Land & Ocean Areas to support a 100% Renewable,

PWh of energy . supply per year



0.89

6.39

2.56

26.71 92,586 km2



15.33 53.160 km2

46.00 53.755 km2



- Tidal Energy
- Wave Energy
- Geothermal
- Hydroelectricity

Utility CSP

Concentrated solar power thermal

Utility Solar Photovoltaic (PV)

between solar modules in rural energy landscapes installed at 60 MWac/km².

Commercial Rooftop Solar PV and Thermal

Installed density of 85 MWac/km² (panels placed end-to-end equals 182 MWac/km^2).

Residential Rooftop Solar PV and Thermal

Equal to 17 billion residential (60-cell) modules or solar on 1.5 billion single family homes.

Onshore Wind

Based on GE 3MW-137 with a 137 m diameter rotor and a 3.6 MWp nameplate at 40% capacity factor and a 4 rotor diameter on-center spacing. The green area illustrates that farming co-exists with onshore wind.



Based on Siemens SG 11.0-200 DD with a 200 m diameter rotor and a 11 MWp nameplate at 45% capacity factor and a 6.4 rotor diameter on-center spacing.

128.00 PWh Total Primary Energy Supply (TPES)

Global Economy

0

The same 800,000 km² area is also shown on the world map at matching scale.

Using 276,266 km² of land and 16,881 km² of ocean we can power the regenerative global economy of the 21st century using only wind, water, and solar.

Total energy landscapes and energy oceanscapes comprise 1,392,599 km² and 487,892 km² respectively. Remember: land use for solar and wind can often be shared with agriculture or other productive uses. Solar panels can also be sited on reservoirs or rooftops where they don't require any land.



Zero-Emissions, Regenerative

How much energy?

The total primary energy supply of the world within our fossil-fuel powered economy circa 2021 is 170 Petawatt-hours (PWh) per year. This is equivalent to 70 PWh of electricity due to the greater conversion efficiency of electricity. For the purposes of this map we have assumed 128 PWh of total primary energy supply, allowing for economic growth and broadly shared prosperity. 🕻

We have already paved over or built structures on 800,000 km² of the earth¹ (the area of the pink square).

For more information about this graphic along with methodology, references and documentation:

https://landartgenerator.org/blagi/archives/77565

Projection

This map uses the Web Mercator projection for its conformality. It avoids the deformation of a Mollweide or equal-area projection. The energy landscape squares are therefore to scale along the equator.



