

# Cost Optimization and Sustainability for Public Cloud Provider

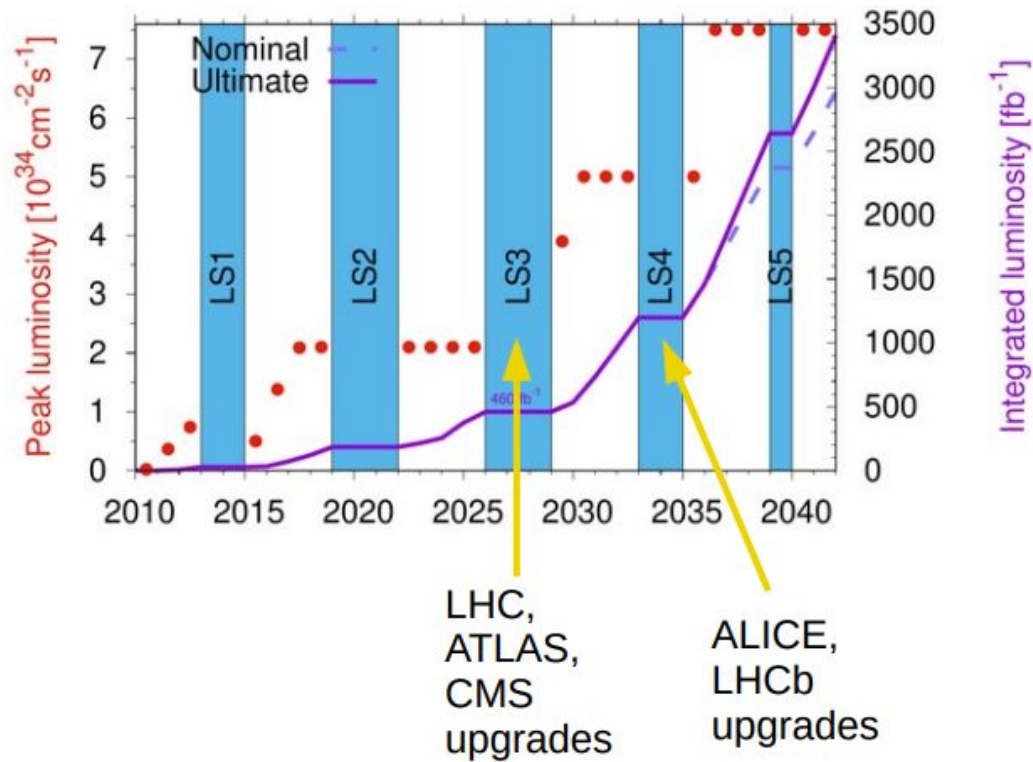
Ricardo Rocha, CERN IT

2025 CERN OpenLab Technical Workshop



# Project Scope

HL-LHC brings increased luminosity (we heard all about it yesterday)



Tommaso Colombo, CERN

2025 CERN OpenLab Technical Workshop

# Project Scope

**HL-LHC brings increased luminosity (we heard all about it yesterday)**

**Impact on the computing carbon footprint**

Estimate for peak of energy exceeding 100GW/h in 2036

Multi-year effort in the IT department to reduce e2e carbon footprint

Similar efforts also within WLCG

[WLCG Environmental Sustainability Workshop, Dec 11th 2024](#)

# Project Scope

## Collaboration with Oracle

**Identify and implement metrics** for cost and carbon footprint

**Optimize (cost and carbon) sizing** of resources for each workload type

Track workloads considering Scope 3 emissions

Schedule to on-premises and public cloud resources

**Build on cloud native infrastructure and its ecosystem (OKE)**



## SCOPE 1 SCOPE 2

## SCOPE 3

Company facilities & vehicles



Purchased electricity, steam, heating & cooling



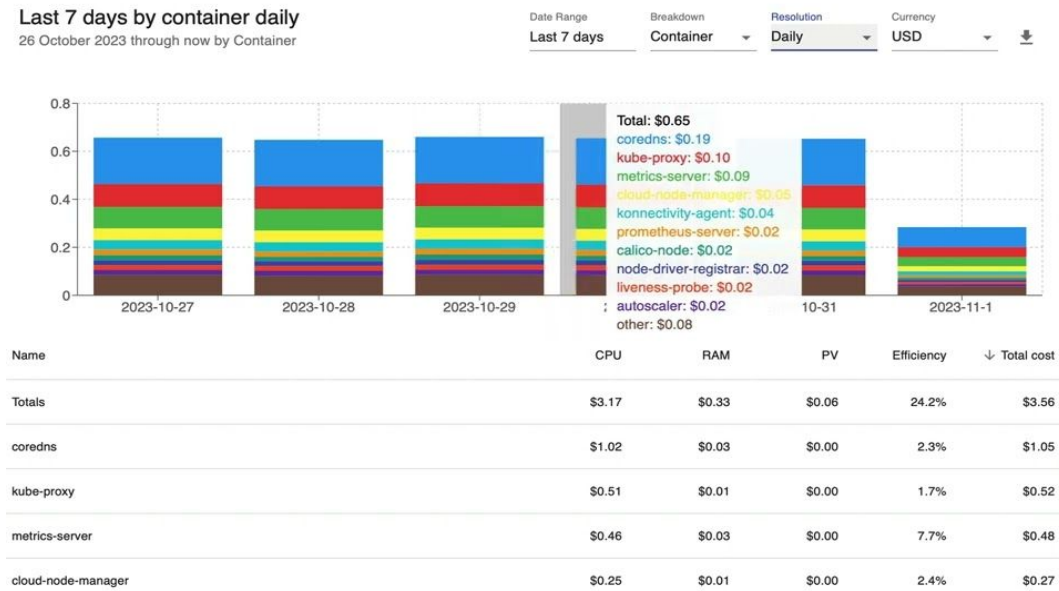
- ✓ Water treatment
- ✓ Waste & recycling
- ✓ Staff & business travel
- ✓ Flights
- ✓ Leased assets & franchises



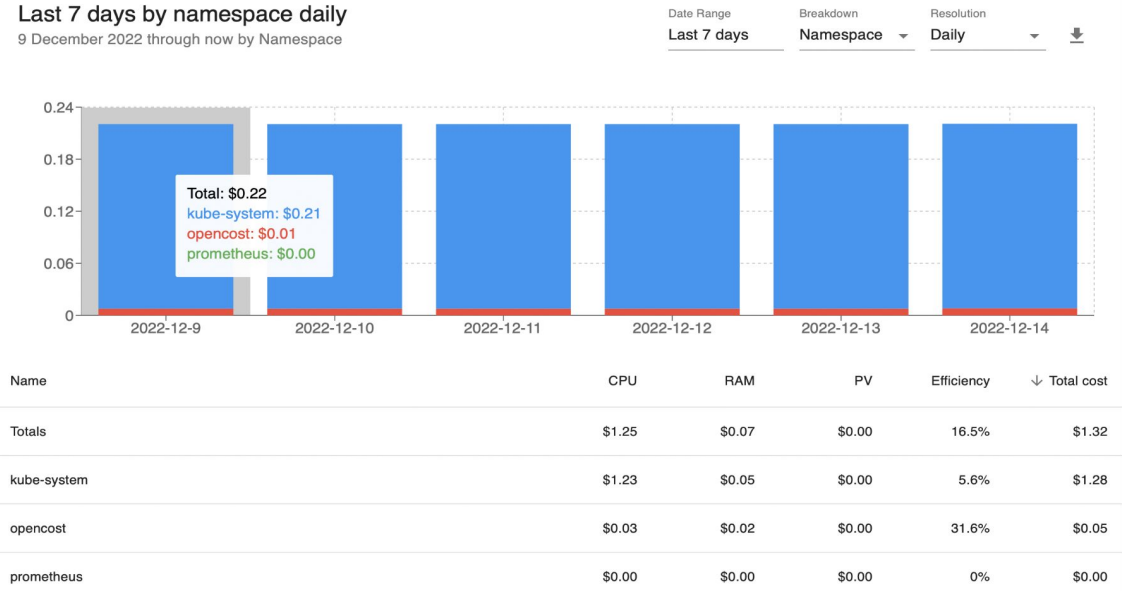
# Past Work: FinOps

## OpenCost as a generic tool to track individual workload costs

Last 7 days by container daily  
26 October 2023 through now by Container



Last 7 days by namespace daily  
9 December 2022 through now by Namespace



## Built-in recommendations for optimal sizing of Pods and Nodes

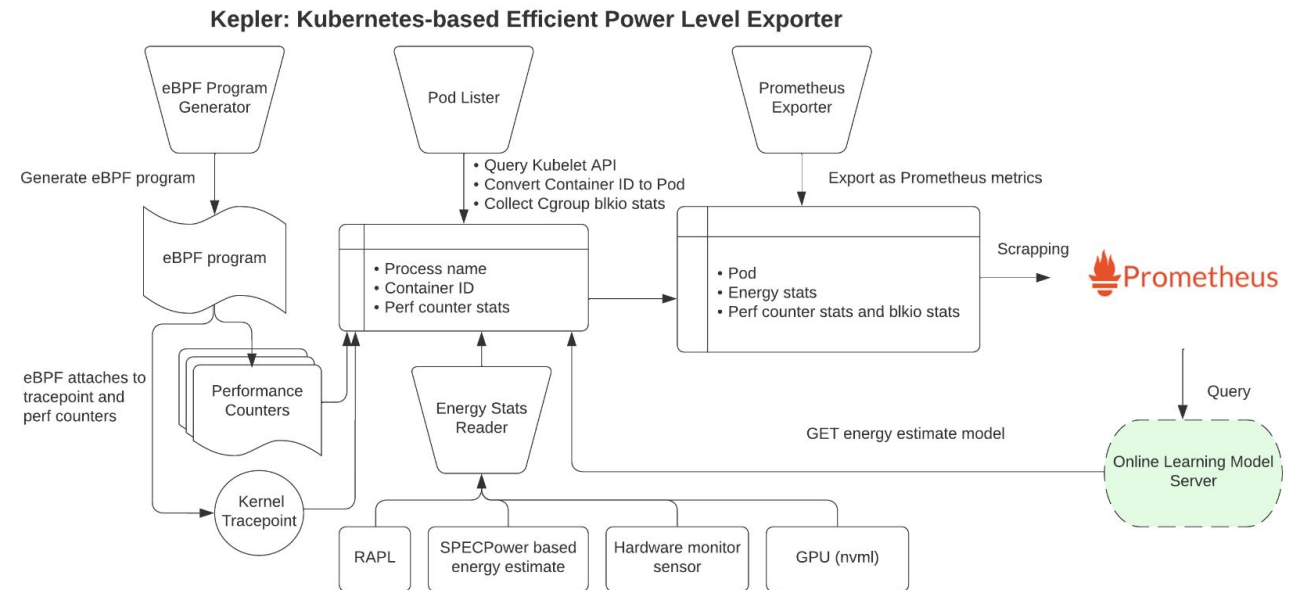
Available provider for the Oracle Cloud Infrastructure (OCI/OKE)

# Past Work: Carbon Footprint

Previous project focusing on carbon and sustainability awareness

Work based on Kepler from the CNCF sustainable computing effort

Relying on eBPF and Linux probes



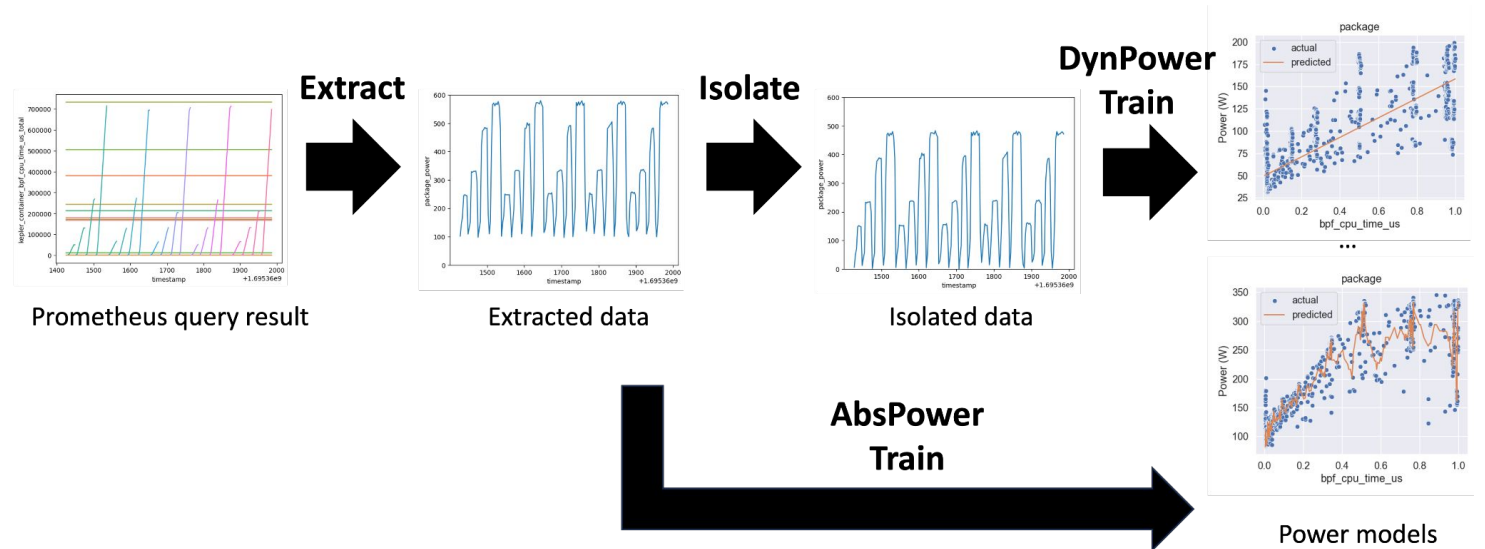
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Multiple models available





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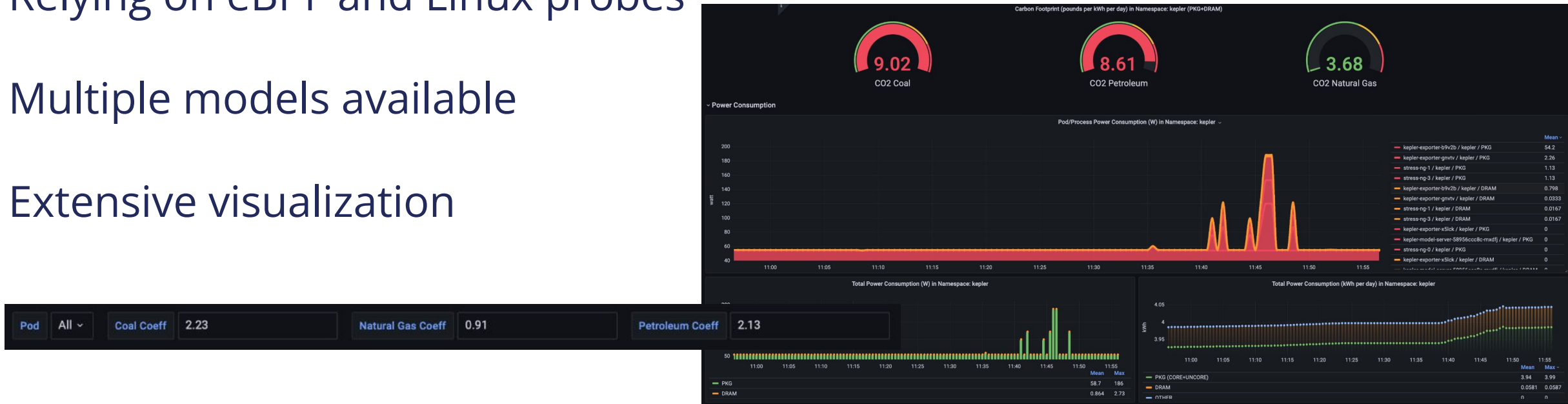
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Multiple models available

Extensive visualization



# Areas to Explore

## Dynamic Workload Scheduling

Schedule based on *total budget, time restrictions ... and carbon*

## Throttling based on workload metrics

## Integration with the CERN IT Cloud Operating Model

**Thank you!**

