HOW COPERNICUS SUPPORTS THE ENERGY TRANSITION

COP4EE uses Copernicus data to determine the potential of areas for the different renewable energy sources and supports regional administrations in defining energy transition targets

The challenge

Energy transition is governed at European and national scale, leading to laws and regulations such as the German EEG or the French LTECV. The implementation of the energy transition in response to these acts is taking place on a regional scale. Regional administrations define their own targets adapted to the local demands and potentials. Regional administrations are often not aware of the full potential and limitations of their spatial units regarding the production of renewable energies. Earth Observation (EO) is therefore used by COP4EE to determine the potential of areas for wind power plants, photovoltaic plants, district heating or the production of biomass (www.geo-way.de).

The space based solution

Open access Copernicus data, particularly the high-resolution Sentinel satellite data, allow for continuous monitoring of land use, crop type cultivation and the use of permanent grassland. By combining these data with digital elevation models, climate data and other existing spatial information (e.g. soil data, Natura 2000 sites, other conservation areas, locations of power plants etc.) in a spatial model, the most suitable renewable energy source for an area can be determined. Regionally adapted scenarios can be computed to address regionally defined energy transition targets. Since Copernicus is providing optical multispectral satellite data (Sentinel-2) as well as cloud-penetrating SAR (Synthetic Aperture Radar) data (Sentinel-1), both with short revisit cycles, the development of renewable energy sources over time can be monitored at high spatial resolution. This includes the estimation of the biomass development of energy crops as well as the monitoring of the implementation of the energy transition. For the first time, this space-based solution allows evidence based spatial decision support to be provided for the renewable energy sector, a key sector reflected in the Paris Agreement.

Benefits to Citizens

The expansion of renewable energies is driven by regulations and financial incentives such as subsidies. In some regions, this often led to a spatially unplanned expansion independent from the actual potential of an area for the production of renewable energies.

Negative land use-related side effects have been observed such as intensification of agricultural production, transformation of permanent grassland to arable land or land use competition with food crops.

The unique character of this space-based solution is that it considers ecological and economical aspects of renewable energy production. For example, factors such as distance from biogas plants (regarding transport costs and GHG emissions) and pollinator-friendly crop cycles are taken into account when assessing the potential for bioenergy crop production.

Copernicus helps finding most suitable areas for an efficient and ecological production of renewables.
Photo: RSS GmbH

Thematic Area: CLIMATE, WATER AND ENERGY

Region of Application: TRIER

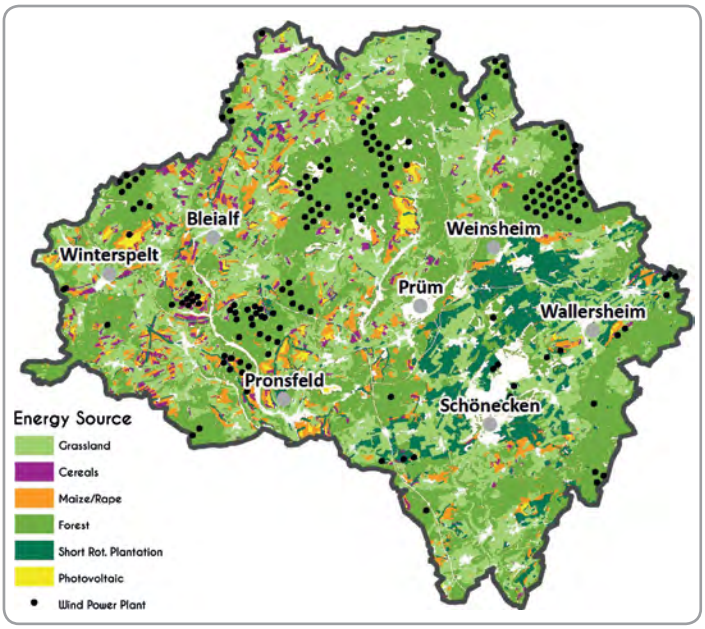
Sentinel mission used: S1, S2

Copernicus Service used: –

Usage Maturity Level: 3

→ THE EVER GROWING USE OF COPERNICUS ACROSS EUROPE'S REGIONS: A selection of 99 user stories by local and regional authorities

The spatial model is an innovative planning tool for regional decision makers and public authorities, such as governing mayors who are directly involved in the development. Hence, the energy transition can be planned in direct response to the local energy demand, on sites with most efficient energy output and in an ecologically sustainable manner. Spatial planning of the energy transition is thus possible, whilst preserving the regional diversity of the landscape with direct benefits for citizens.



Designation of the most suitable renewable energy source per area for the municipality of Prüm.
Credit: Contains modified Copernicus Sentinel data [2016]

> "This Copernicus-based model helps decision makers and experts to enforce the energy transition. The possibility of creating scenarios is used to find the optimal solution for the individual region."

Achim Hill,
Energy Agency of the Region Trier

Outlook to the future

The energy transition is a major challenge for the European Union. Its territorial implementation is having more and more impact on regional development. The COP4EE approach has so far been established in the region of Trier and Bitburg-Prüm in Germany, but with the fully operational Sentinels and with modern IT infrastructure for big data processing, it is possible to scale up the approach to the EU territory. The Copernicus programme, with its long-term provision of free EO data and the upcoming Copernicus Data and Information Access Services (DIAS), is therefore fundamental.

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ABOUT COPERNICUS4REGIONS

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The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains.

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