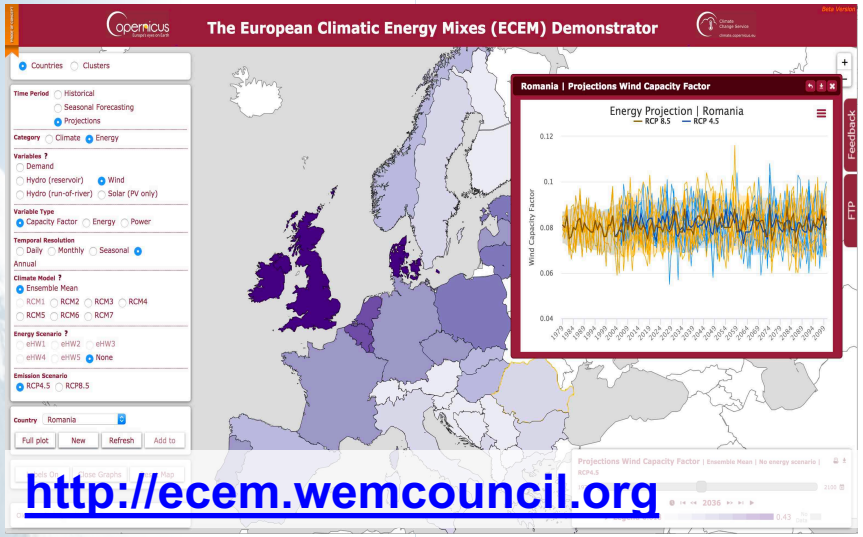
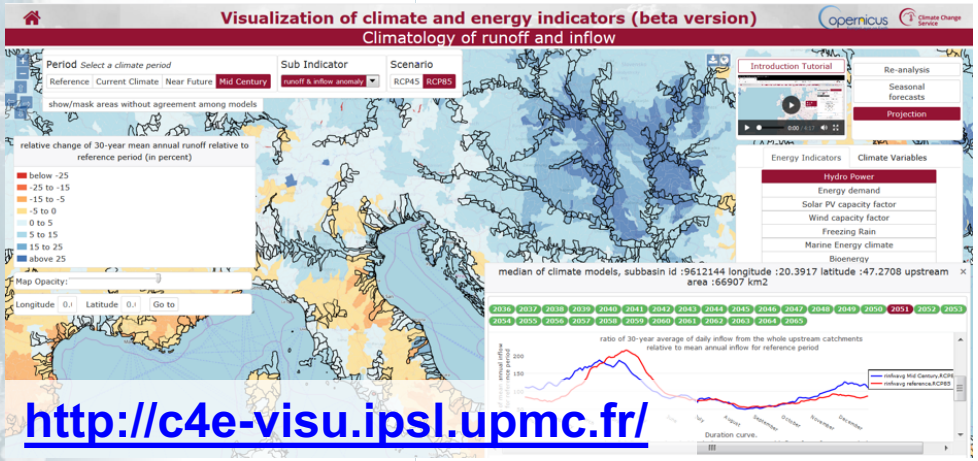
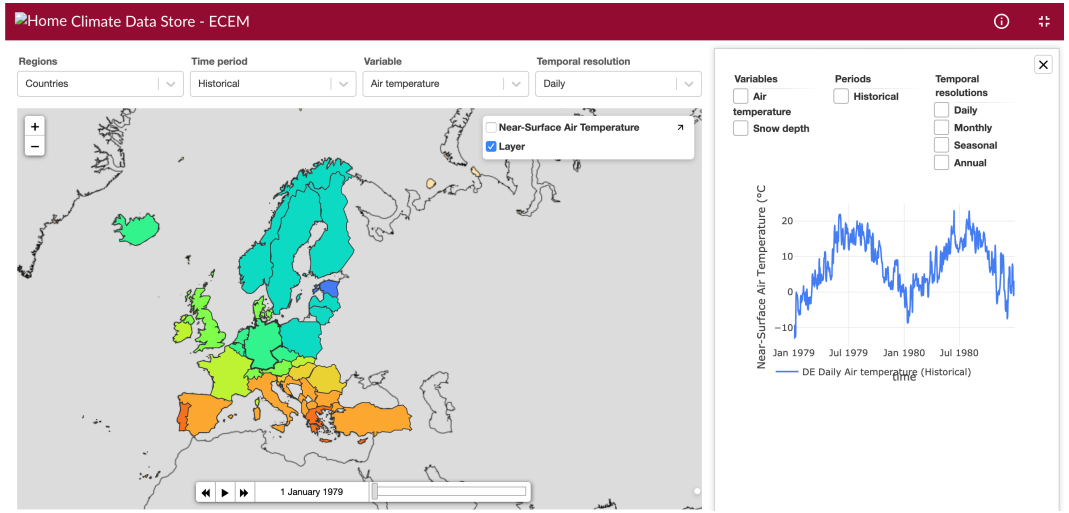
C3S ENERGY: The visual demonstrator



http://ecem.wemcouncil.org



http://c4e-visu.ipsl.upmc.fr/



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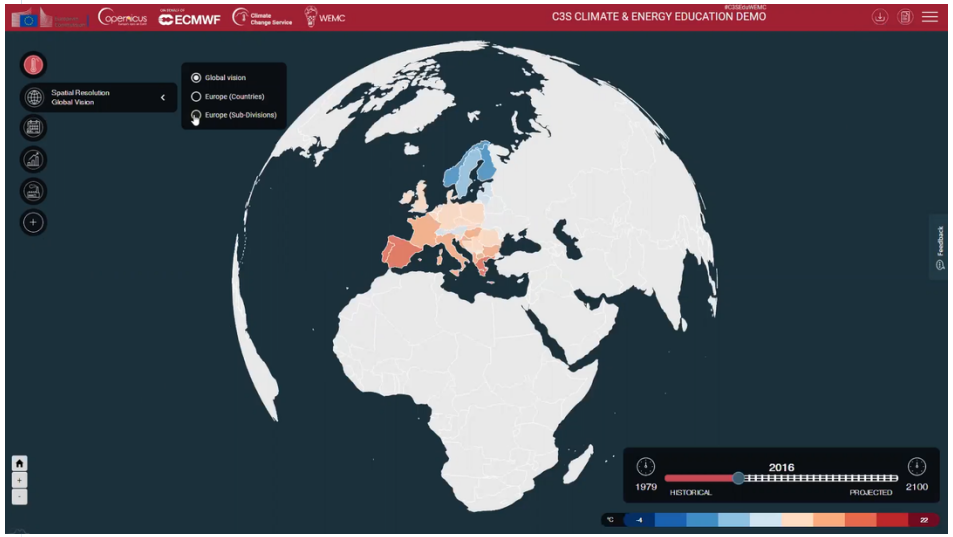
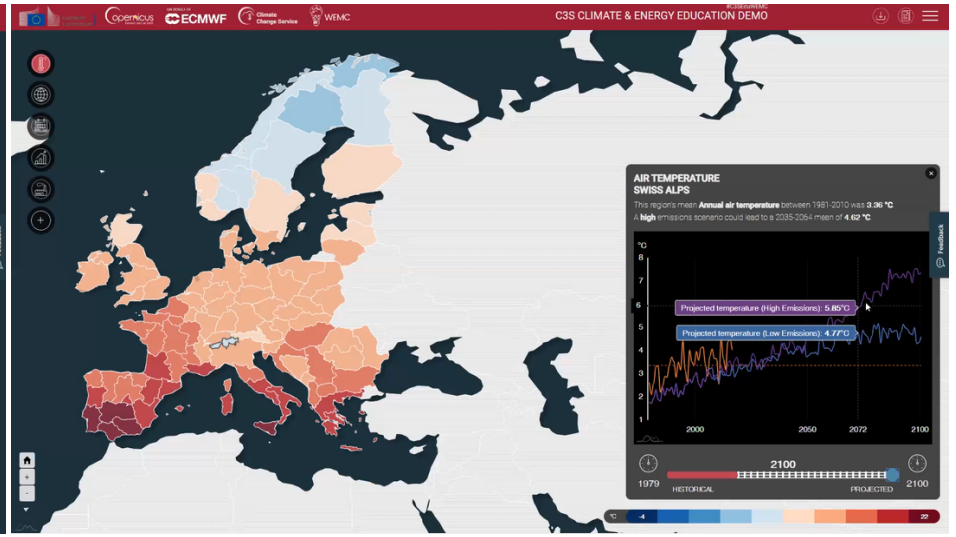
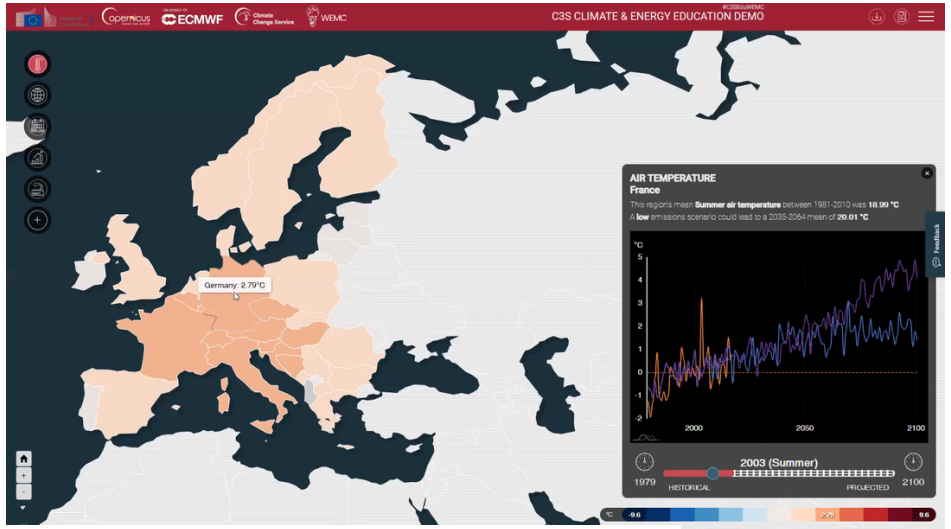
Built on the C3S ECEM tool, it will soon be updated with the most recent climate data, and also extended to the rest of the globe







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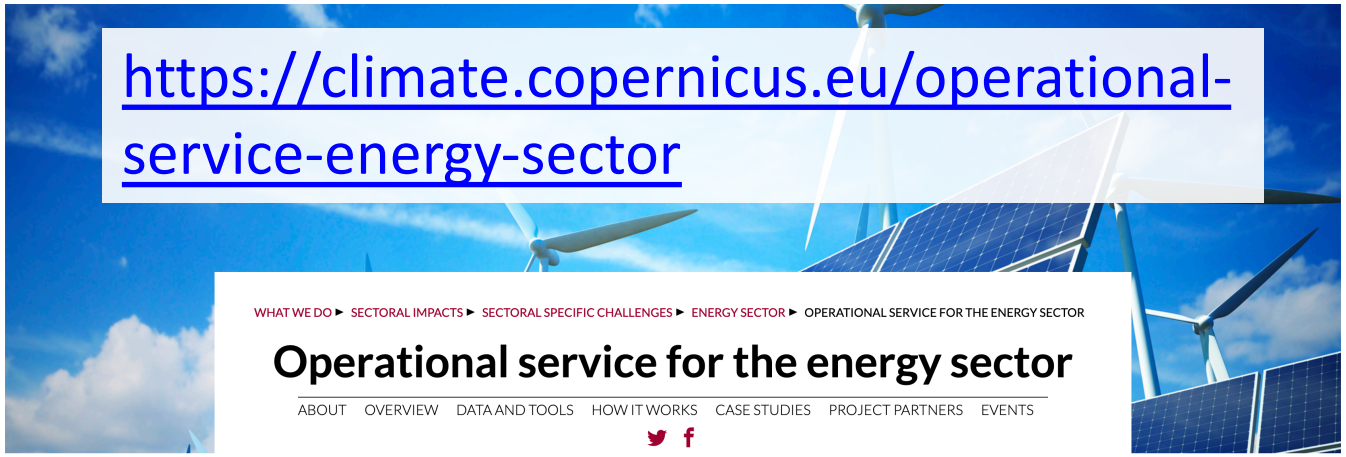

See also two **poster presentations** related to C3S Energy, Wednesday 7 October

Dubus et al. - https://www.youtube.com/watch?v=Xbfu3plYojw

Bloomfield et al. - https://www.youtube.com/watch?v=xMB7GPDs9h0

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