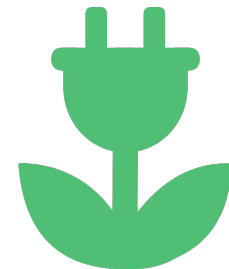




Carbon Scaling - Carbon Zero Zone

ITClass 2022/2023 Innovation assignment
Aristotelis Rapai, Chih-Chieh Lin, Haochen Wang, Zixuan Chen
August 2023

CARBONZEROZONE



do your thing



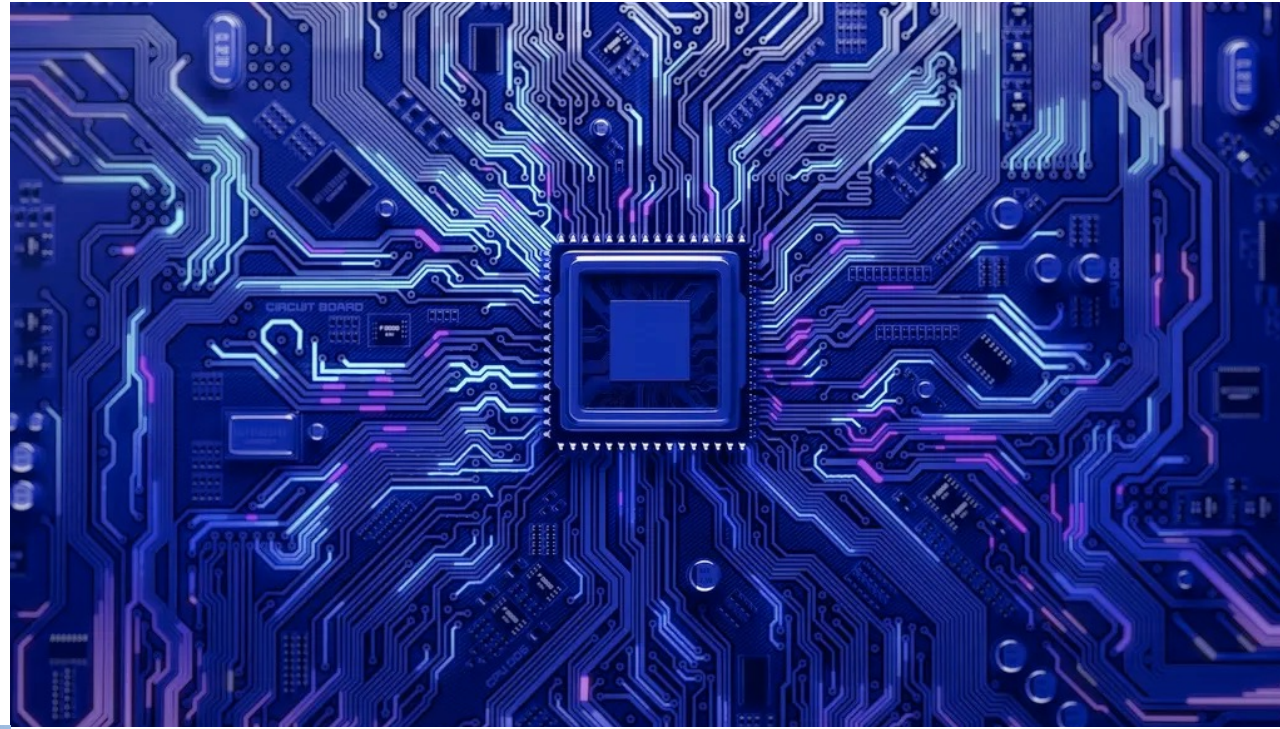
481 g
CO₂e/kWh

87 %
Gas + Coal

10 %
Green Energy

1

Dashboard



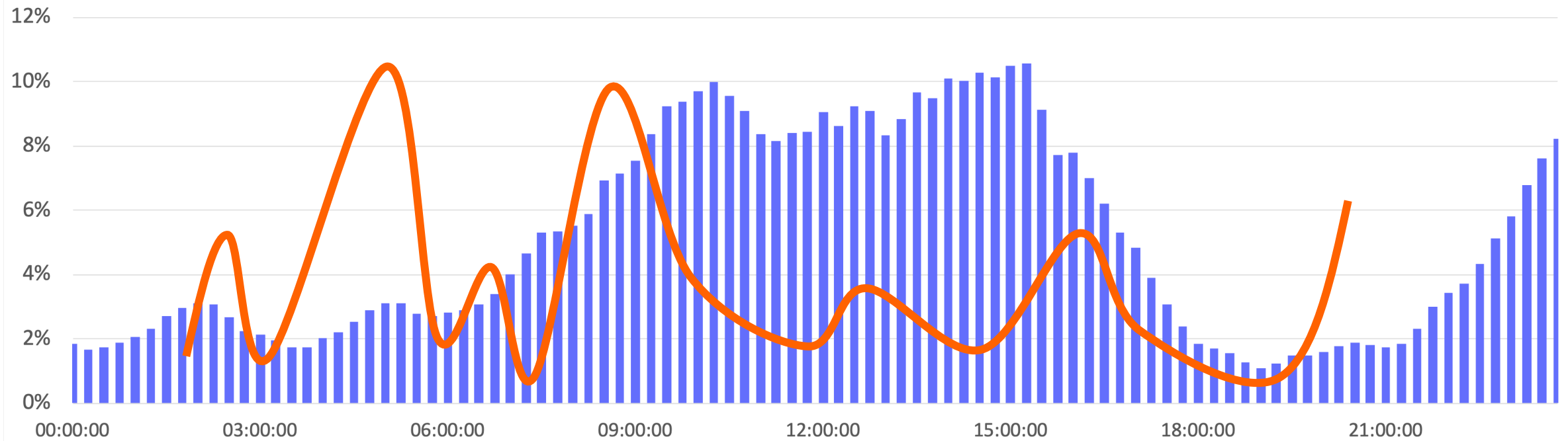
2

Unreliable Renewable Energy



Unreliable Renewable Energy

Percentage of electricity from renewable energy in NL



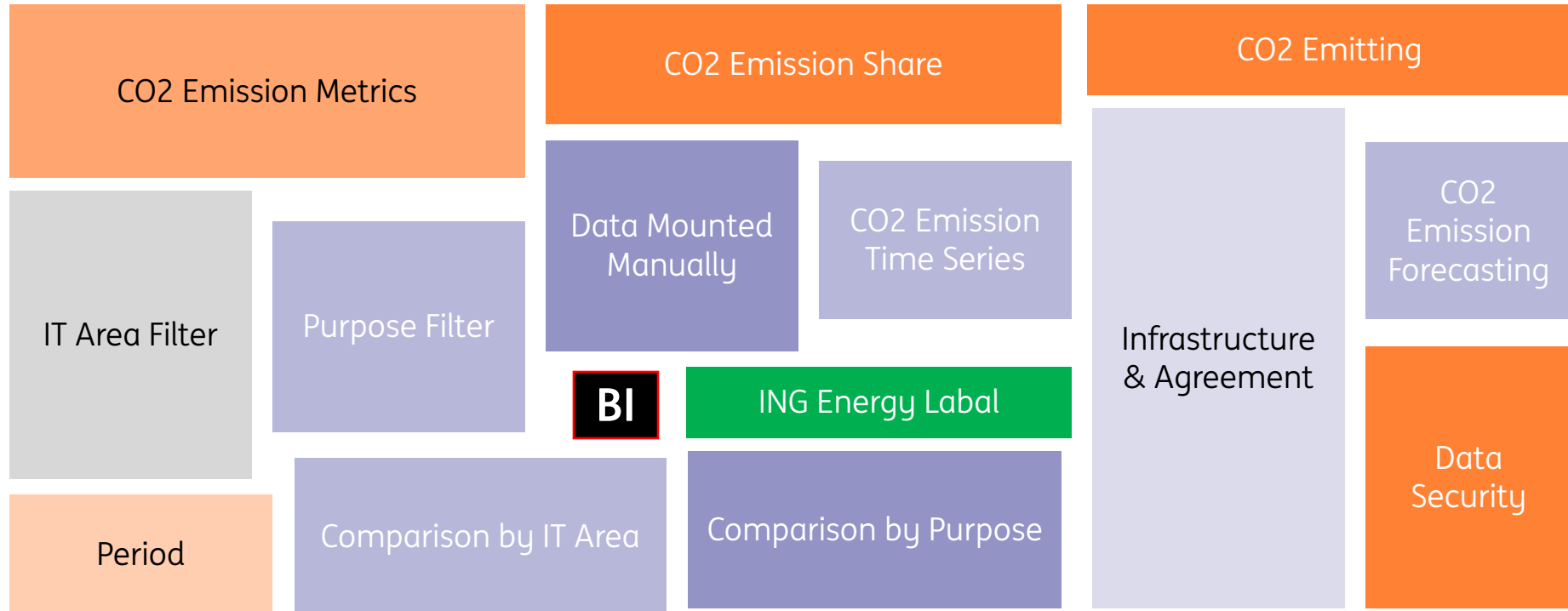
* Data from: ENTSO-E Transparency Platform

Dashboard



Provisioning only

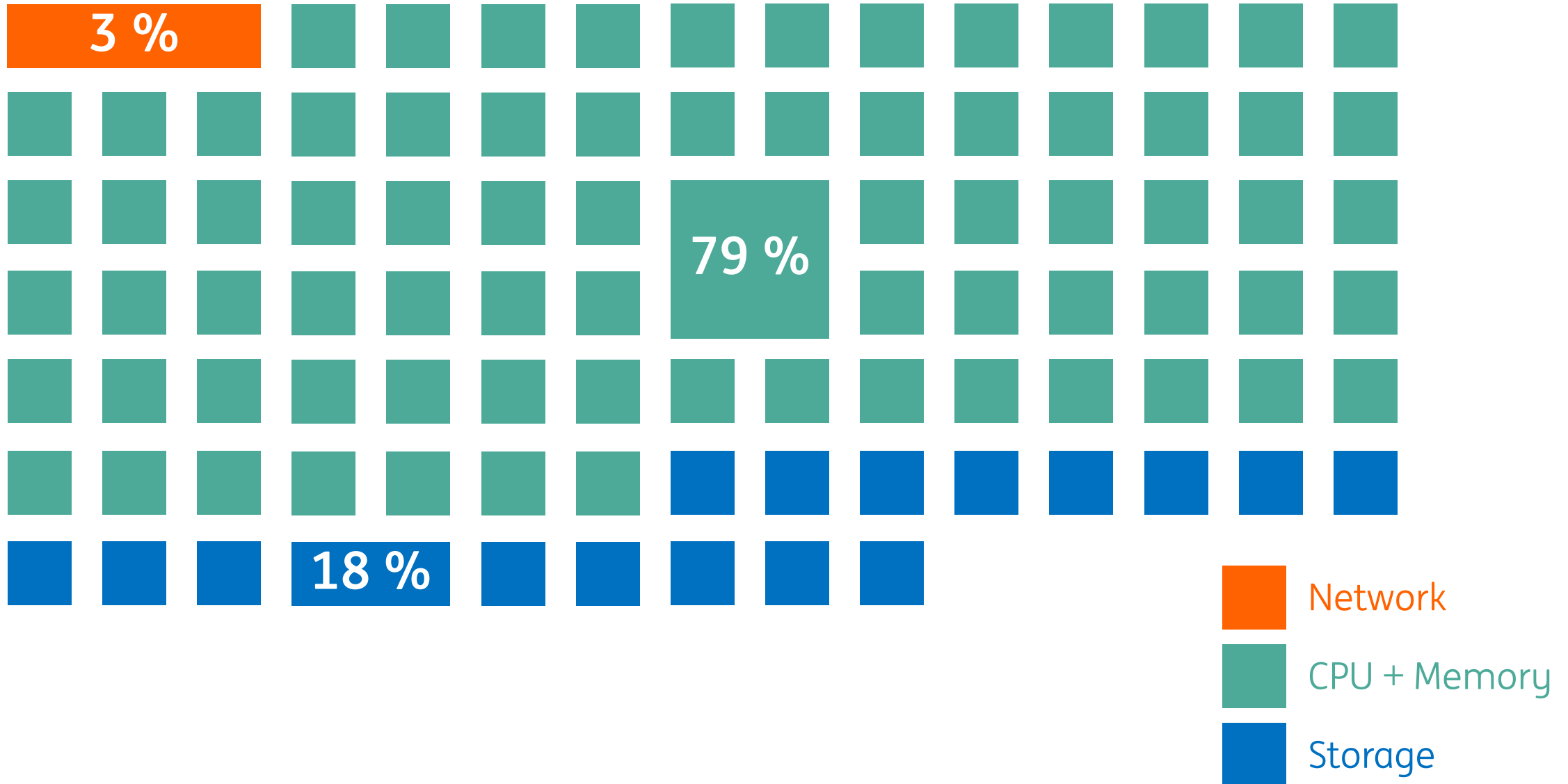
High granularity



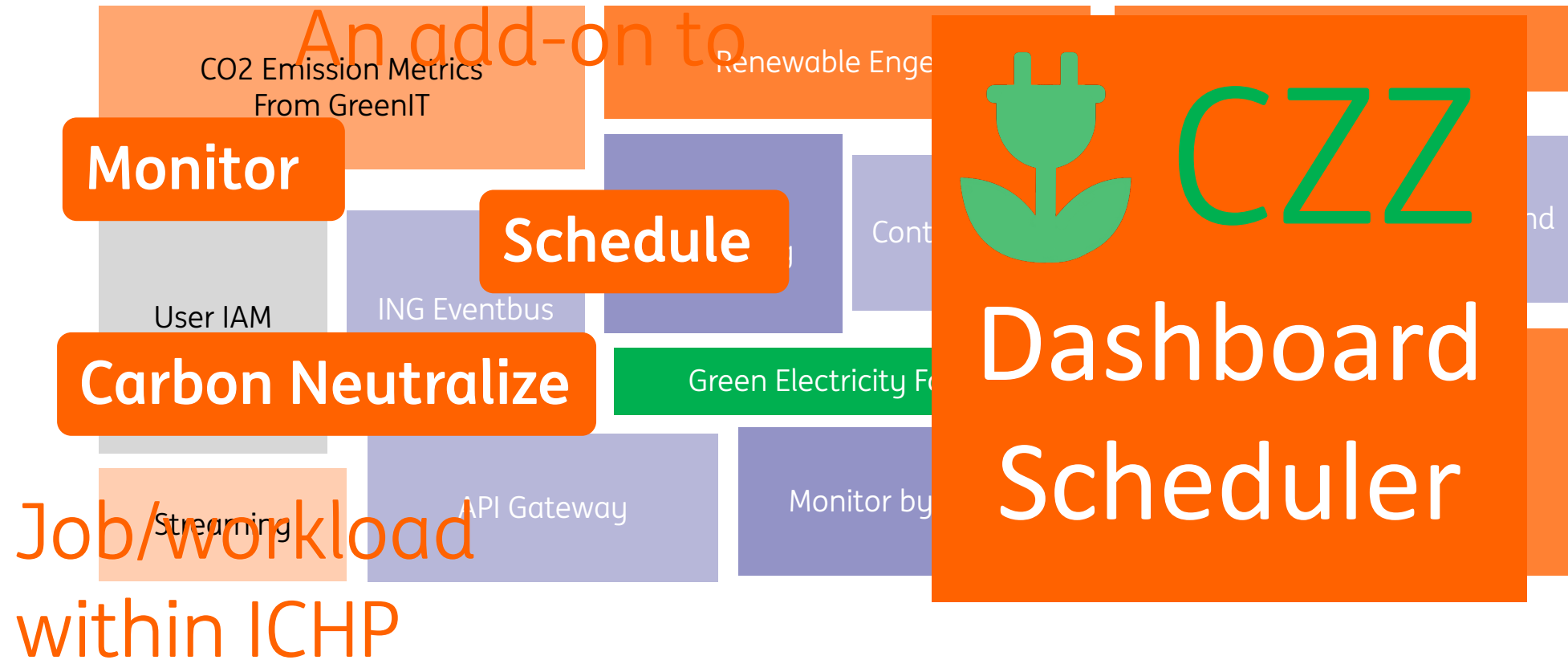
Static data management

Without electricity sources

Power distribution in a data center



CarbonZeroZone Duty



entsoe

Static/Streaming
Monitoring

Entsoe

Submit job



Renewable energy forecast
ING Eventbus

Dashb

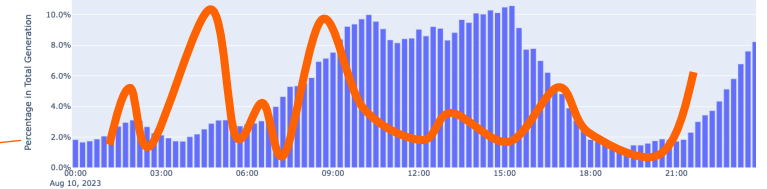
CPU, Memory, Network, Storage

Scheduler

Scheduler

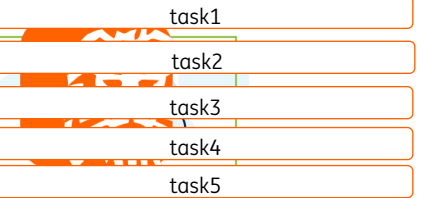
Find optimal tir

Electricity from Renewable Source in NL



Stream monitoring

New job scheduled
Static monitoring

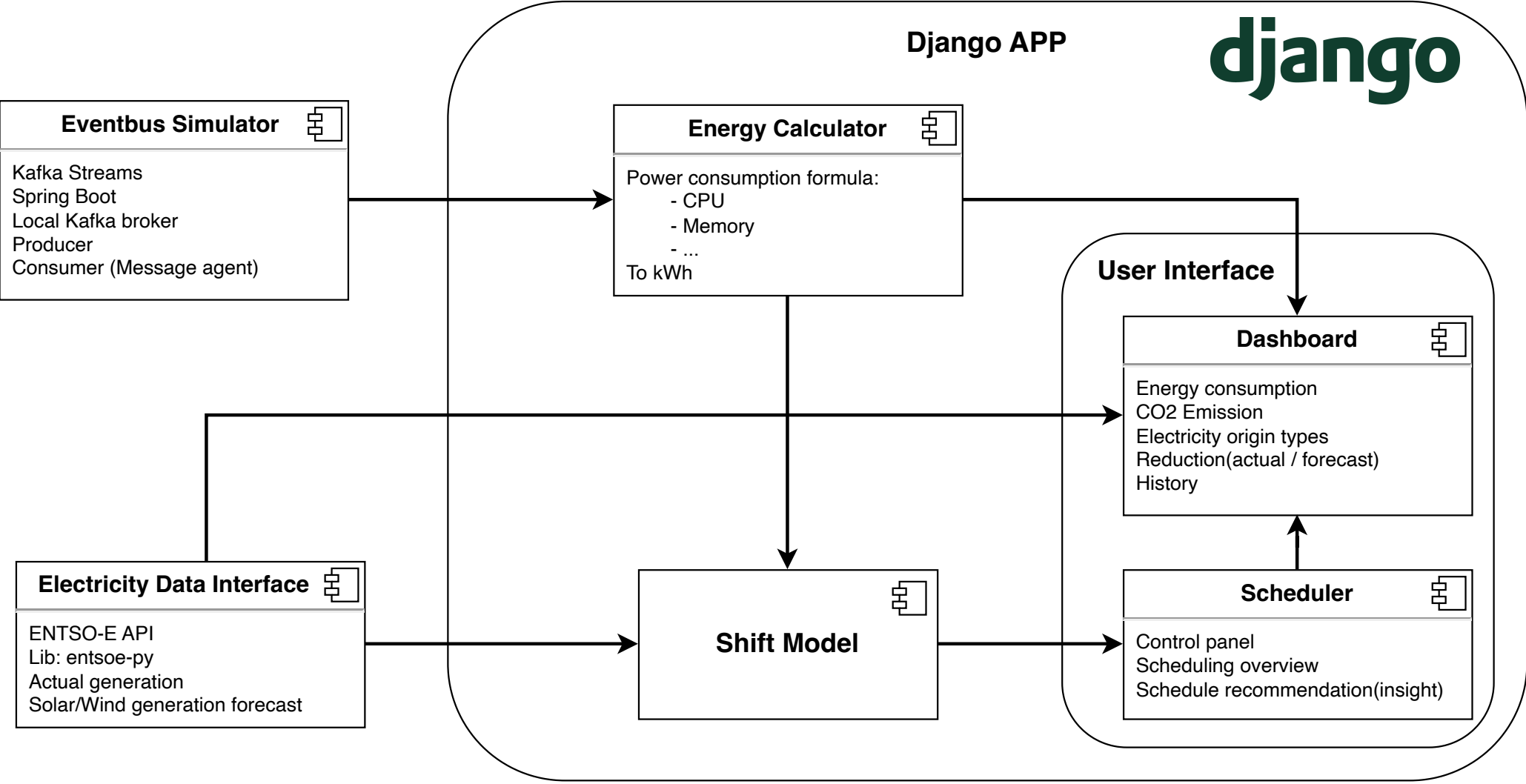


User

Optimization

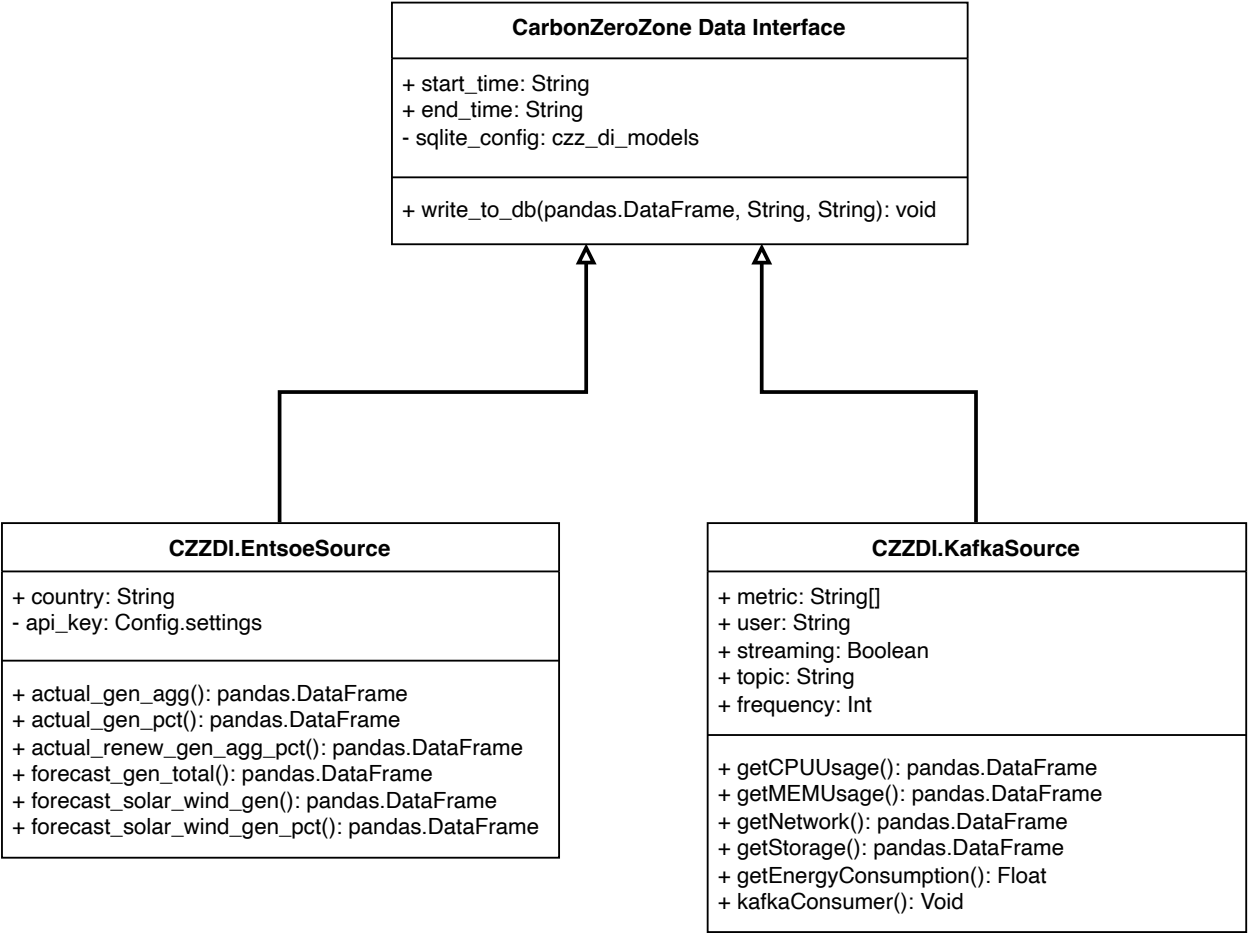


CZZ Service Architecture

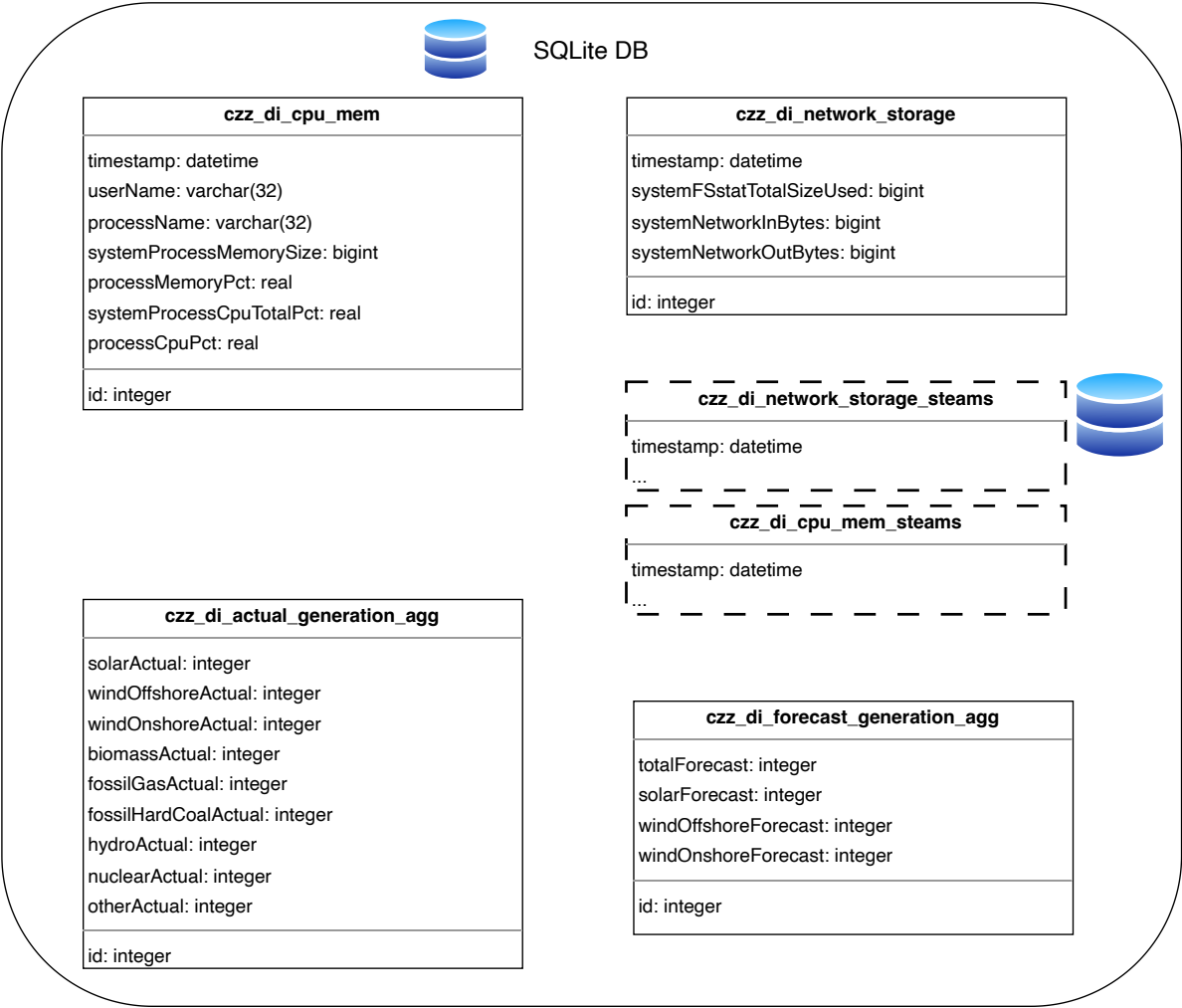


CZZ Data Interface

Data API

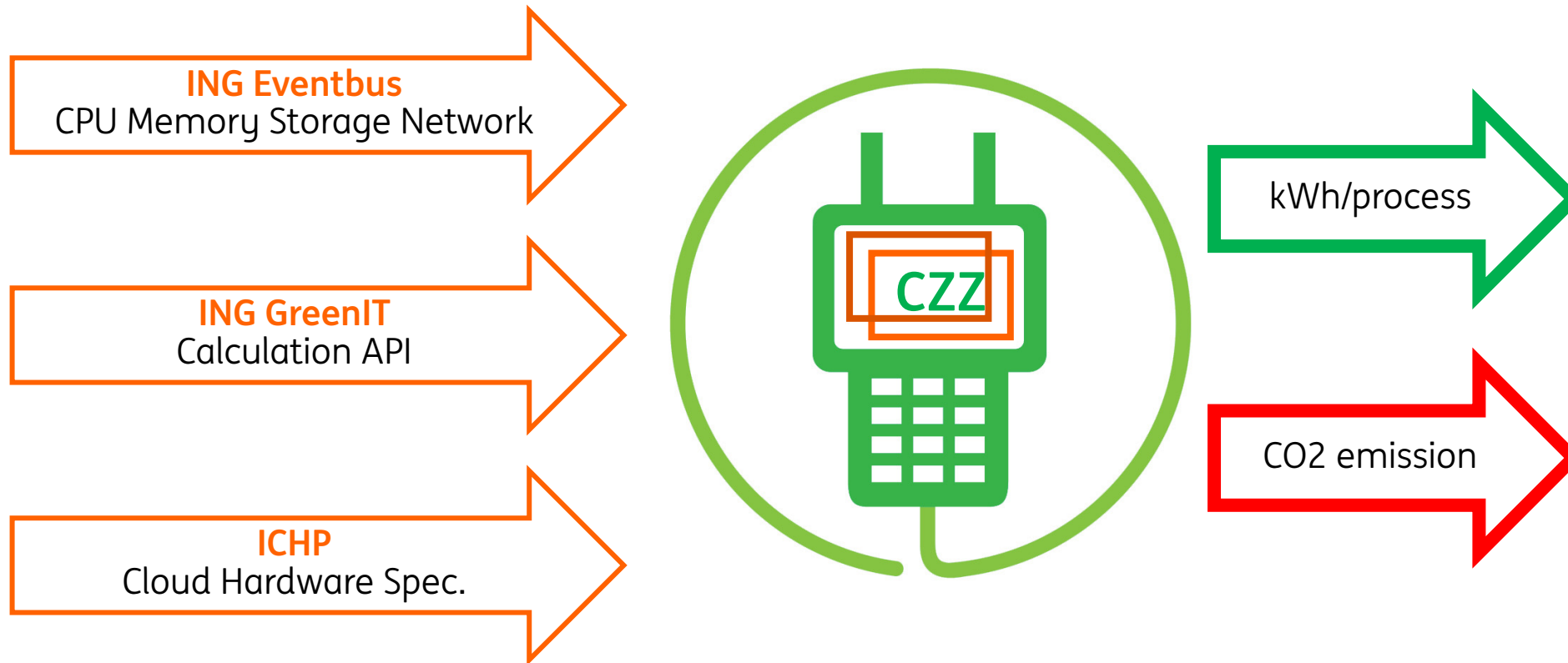


Data Management



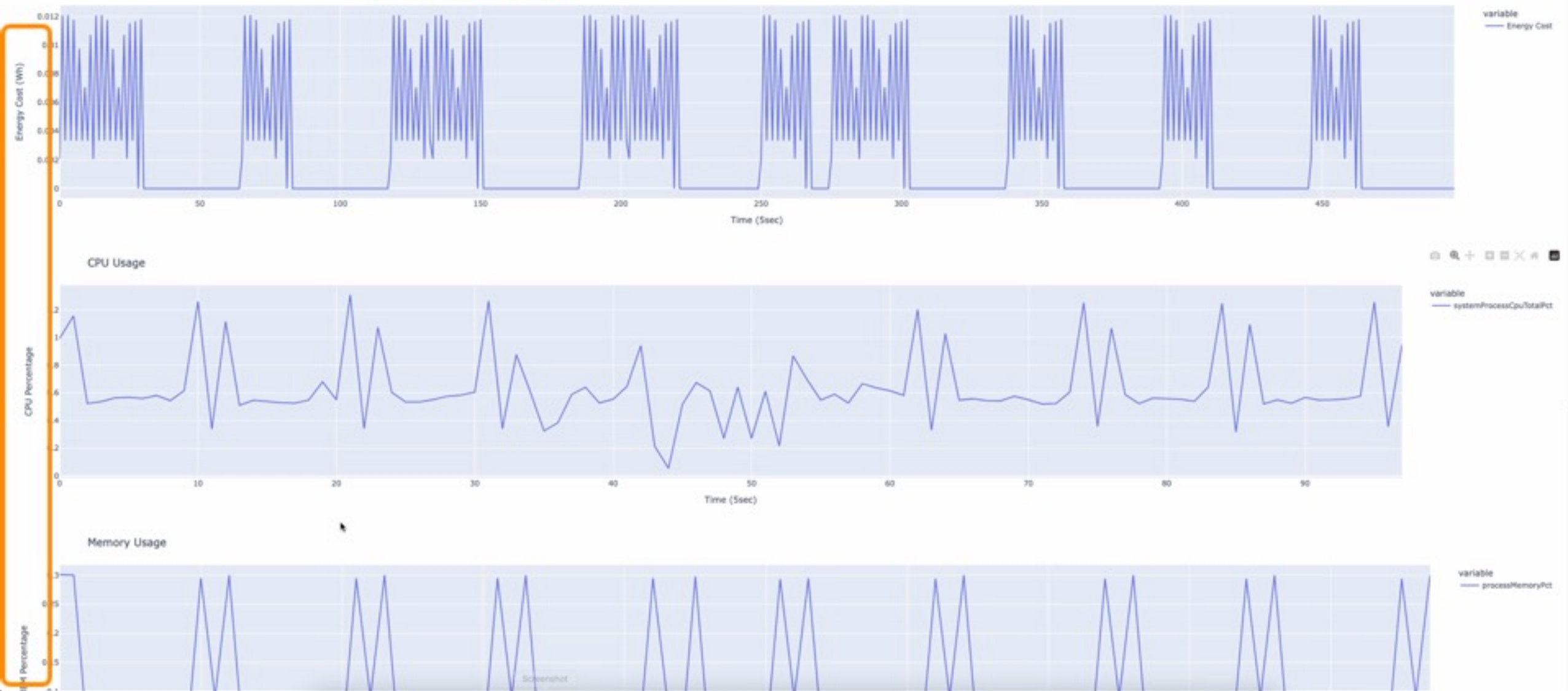
CZZ Energy Calculator

Total Energy = Compute kWh + Storage kWh + Network kWh + Memory kWh



Streaming Monitor Data Dashboard

4 metrics



Impact

- > Sustainability
- > 2 Problems
- > Our Solution

Actual **Use 10%** **Scheduler**
energy cost Green Energy for processes

↓ CO₂



Future Work

A photograph of a modern, multi-story glass building with a curved facade, reflecting the sky. In the background, two large white wind turbines are visible against a clear blue sky. The building is situated near a body of water, and its reflection is visible in the water. A small orange logo is visible on the building's facade.

- > Consider **overload situation**
- > **Extend** scheduling period
- > Integrate with GreenIT
- > **TPA** outbound proxy to Enstoe API
- > **Apply** in ICHP, IPC

CARBONZEROZONE

Schedule it

Shift it

Save it

