

How TSO's in Europe and the Mediterranean share their data using ArcGIS

Colin Broderick

Head of Web & Collaboration and
Data Visualization Expert
ENTSO-E

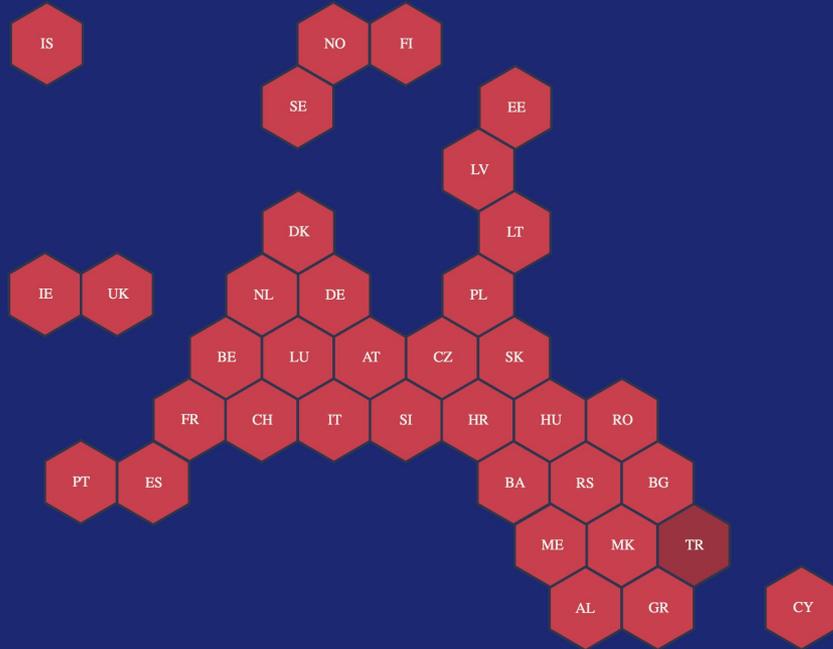




VORARLBERGER ÜBERTRAGUNGSNETZ GmbH



ENTSO-E represents



43 TSOs

operating electricity
systems & facilitating
power markets in

36 countries (EU+8)

Power data (EU+8)

ENTSO-E IN FIGURES

43 TSOs

operating electricity systems & facilitating power markets in

36 countries (EU + 8)



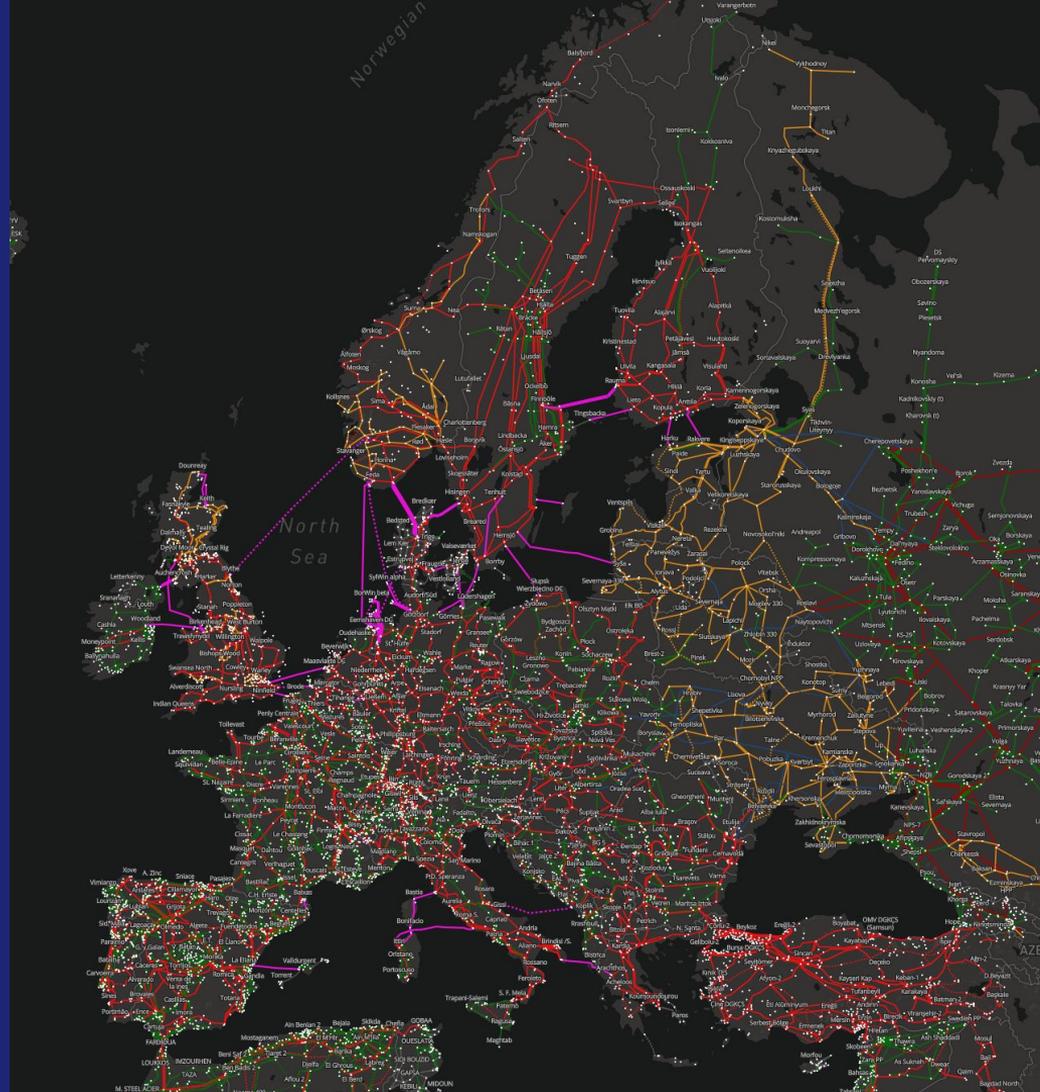
±435 TWh of electricity exchanged across borders



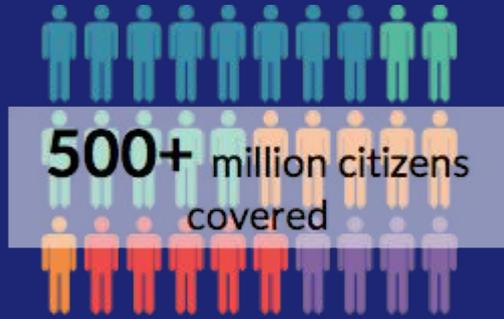
±480,000 km of interconnections
This is more than the distance between the Earth and the Moon



Highest load 581 GW 18/1/2017
Lowest load 265 GW 11/6/2017



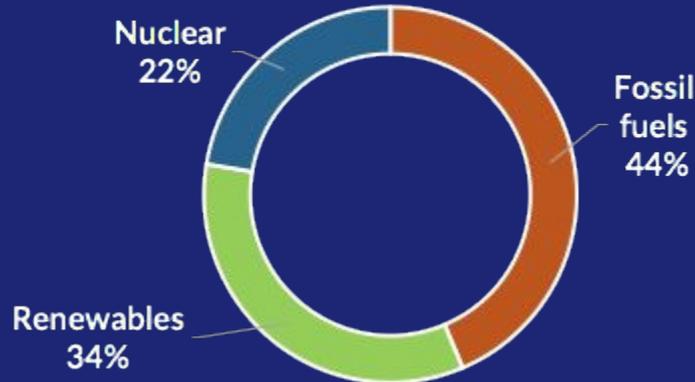
Power data (EU+8) - 2017 Numbers



3 673 TWh generated

3 631 TWh consumed

1,14 TW of installed generation capacity



A pan european transmission map

Produced yearly since 1951. Updated by ENTSO-E since 2009.

A comprehensive illustration of the interconnected networks covering all of Europe as far as the Urals and the Mediterranean basin.

It displays the transmission grid - high voltage lines, substations and power generators.

Some background on data collection

Originally the map was a CAD vector file displaying the transmission grid.

In 2009 this map was converted to a GIS format (File geodatabase & shapefiles) with ArcGIS Desktop.

In 2017 we engaged ESRI Belux to develop a custom web app for the map data collection.

The evolution

1951

Through to

2019



U.C.P.T.E.

Union pour le coordination de la production et du transport de l'électricité
Unione für die Koordination der Erzeugung und des Transportes elektrischer Energie
Unione per il coordinamento della produzione e del trasporto di energia elettrica
Unie voor de coördinatie van de productie en het transport van elektriciteit

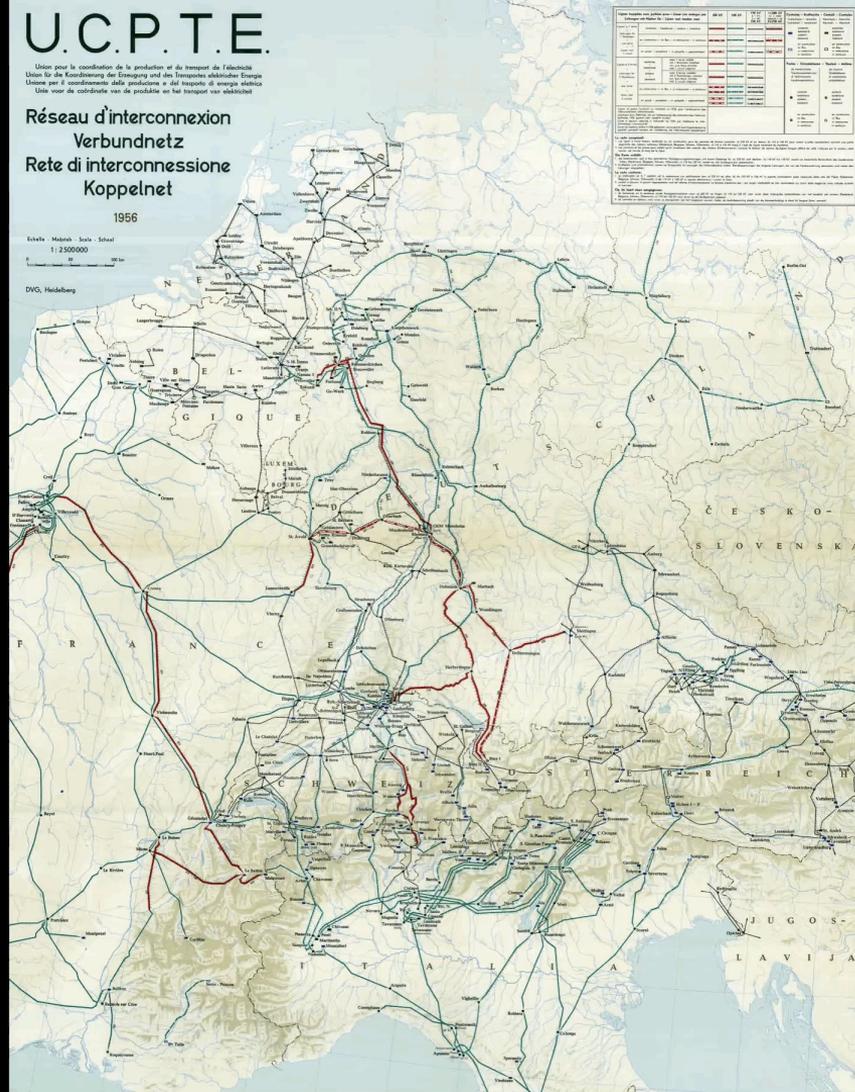
Réseau d'interconnexion
Verbundnetz
Rete di interconnessione
Koppelnet

1956

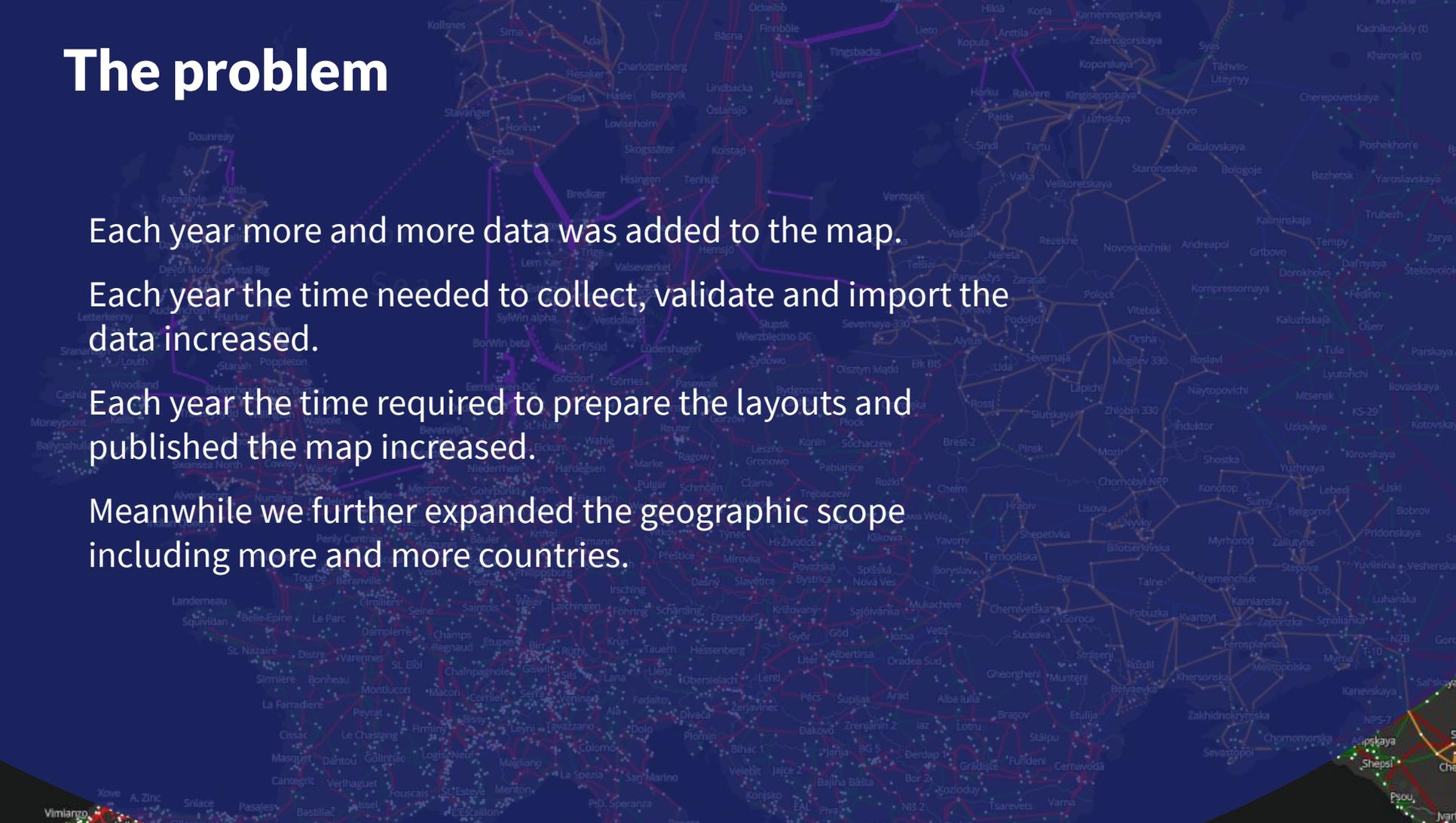
Echelle: Méditerranée - Sud-Est de l'Europe
1:2500000

0 50 100 km

DVG, Heidelberg



The problem



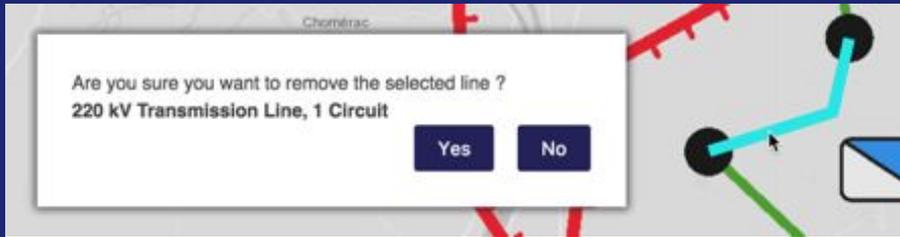
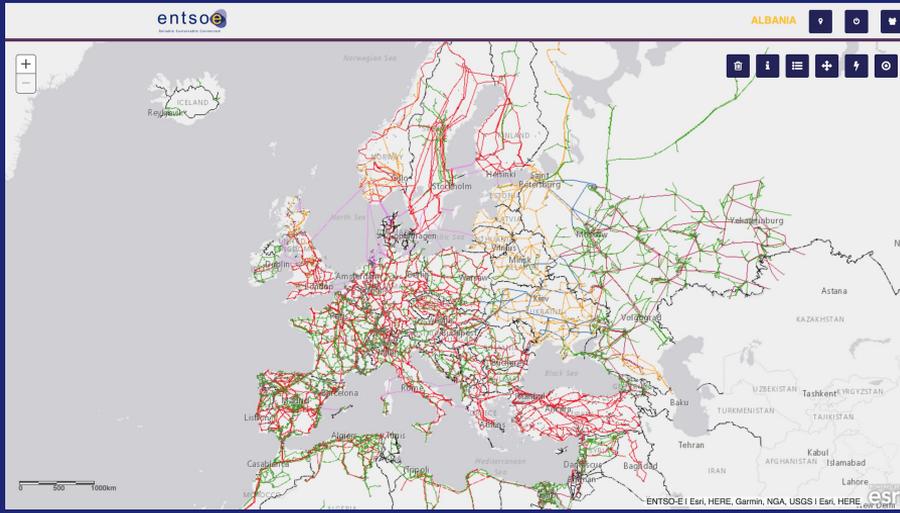
Each year more and more data was added to the map.

Each year the time needed to collect, validate and import the data increased.

Each year the time required to prepare the layouts and published the map increased.

Meanwhile we further expanded the geographic scope including more and more countries.

The solution to the collaboration problem



Developed in collaboration with ESRI Belux



Self service platform for data correspondents to map their country.

ArcGIS Server + MSSQL Database

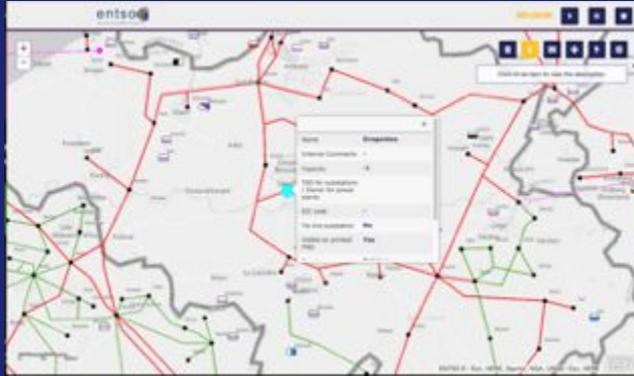
Custom Javascript frontend
(**ArcGIS JS 3.x** + JQuery)

User Authentication, authorization and audit log

Our publication process - online map

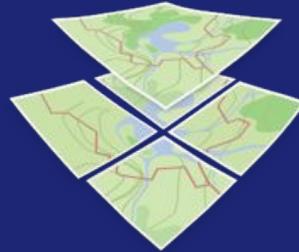


ArcGIS Server
Custom web
editing tool



Extract to

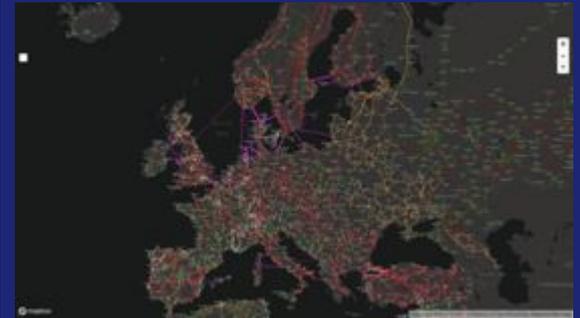
GeoJson



Compile to Vector Tiles

Style, upload to CDN
and overlay on OSM
base layers

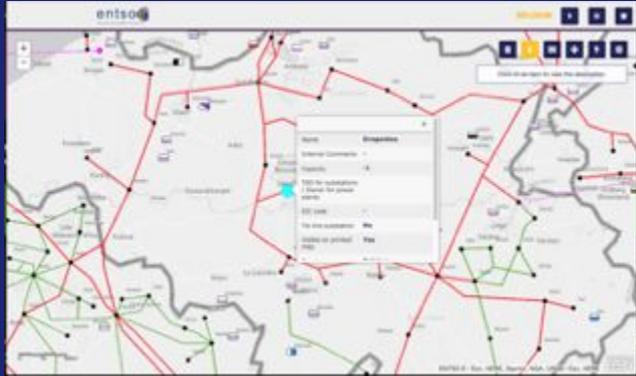
Publish on the ENTSO-E
Website



Our publication process - print maps



ArcGIS Server
Custom web
editing tool



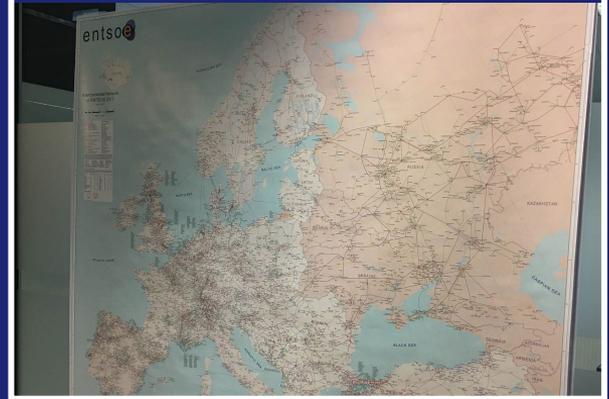
Sync with ArcGIS
Desktop

Layouting of the maps

Place labels and
annotation



Printing by publisher



The benefits

Overall publication time of the map has reduced significantly.

Possible to perform ad-hoc updates between official releases.

Barrier to further collaboration lowered, easy to onboard data correspondents and new data providers.

Where can you view and download it?

entsoe.eu/data/map/



[Network Codes](#) [Data](#) [R&I](#) [Outlooks](#) [Regions](#) [Digital](#) [Publications](#) [About](#)

[Grid Map](#) [Transparency Platform](#) [Power Statistics](#) [EIC Codes](#)

ENTSO-E Transmission System Map

This map is a comprehensive illustration of the transmission system network operated by members of the European Network of Transmission System Operators. This means that network elements are not located at their real geographic location.

In general the map shows all transmission lines designed for 220kV voltage and higher and generation stations with net generation capacity of more than 100MW.

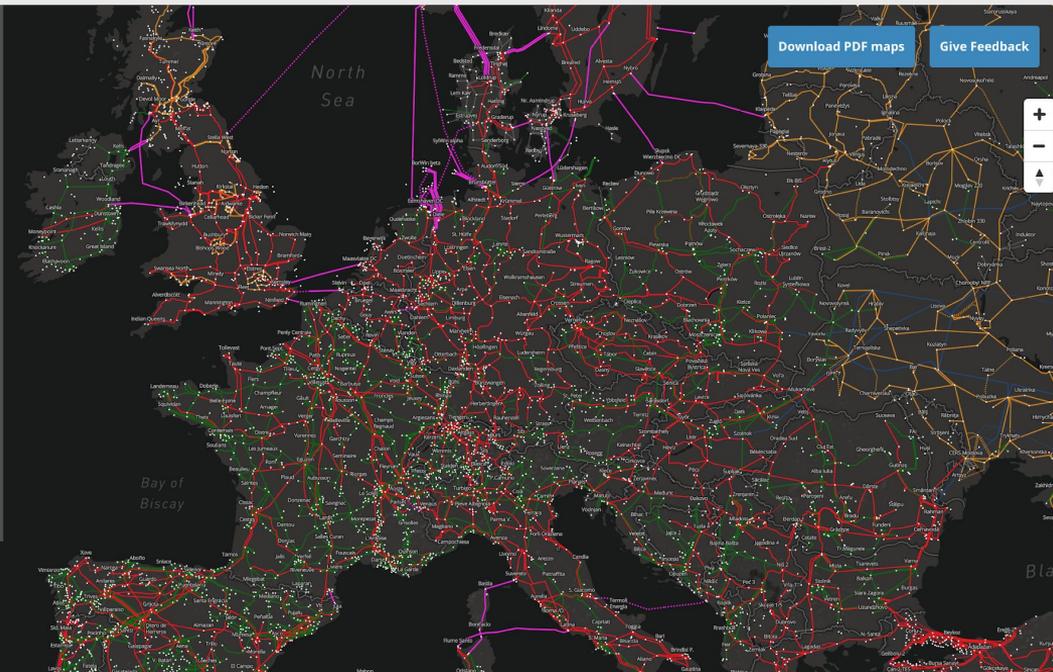
Data correct up to 01/01/2019

[Full Details](#)

[Show Cross Border Only](#)

[Click any feature for extra info](#)

Legend



entsoe

Colin Broderick

/ colin.broderick@entsoe.eu

/ [@rusty1052](#)

entsoe

The logo for entsoe features the word "entsoe" in a white, lowercase, sans-serif font. The final letter, "e", is partially overlaid by a graphic consisting of three overlapping, semi-transparent circles in shades of light blue and grey. The background is a solid dark blue with a thin, curved yellow line at the bottom.