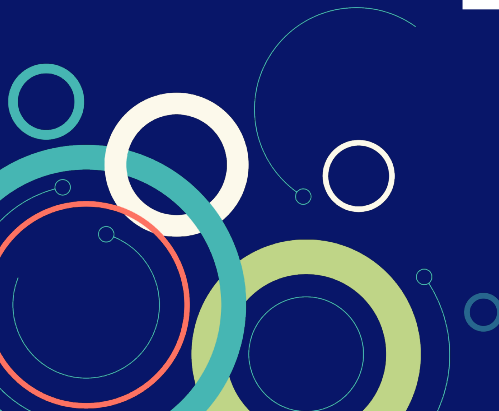
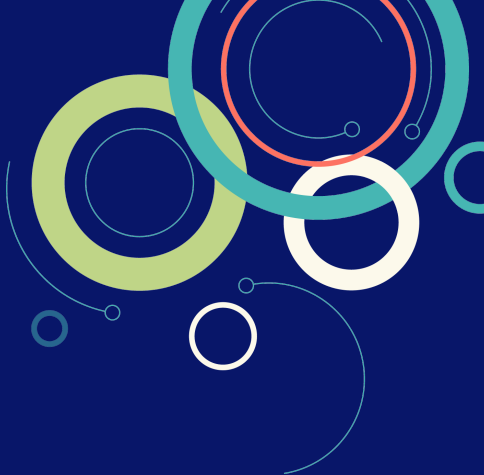




Observability Summit Europe

Carbon as a First-Class Signal: Designing a Standard for OpenTelemetry



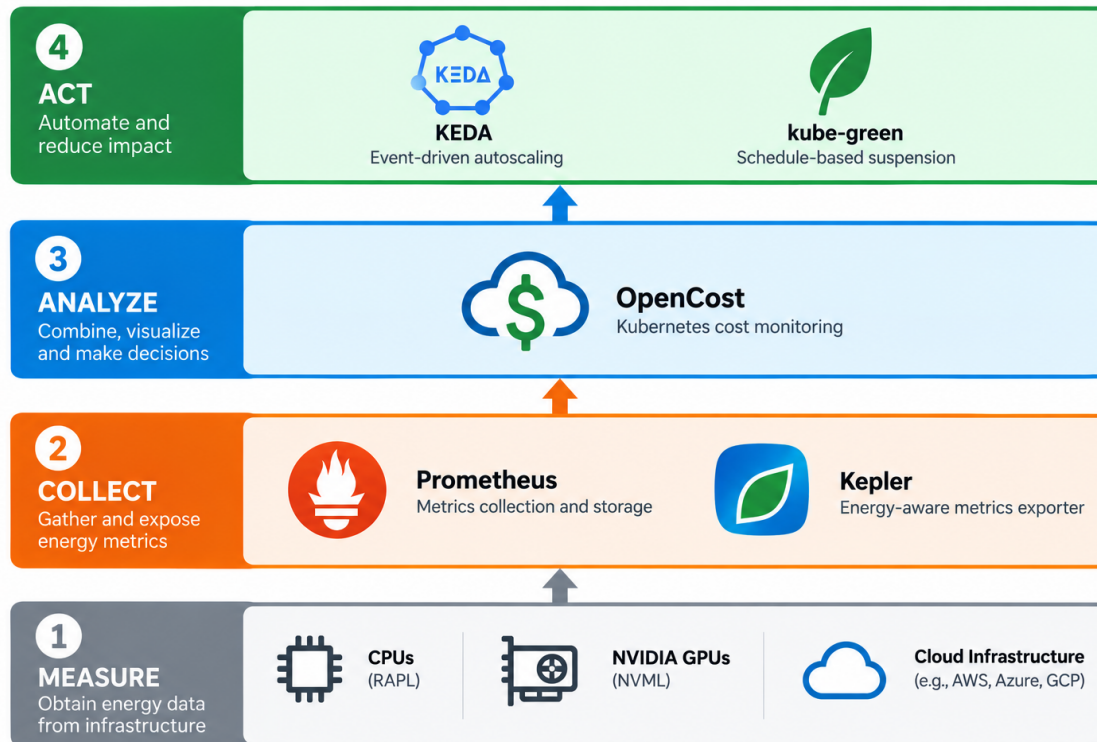


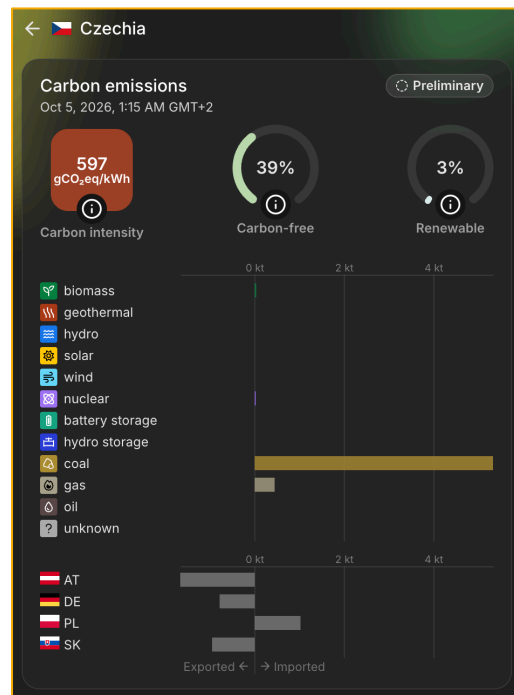
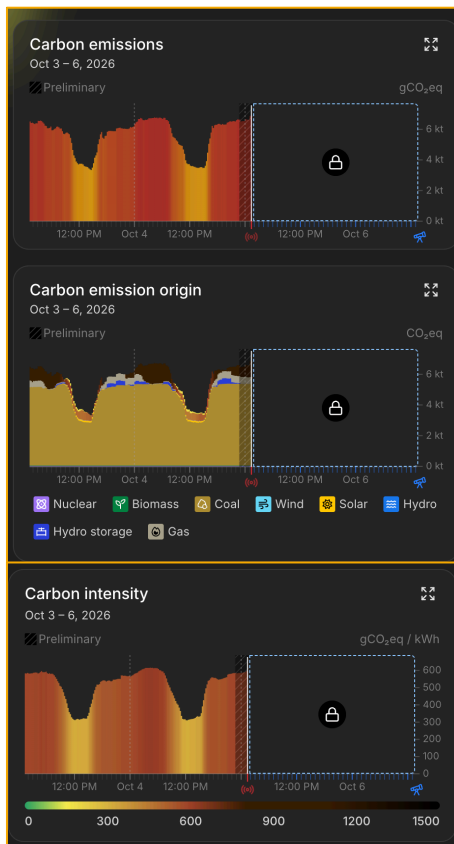
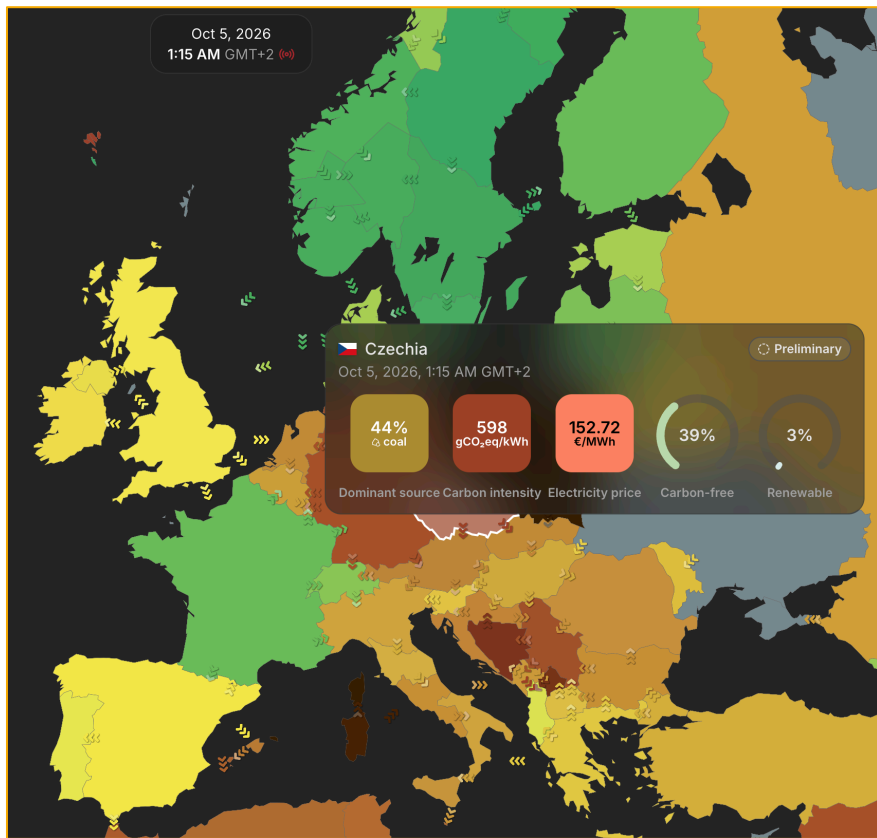
Head of DevRel Engineering



VictoriaMetrics





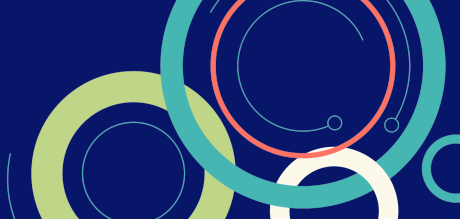




The missing signal

Software Carbon Intensity (SCI) = carbon emissions per functional unit

Version A	Version B
100 kg CO₂e 1 million transactions	110 kg CO₂e 2 million transactions
0.0001 kg CO₂e per transaction	0.000055 kg CO₂e per transaction



Software Carbon Intensity (SCI)



$$\text{SCI} = ((E \times I) + M) \text{ per } R$$

E

Energy

Energy consumed
by the software

I

Intensity

Carbon intensity of
the electricity grid

M

Embodied

Emissions baked into
the hardware

R

Functional Unit

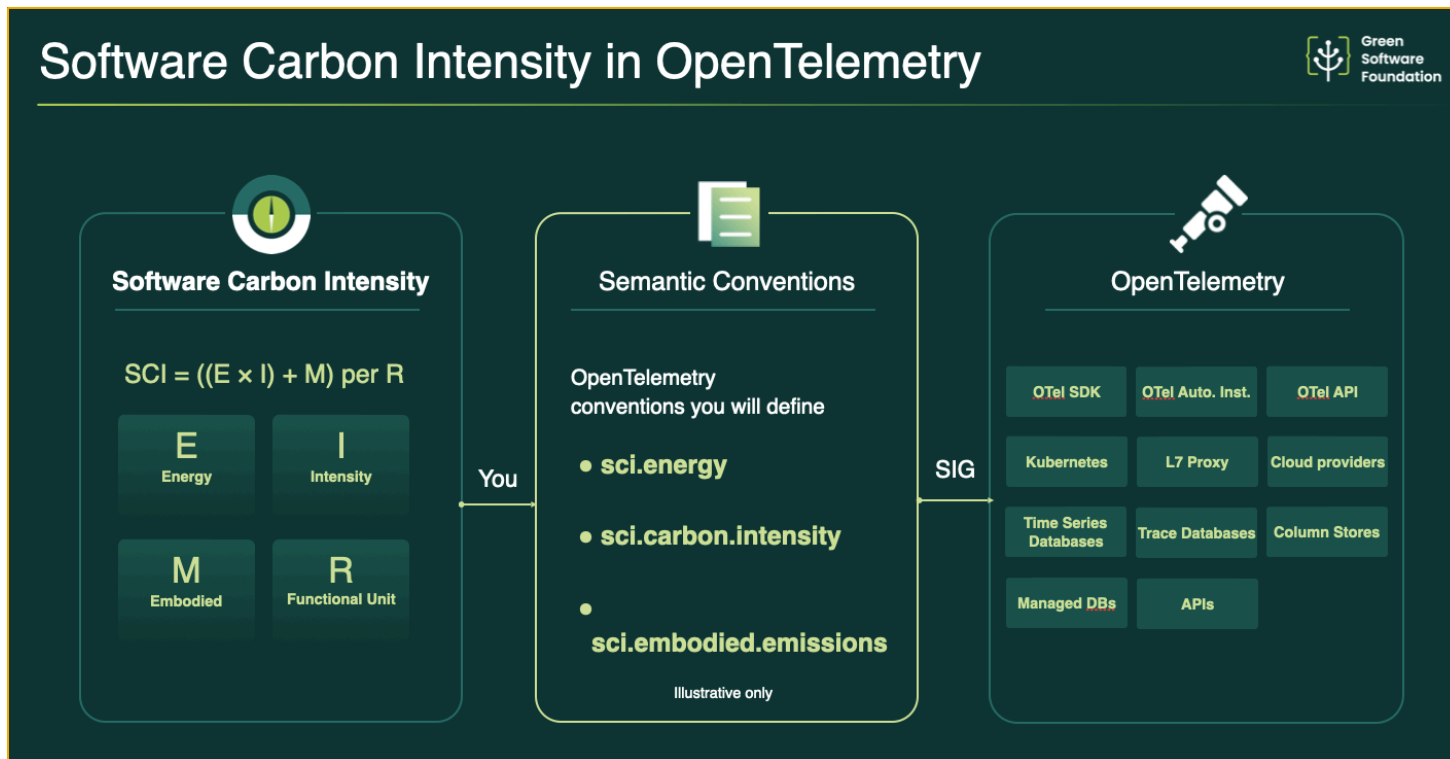
Rate — per
transaction, user, request

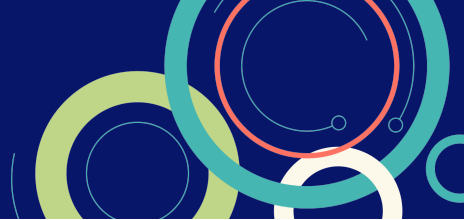
Operational Energy

ISO/IEC 21031:2024 | Designed for Action not Reporting



Software Carbon Intensity in OpenTelemetry





Scope

Green Software Foundation

$$SCI = ((E \times I) + M) \text{ per } R$$

Scope

Current work

SCI for OpenTelemetry Assembly Results: Topic 1 - Scope & Use Cases



Participant Engagement

37 participants invited

13

Did not participate

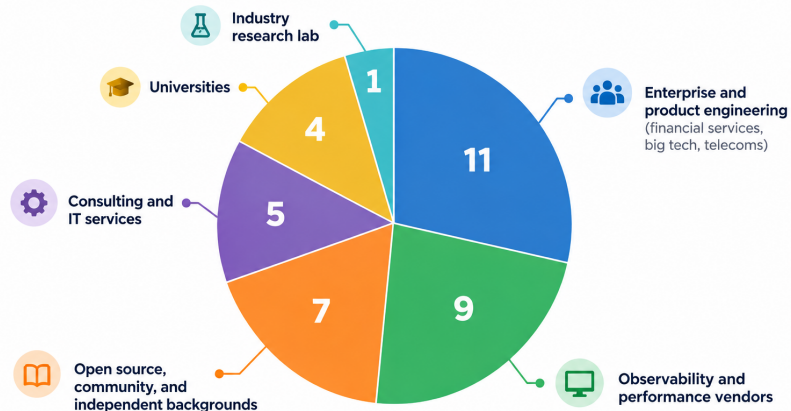
35%

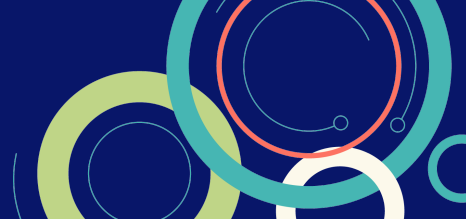
65%

24

Participated across
Discovery, Deliberate &
Decide

Participant Diversity

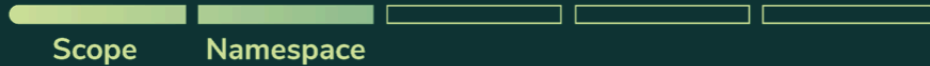




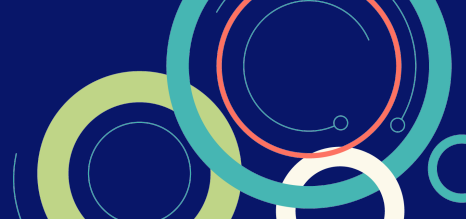
Namespace



$$\text{SCI} = ((E \times I) + M) \text{ per } R$$



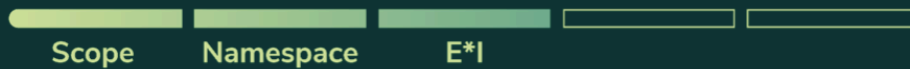
Coming up next!



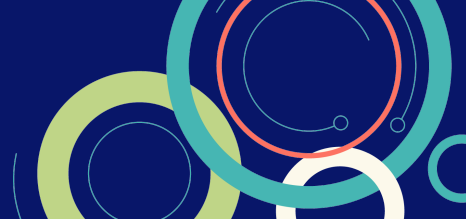
E x I: Operational Energy



$$SCI = ((E \times I) + M) \text{ per } R$$



Coming up next!



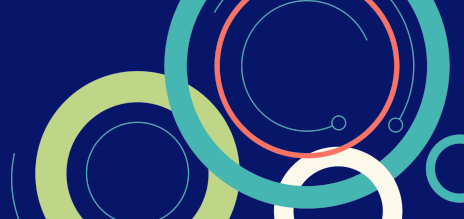
M: Embodied Carbon



$$\text{SCI} = ((E \times I) + M) \text{ per } R$$



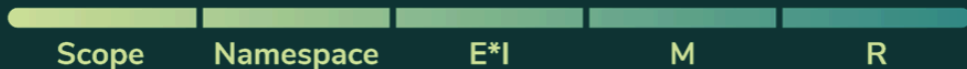
Coming up next!



R: Functional Unit



$$SCI = ((E \times I) + M) \text{ per } R$$

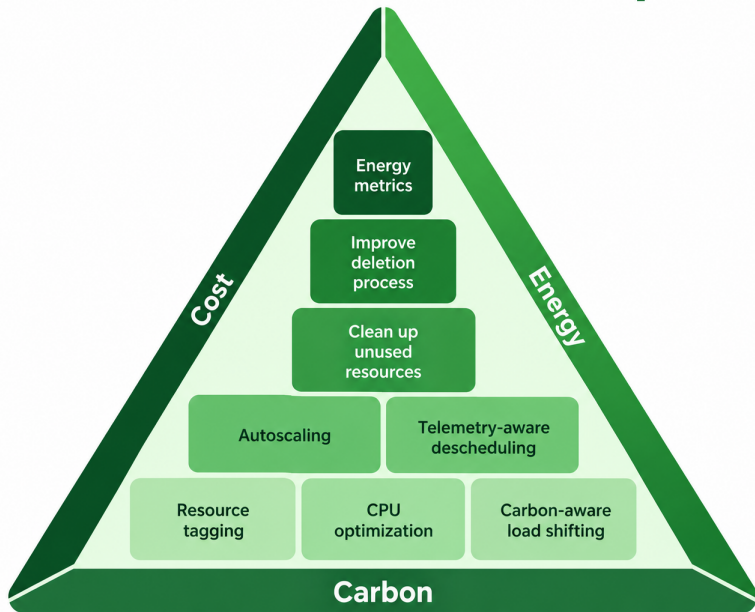


Coming up next!



What if carbon became context for the engineering decisions we already make?

GitOps + FinOps = GreenOps



Carbon is becoming another dimension of system efficiency

1. Measure it

Use the systems you already have to measure energy and carbon information.



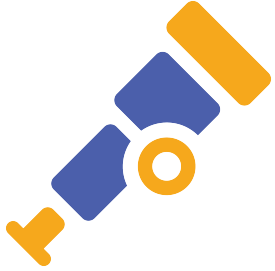
2. Connect it to cost and performance

Link carbon and energy data to cost, performance and workloads.



3. Use it in engineering decisions

Ask whether this context changes an engineering decision and make carbon part of the conversation.



SCI gives us a way to measure.
OpenTelemetry gives us a common language.
Carbon can become a first-class operational
signal.





diana@victoriametrics.com

Thank you!