

# Renewables in Europe: Land requirements can be reduced at low cost

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Transitioning our energy supply from coal, oil and gas to wind and solar power is feasible. However, renewables require more land than conventional forms of energy generation. A new study explores the options to reduce the land requirements of a fully renewable energy

supply in Europe and their possible impact on the cost of electricity.

The most affordable option for a fully renewable electricity supply in Europe is based on solar parks and onshore windfarms. However, this solution requires some 97,000 km<sup>2</sup> land, or roughly 2% of the total area of the European Union—an area equivalent to the size of Portugal.

## **Offshore wind and solar energy can reduce land requirements**

Wind and solar farms change landscapes and their development is frequently the subject of controversy. This is especially true in the case of onshore windfarms, currently the most important technology behind the European energy transition, as these occupy large areas and are visible from a long distance. Prioritizing the adoption of other electricity generation infrastructures in the future could reduce the space requirements of a fully renewable electricity system. According to the study, three options could be pursued individually or in combination to achieve this goal: Offshore wind power, large solar parks, and roof-top solar systems. Each of these technologies could limit land use to about 48,000 square kilometers—one percent of the area of Europe—or even less.

## **Additional costs are low**

According to the study, [offshore wind](#) power is particularly cost-effective and could reduce onshore land requirements by 50 percent at an additional cost of five percent compared to the cheapest option. Replacing onshore wind farms with large solar parks or roof-top solar systems would incur [additional costs](#) of up to 20 percent. "We have to decide, as a society, how much we value open land," explains the study's author Tim Tröndle. The well-planned expansion of [offshore wind](#)

[power](#) and [solar energy](#) offers opportunities to effectively reduce onshore land requirements at a low additional cost.

**More information:** Tim Tröndle et al, Supply-side options to reduce land requirements of fully renewable electricity in Europe, *PLOS ONE* (2020). [DOI: 10.1371/journal.pone.0236958](https://doi.org/10.1371/journal.pone.0236958)

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