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Deep Decarbonization

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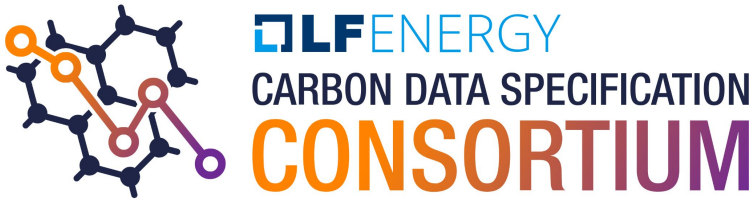
Deep Decarbonization

A unified data standard for power grids

https://powersystemsdata.carbondataspec.org
Pierre Segonne / @pierre_segonne
Stephen Suffian / @ssuffian

The CDSC WG2



- Pierre Segonne
  - Tech lead at ELECTRICITY MAPS
  - Former maintainer of the WG (2022-2023)

- Stephen Suffian
  - Principal software engineer at WattCarbon
  - Maintainer of the WG (2023-)

Climate change, caused by fossil fuels

and our world is powered by them

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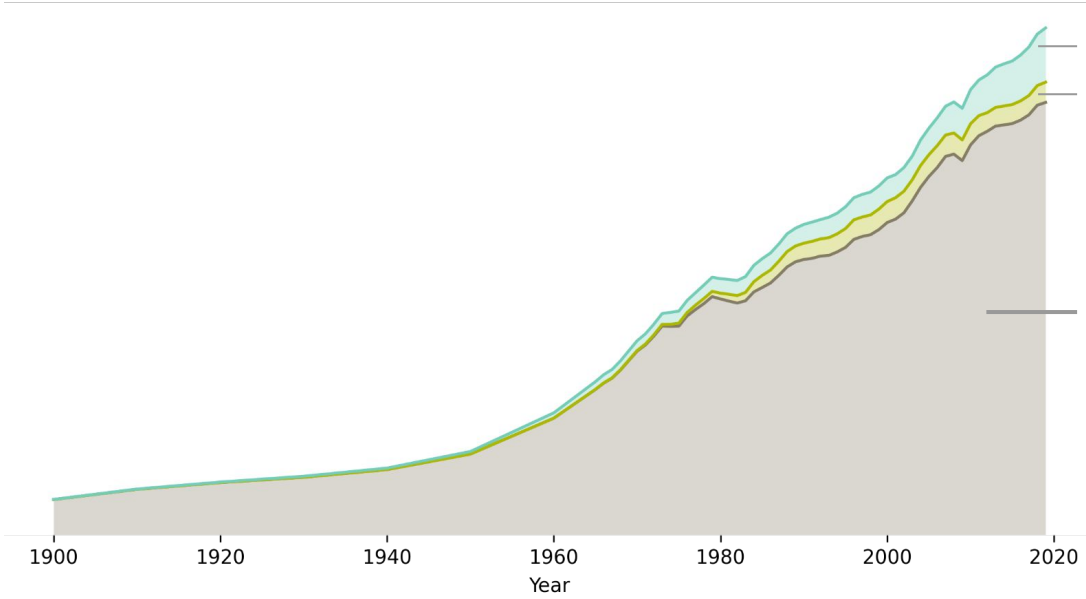
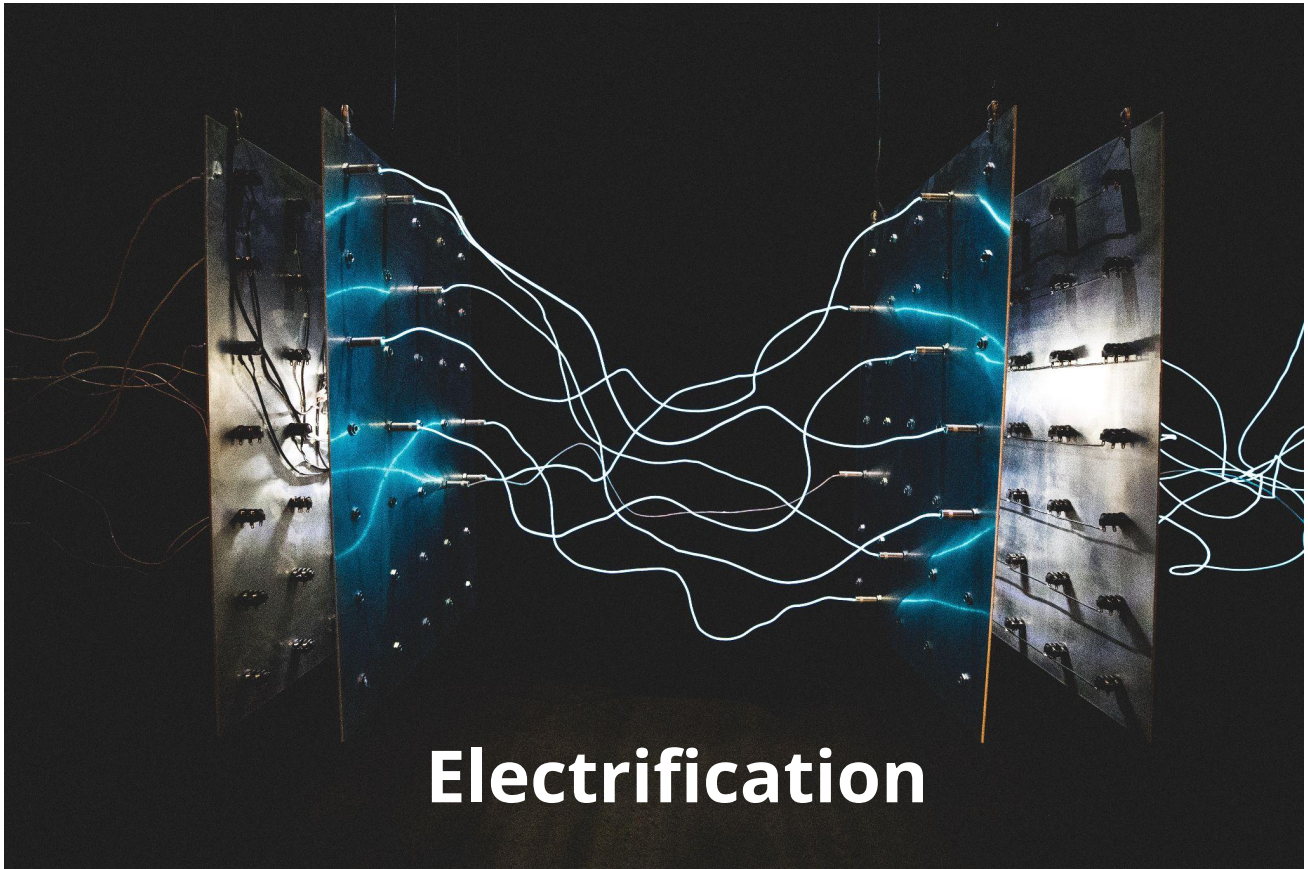


Hydro (and wind and solar)

Nuclear

CO2-emitting fuels
representing >80% of our energy
must get to 0 by 2050 for 2° target

A key part of the solution



On the need for power data

Electricity generation can have vastly different impacts

Source for coal (left): https://www.eia.gov/tools/faqs/faq.php?id=74&t=11
Source for wind (right): https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_annex-iii.pdf#page=7

Electricity Maps

organising power data worldwide

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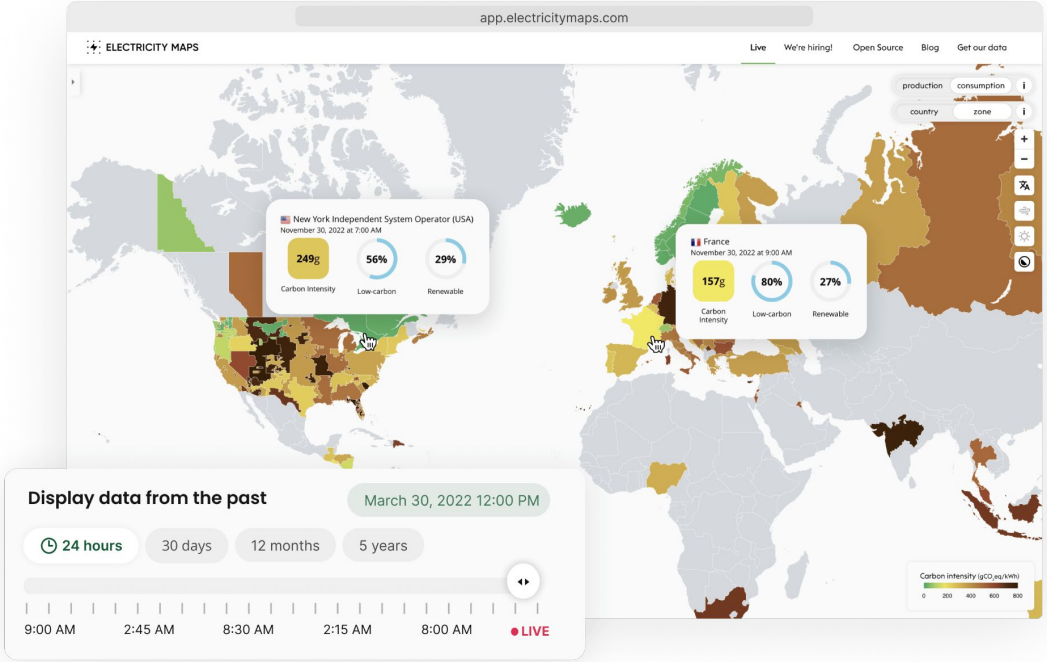
Electricity Maps provides unified and real-time access to the **world's** electricity data

- **Global coverage**
  100+ data sources to cover more than 180+ zones across the world
- **Open-source core**
  1000+ contributors have helped us identify data sources and build parsers for them

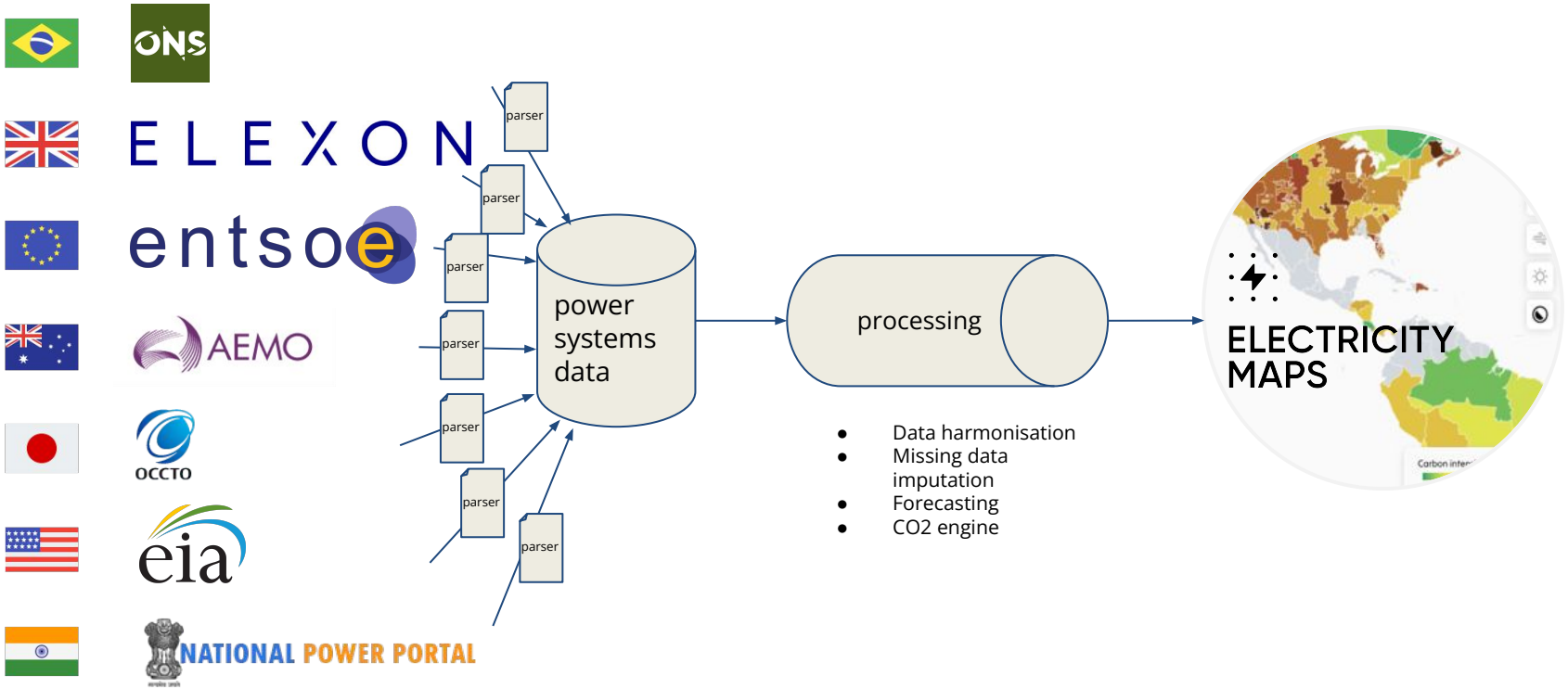


https://app.electricitymaps.com/

Electricity Maps

organising power data worldwide

The data pipeline, roughly speaking



Electricity Maps

organising power data worldwide

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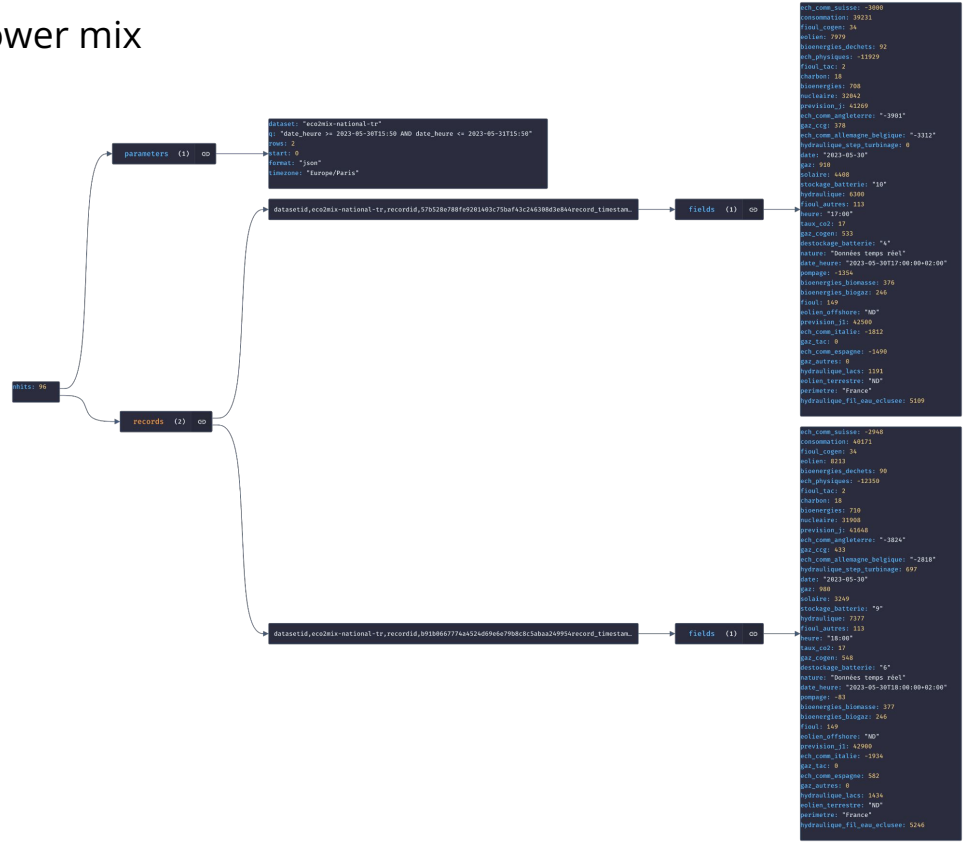
From easy to fetch parser data – French power mix

```
curl —location
“https://opendata.reseaux-energies.fr/api/records/1.0/search/?dataset
=eco2mix-national-tr&q=date_heure%20%3E%3D%202023-05-30T15%3
A50%20AND%20date_heure%20%3C%3D%202023-05-31T15%3A50&ti
mezone=Europe%2FParis&rows=2&apikey=XXXX”
```

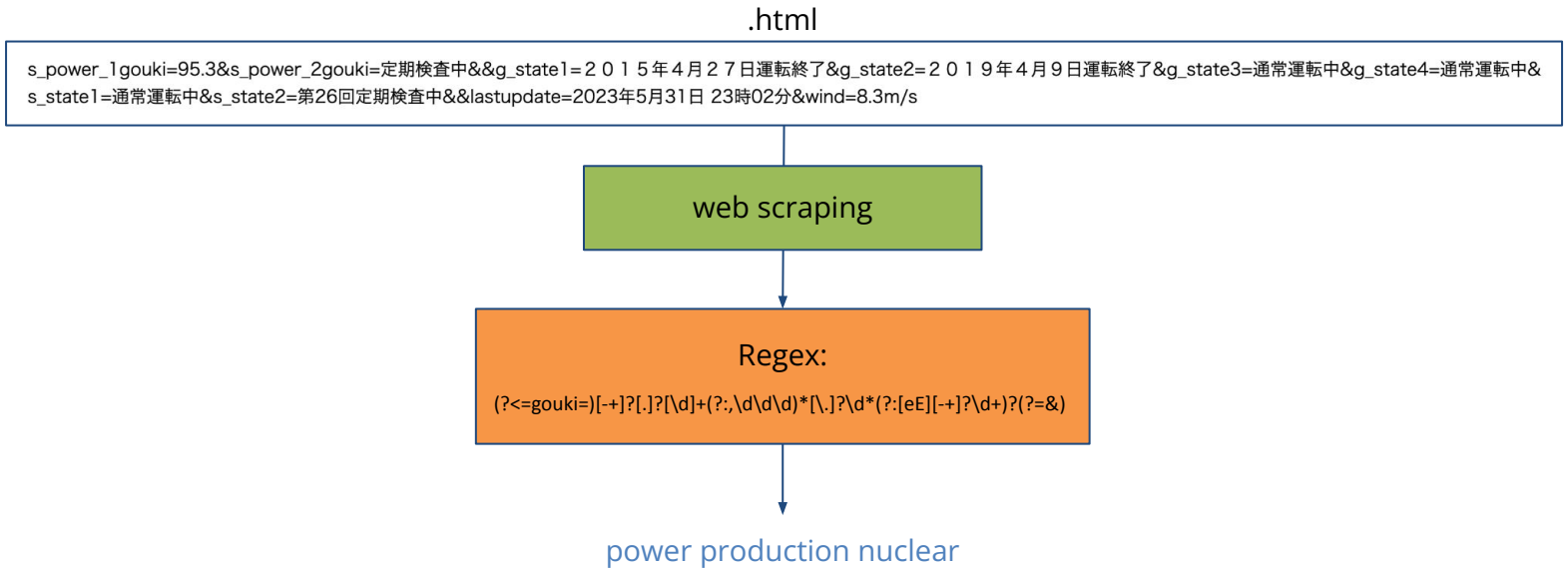


A single API call to fetch full production mix

Electricity Maps

organising power data worldwide

To harder to fetch power data – Japanese nuclear power production



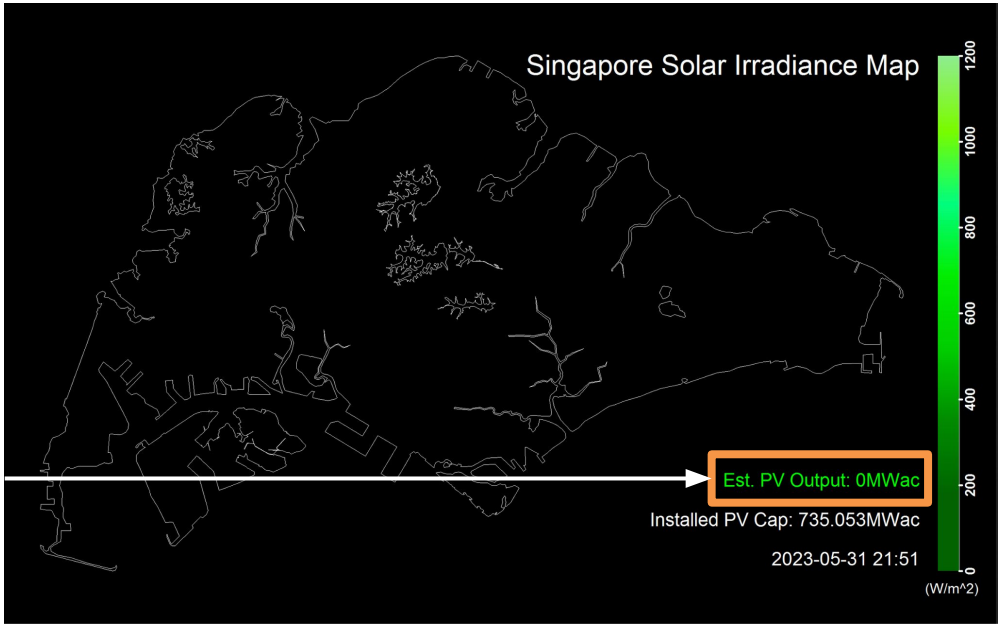
Source: https://www.kyuden.co.jp/php/nuclear/sendai/rename.php?A=s_power.fdat&B=ncp_state.fdat&_=1520532401043

Electricity Maps

organising power data worldwide

To *!$*€%* – Singapore solar power production

Running optical character recognition (OCR)



Source: https://www.ema.gov.sg/cmsmedia/irradiance/plot.png

WattCarbon

decentralised access to power data

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% Renewable numbers are rough estimates:
MISO taken from their API on 2023-05-31
Minnesota power taken from self reporting for 2021
HPU taken from their capacity as purely biomass

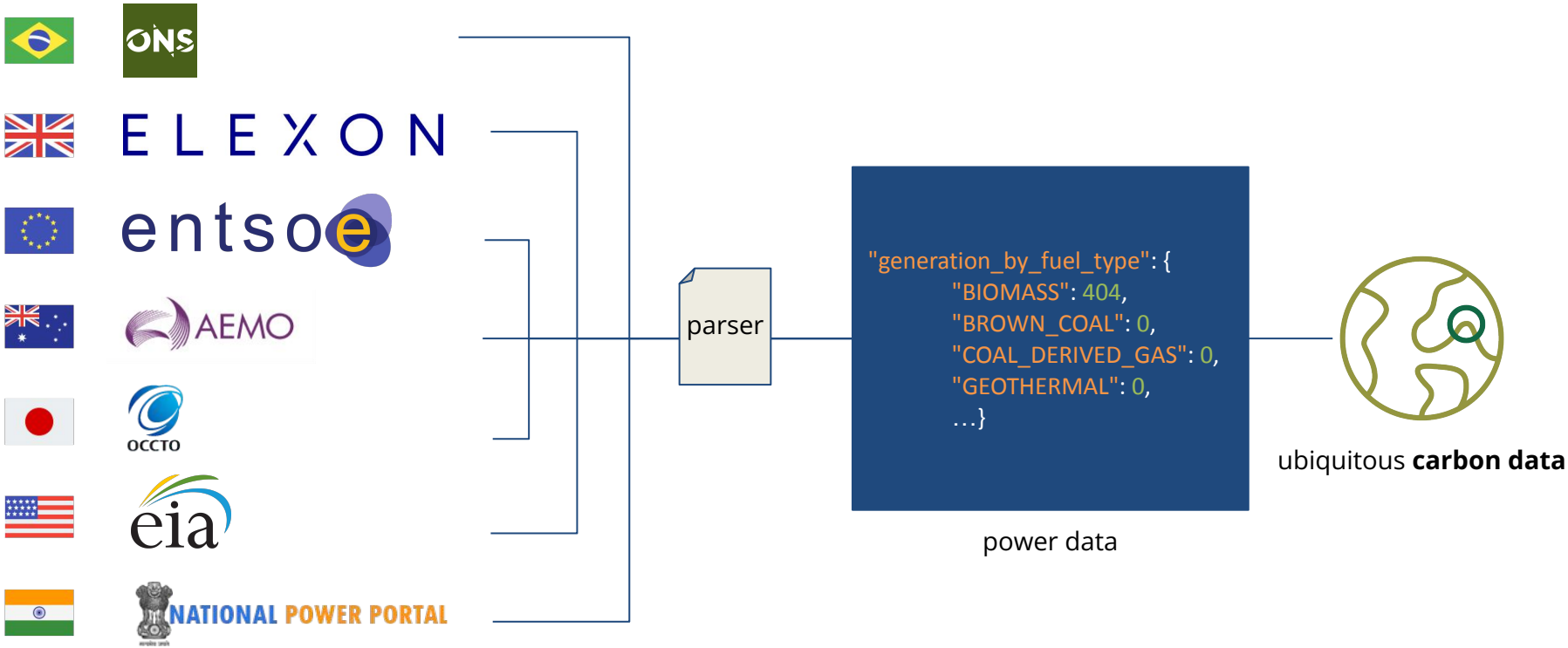
Small utilities may not even have data available

WattCarbon uses this granular data to form a demand-side decarbonization marketplace

Learn more at **17:05 today in the Auditorium**: Incorporating Demand Response Into Clean Energy Procurement - McGee Young, WattCarbon

The vision

Power data sources sharing the same interface



An API demonstrator

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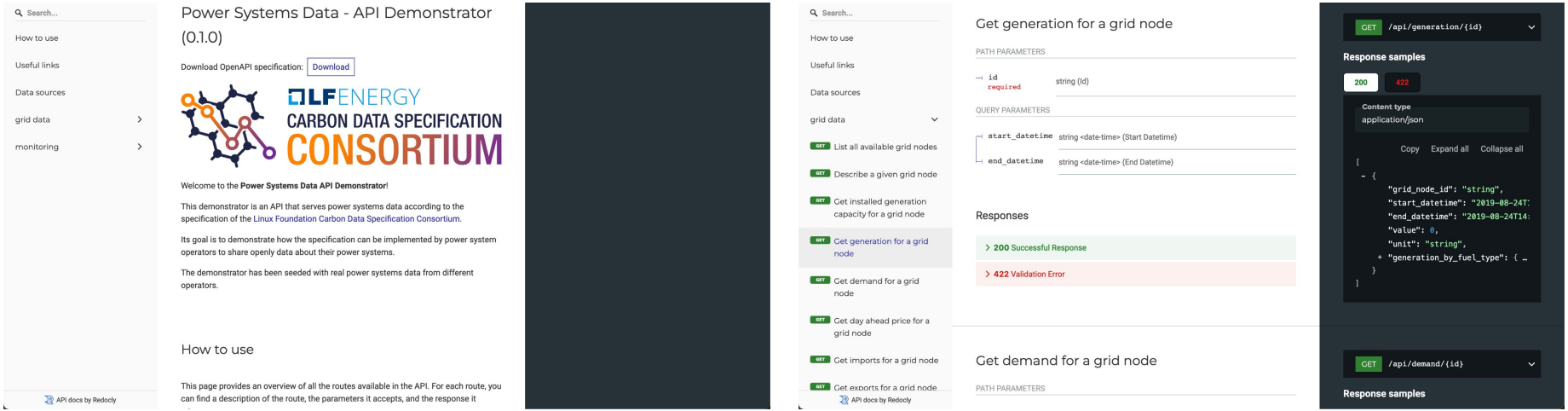
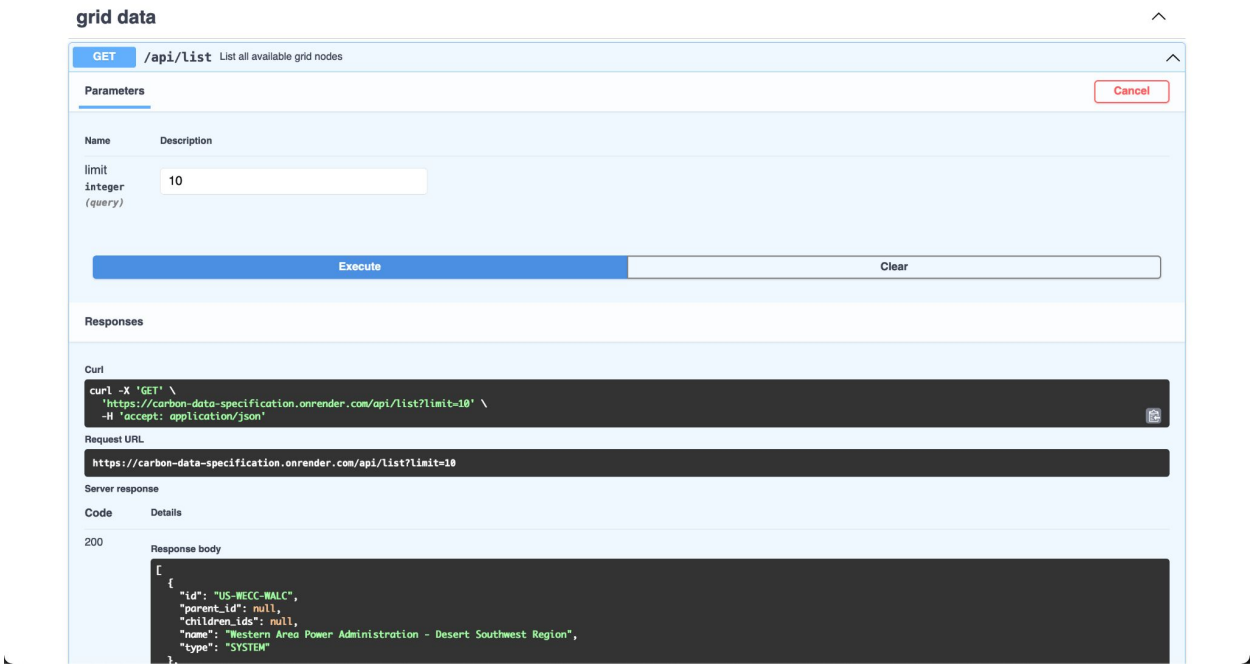


https://carbon-data-specification.onrender.com/redoc

An API demonstrator



Live in an interactive environment with real data
https://carbon-data-specification.onrender.com/docs

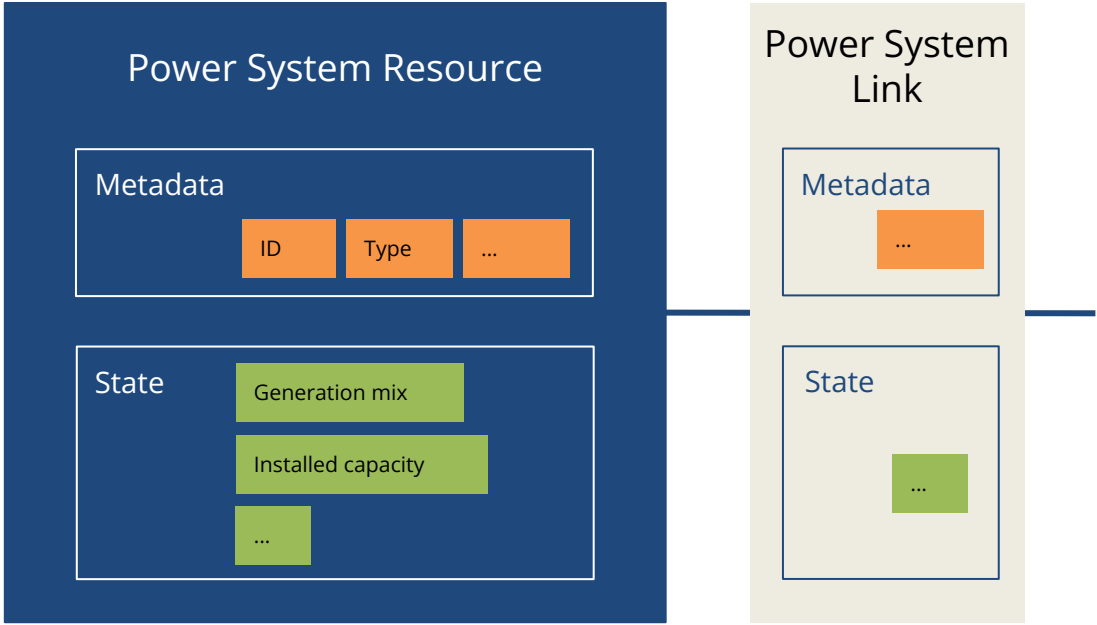
The underlying specification

defining an abstract power grid

An electricity grid can be seen as a graph of **Power System Resources** (nodes) connected by **Power System Links** (edges)

- **Specification of the topology model**
  First output of the WG
- **Examples with real life hierarchy**
  Europe + U.S.

https://powersystemsdata.carbondataspec.org/specs/cdsc-wg2-01

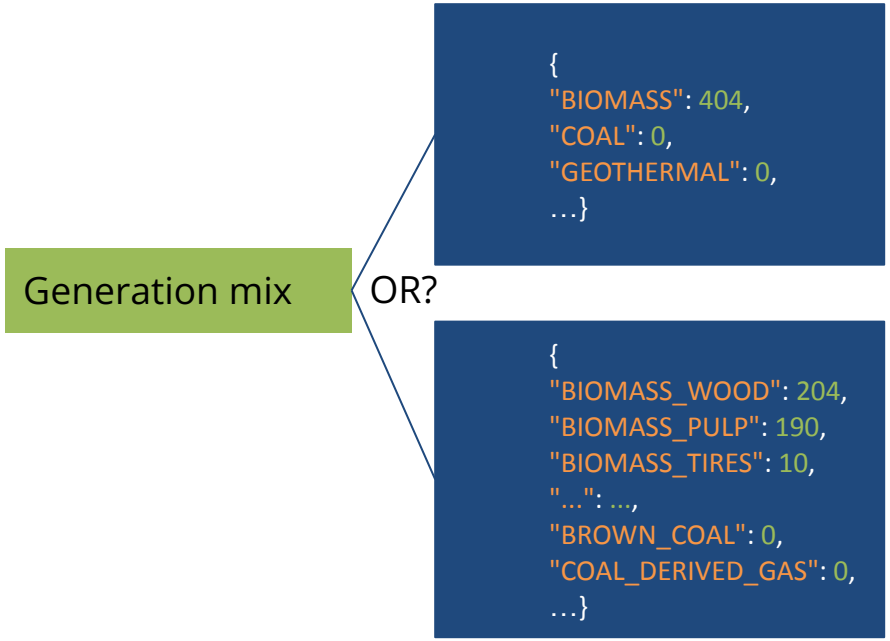


The underlying specification

defining all relevant data types

The standard must specify the content of the expected state data for **Power System Resources**

- **Definition per type of resource**
  2nd output of the WG
- **Definition of all power modes**
- **Definition of fuel types**
  (combining from TSO libraries)



Upcoming challenges

and how **you can help**

- Creating momentum amongst power system operators
  - Verifying that the proposed standard can align with different information models
    - CIM vs EBIX Harmonised Role Model vs NERC
  - Upcoming carbon disclosure mandates is a great opportunity
    - IIJA bill in the US
    - Article 20a of REDIII in the EU

- We are looking for
  - Power System operators (thanks ETNSO-E!)
  - Other Power system experts
  - Developers
  - Enthusiasts

The WG2

- Members
  - Power data providers
  - Large corporate buyers of electricity
  - Clean energy solutions providers
  - Interested individuals

- Open-source
  - learn more https://powersystemsdata.carbondataspec.org/
  - Come to our next meeting on June 13th at 5 PM CET
  - contributions welcome https://github.com/carbon-data-specification/Power-Systems-Data or https://github.com/carbon-data-specification/Power-Systems-Data-API-Demonstrator

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Thank you for listening

https://powersystemsdata.carbondataspec.org
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