# Climate variability and European power systems

Matteo De Felice

Joint Research Centre, Directorate Energy, Transport and Climate

# Climate variability and change in European power systems


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- **First step**: historical using 26 climate years
- Unit commitment model and hydro-thermal scheduler
- **Second step (planning)**: 2030/2050 scenarios with climate change



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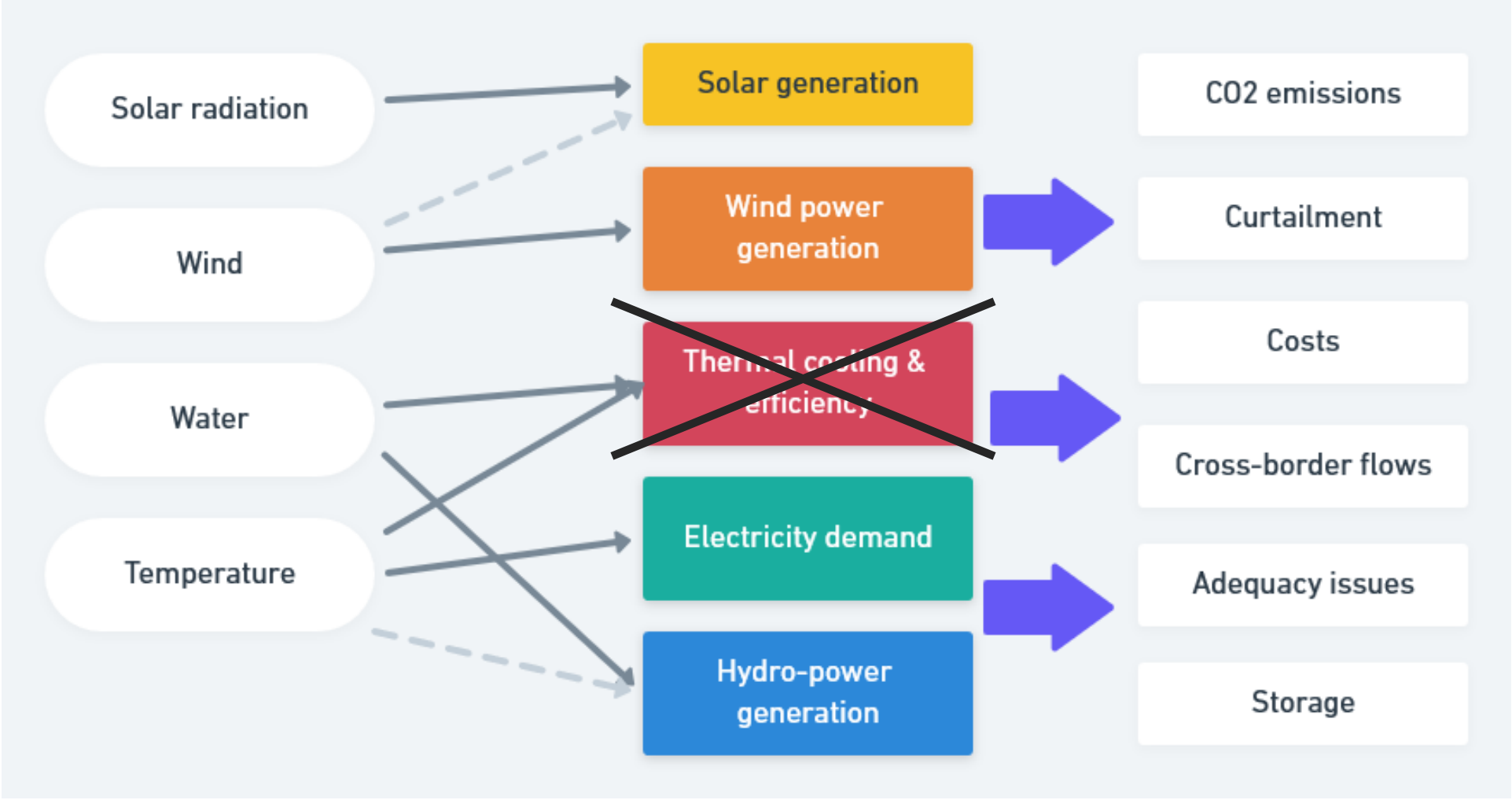




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# “Why variability is important?”

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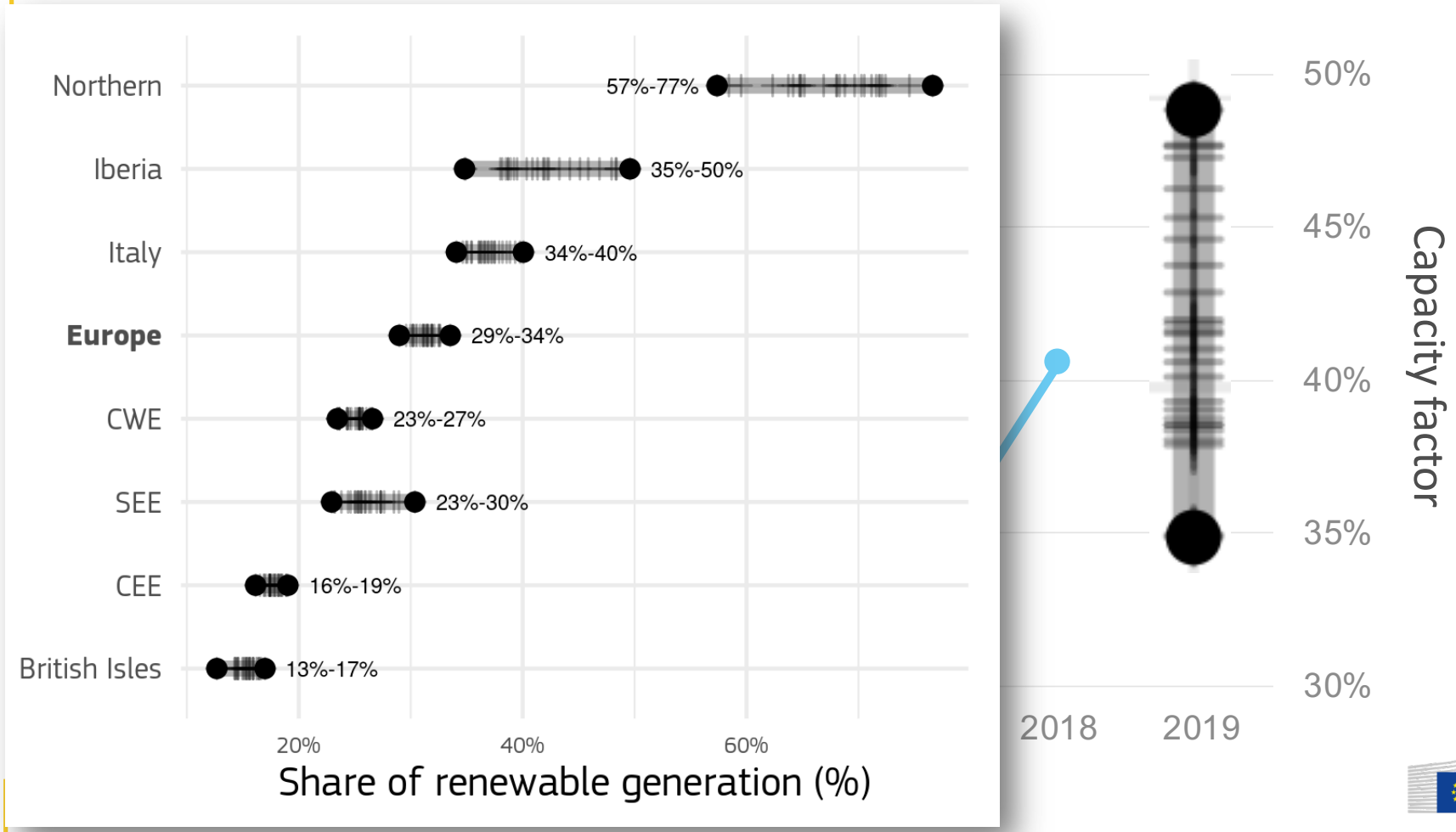
# Example – renewable generation in Spain

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# “And what about the future?”

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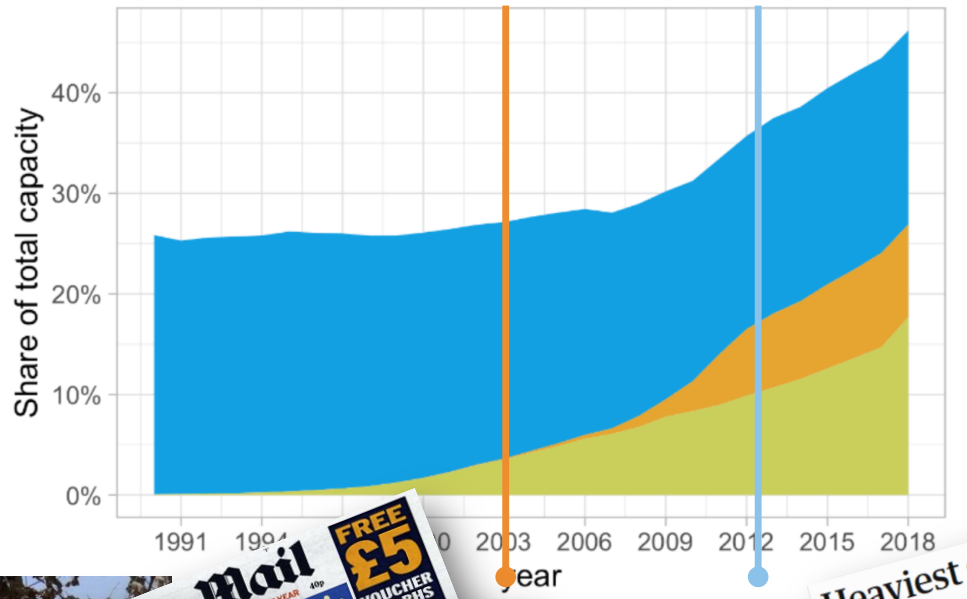



2003 European heat wave

2012 Cold spell

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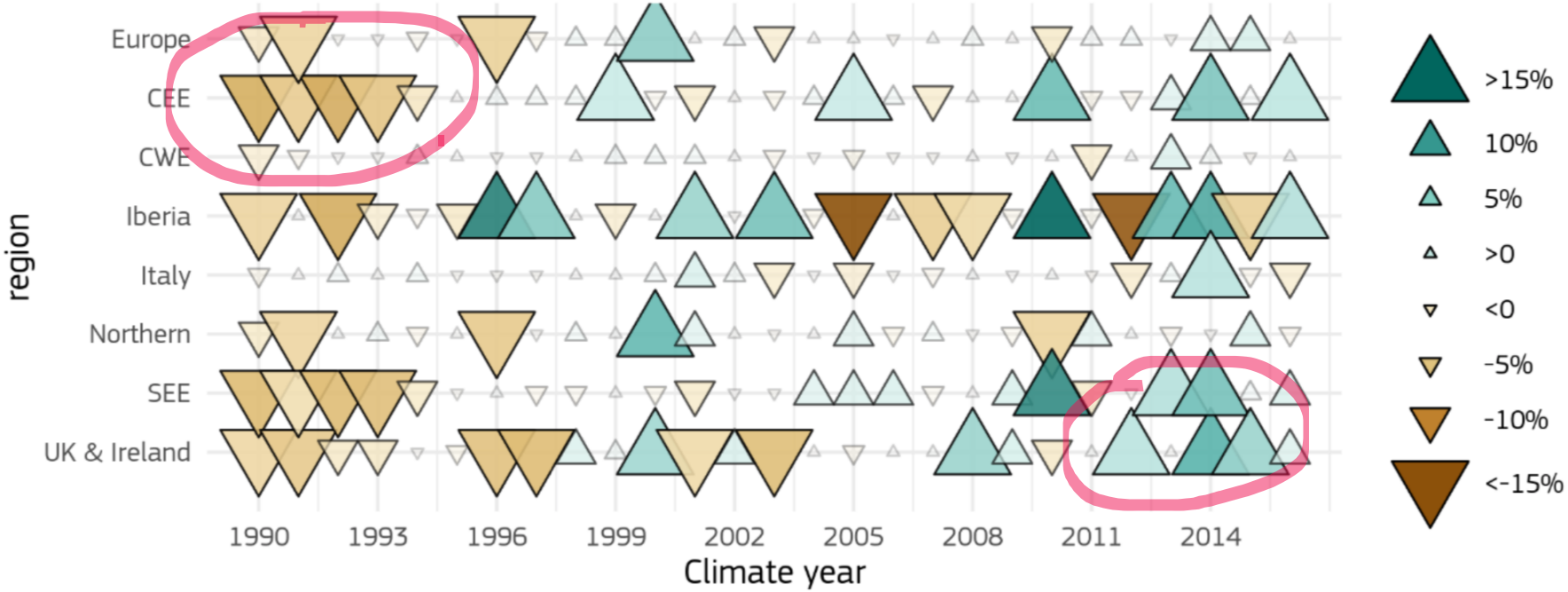
# Hydropower inflow across the years

**Figure 4.** Annual variability (percentage deviation from the average) of daily inflow in the 26 climate years for the considered regions.



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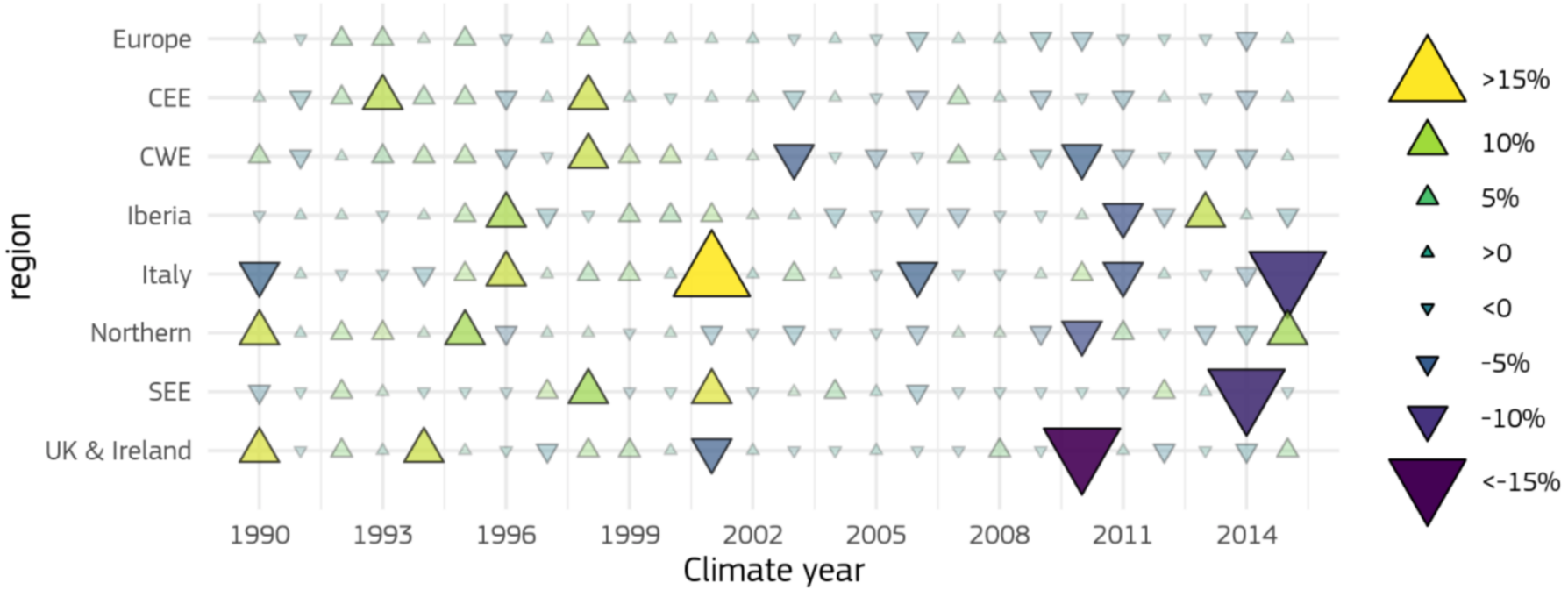
# Wind (onshore)

**Figure 5**. Annual variability (percentage deviation from the average) of onshore wind resources in the 26 climate years for the considered regions.



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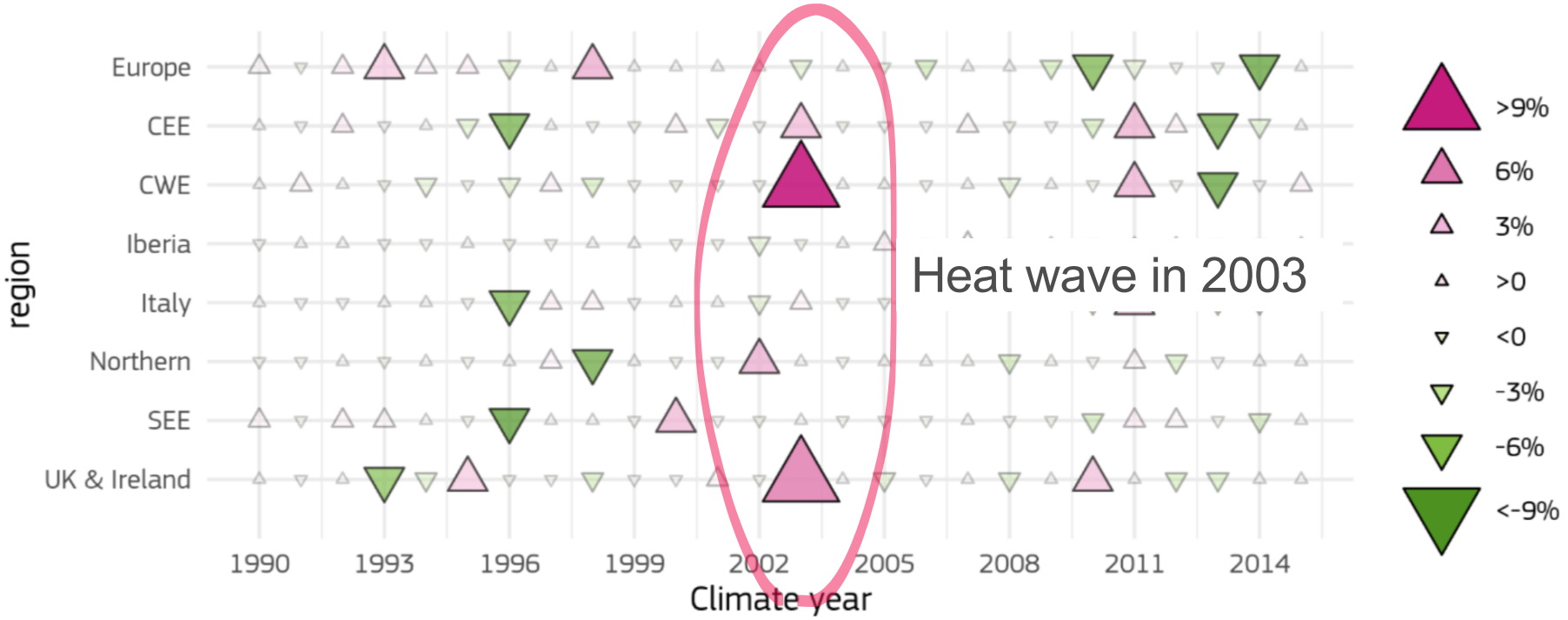
# Solar (PV)

**Figure 6.** Annual variability (percentage deviation from the average) of solar resources in the 26 climate years for the considered regions.



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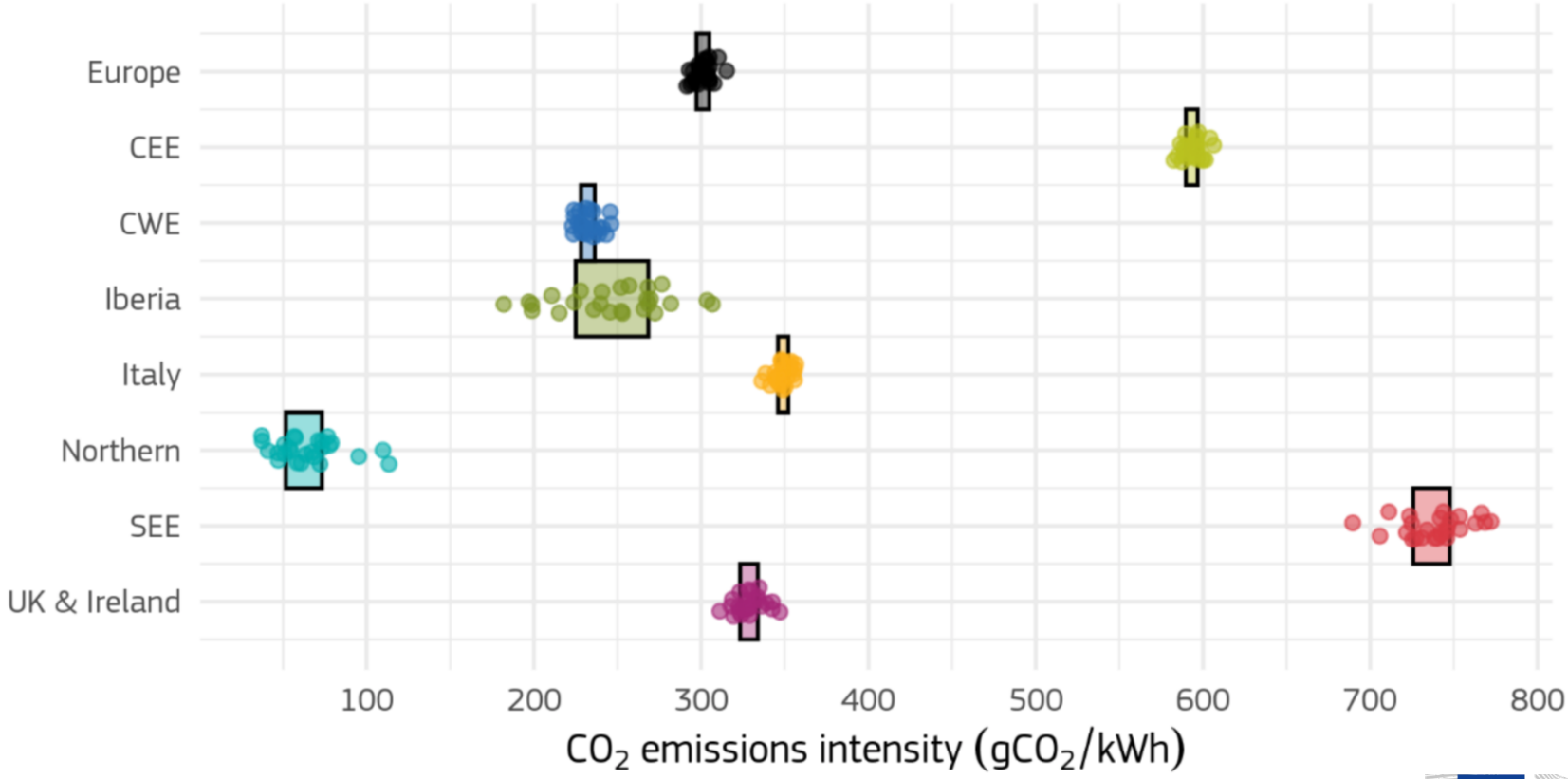
# $CO_2$

**Figure 18.** Intensity of the $CO_2$ emissions of the regional power systems.



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# Our data products

EMHIRES: Wind & Solar power generation:
30 years hourly-time series

ENSPRESO: **EN**ergy **S**ystem **P**otentials for **R**enewable **E**nergy **S**ources

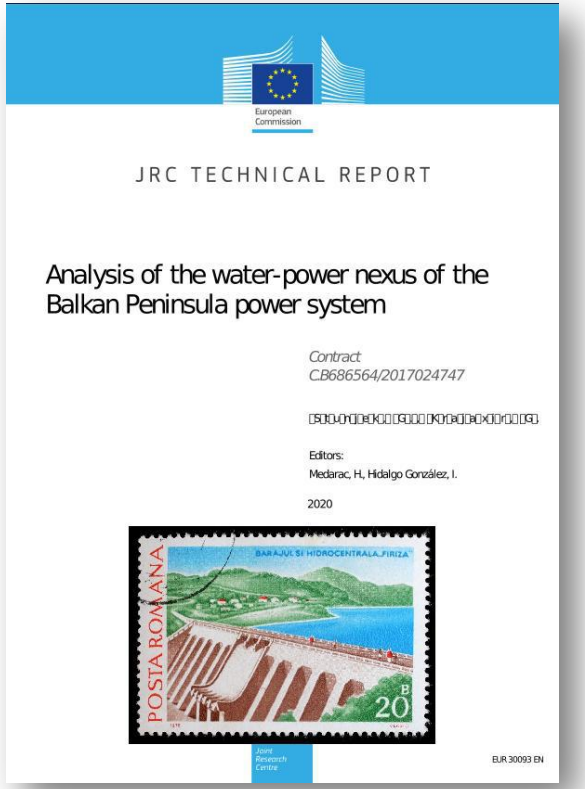
JRC Open Power Plants Database (JRC-PPDB-OPEN)

Water-Energy-Food-Ecosystem Nexus Data Collection

…and many other datasets on the JRC Data Catalogue
https://data.jrc.ec.europa.eu/

# Other reports


https://europa.eu/!Xv74Nh




https://europa.eu/!tw97wu



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