

Advancing the understanding of hectoscale forecasts for Renewable Energy Systems



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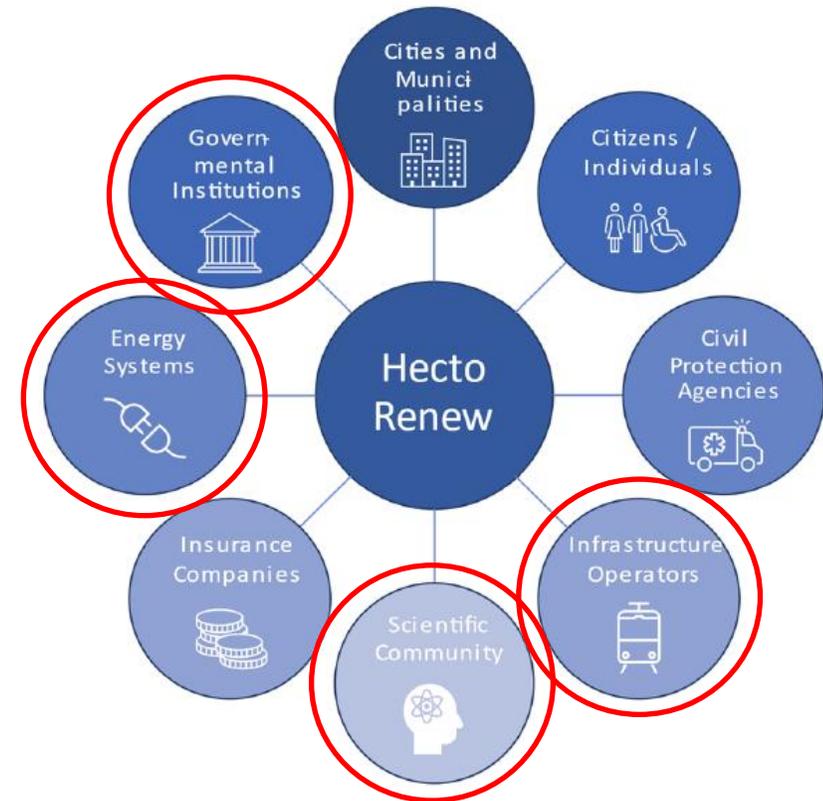
Irene Schicker, Annemarie Lexer (GeoSphereAustria)

Digital Twin Austria, December 4th, 2025

HectoRenew - Goals

=> analyse the usability of DT Climate output for the **renewable energy sector** (directly or as input for dynamical climate simulations):

- (i) to assess the **skill of the Global DT Climate scenarios** with respect to representativeness of **extreme (meteorological) events, synoptic patterns**, and their impact on renewables;
- (ii) estimate the **added value of highly resolved climate scenarios dynamically downscaled to hectometric spatial resolution** (and higher vertical resolution) with respect to selected renewables extreme events (negatively affecting either the supply or the infrastructure itself);
- (iii) to assess for wind, PV, and hydropower **post-processed performance curves** based on either (converted) DT Climate or the hectometric simulations.



HectoRenew – used Data

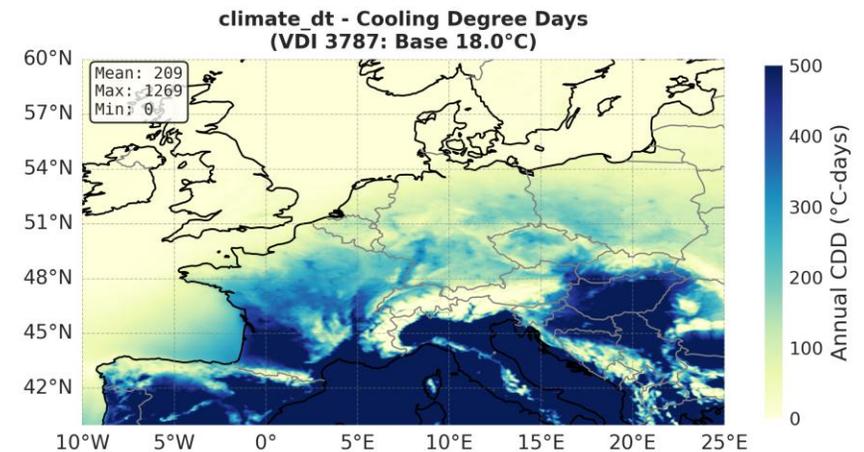
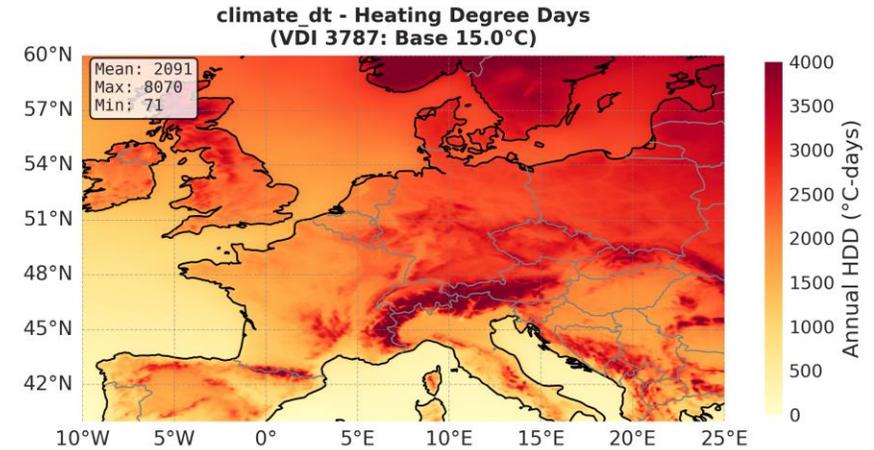
Future projection	IFS-NEMO	4.4 km atmosphere, 1/12 ocean/sea-ice
Storyline simulation present climate	IFS-FESOM	9 km atmosphere, 5km ocean/sea-ice

Parameter	Future projection	Storyline
Total precipitation	2020-2024	2017-2024/11
U-wind comp.	2020-2024	2017-2024/11
V-wind comp.	2020-2024	2017-2024/11
T2m	2020-2024	2017-2024/11
Geopotential	2020-2024	x
Surface pressure	2020-2024	x

Download from: [DestinE ClimateDT Parameters - DGOV DestinE collaboration zone - ECMWF Confluence Wiki](#), using Polytope service adapted from: [polytope-examples/climate-dt](#) at [main · destination-earth-digital-twins/polytope-examples · GitHub](#)

Issues: download 100m U,V wind comp. (changes in phase 2), volumetric soil moisture (planned phase 2, early 2026), soil temperature (not part of phase 2), 3d pressure

Heating & Cooling Degree Days - Spatial Distribution (Alpine Region Energy Demand)



Paper preprint: <http://arxiv.org/abs/2511.05584>

Thank you! Questions?



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