

ENERGY & SPACE

SPACE AND WATER NEEDS FOR DECARBONISED FUTURES

DATA-ORIENTED INPUTS FOR ENERGY DECISION-MAKING

WHY?

Achieving European climate and energy targets for the next decades relies on a **rapid implementation of renewables and electricity grids**.



This means a further deployment of **renewable and grid infrastructure**, which requires substantial **resources, including water and space** on land and at sea.



Increasing competition over these resources can lead to conflicts among different actors and uses.



The challenge is to balance renewable energy and grid deployment with **economic activities and nature protection**.

To address this, a better understating of space and water requirements for optimised infrastructure placement and implementation is needed.

WHAT?

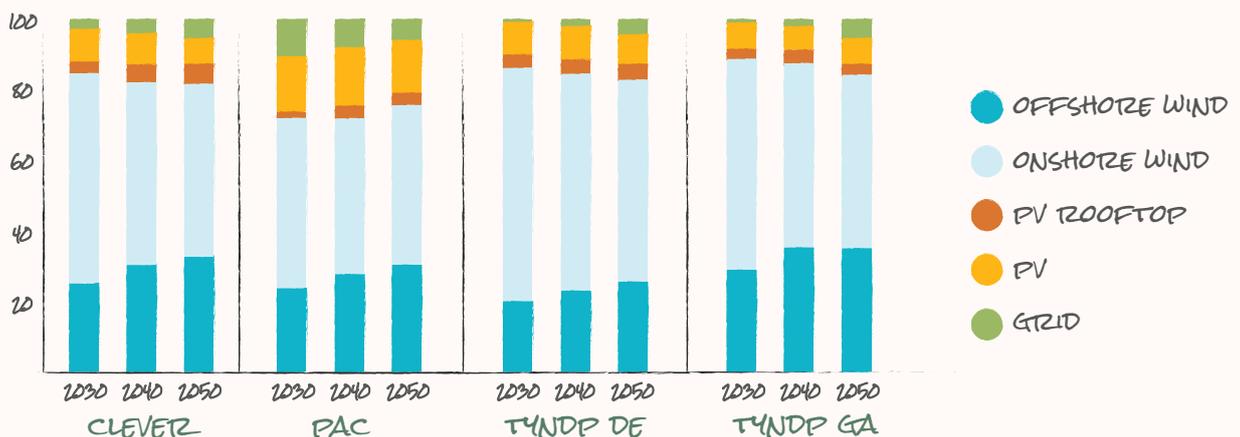
A comparative analysis of different decarbonisation scenarios allowed us to understand the **spatial and water needs of the energy transition infrastructure** to be implemented in Europe by 2030, 2040 and 2050

We analysed four decarbonisation scenarios, developed by different actors and varying in terms of targets and drivers behind the transition¹

- **Paris Agreement Compatible (PAC) Scenario** aims at achieving 100% renewables and net-zero greenhouse gas emissions by 2040.
- **CLEVER Scenario** focuses on reaching 100% renewables and climate neutrality by 2050 through sufficiency and efficiency measures.
- **Distributed Energy (DE)** and **Global Ambition (GA)**, both developed by European Network of Transmission System Operators for both Electricity and Gas (ENTSO-E and ENTSO-G) for the 2022 Ten-Year Network Development Plan (TYNDP).

RESULTS

How much percent of the **entire space needed for the energy transition** infrastructure will be occupied by different technologies by 2030, 2040 and 2050?



¹ The analysis was commissioned by Renewables Grid Initiative (RGI) and carried out by the Reiner Lemoine Institute (RLI).

HOW MUCH SPACE WILL BE NEEDED FOR THE ENERGY TRANSITION INFRASTRUCTURE ACROSS EUROPE?

Our interactive tool provides users with results of the comparative analysis in a dynamic way, covering the EU, national and regional contexts.



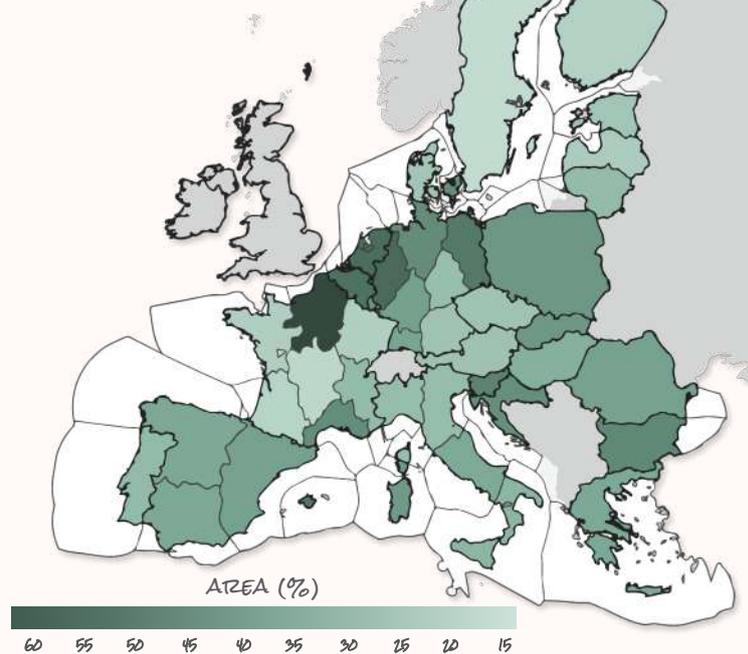
Amidst finite resources, this tool unveils the spatial and water demands of diverse decarbonisation pathways, facilitating strategic energy system planning.



It can support decision-makers in navigating the complex landscape of Europe's decarbonisation.

[EXPLORE HERE OUR INTERACTIVE TOOL](#)

NEEDED SPACE FOR 2050: PAC SCENARIO



HOW TO USE THE INTERACTIVE TOOL?

- 1 Choose between a single or comparative scenario visualisation.
- 2 Specify criteria like time frame, spatial resolution, units, and technologies. Tailor results for different years and view spatial or water requirements. Choose measurement units and display technologies on the map.
- 3 Explore the detailed bar chart data by clicking on countries or regions. Modify criteria using the unit selection box without affecting overall map results. Easily isolate specific criteria within the bar chart.

ADDRESSING THE CHALLENGE OF LIMITED RESOURCES

Considering the space constraints to implement the needed energy transition infrastructure to achieve climate neutrality in Europe by 2050, we need to promote:

-  **Transparency & data-sharing between actors** for example, with open-source modelling
-  **Nature-friendly solutions on the ground** to allow nature to thrive alongside grids
-  **Online tools for optimised planning and siting** to help visualise occupied or protected areas
-  **Multiuise of available space, on land & at sea** e.g. generation and farming through Agri-PV
-  **Meaningful stakeholder engagement processes** to promote transparency & provide legitimacy