



Standardizing Inverter Availability

2025 PVPMC

Albuquerque, NM

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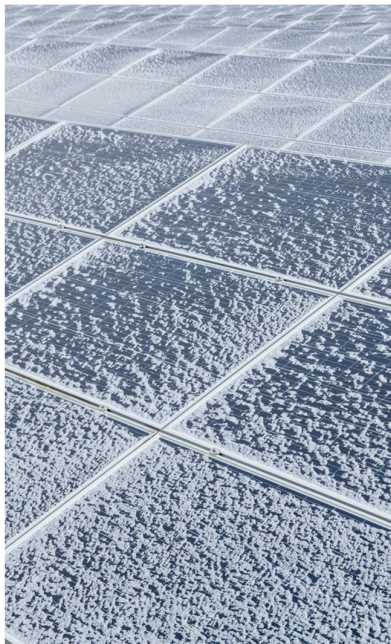


Agenda

- Difficulty in calculating and comparing availability
- Standardization: Benefits and potential headwinds
- IEC 63019: Photovoltaic power systems (PVPS) – Information model for availability

Factors impacting availability

Environment
DC array



Inverter
Transformers

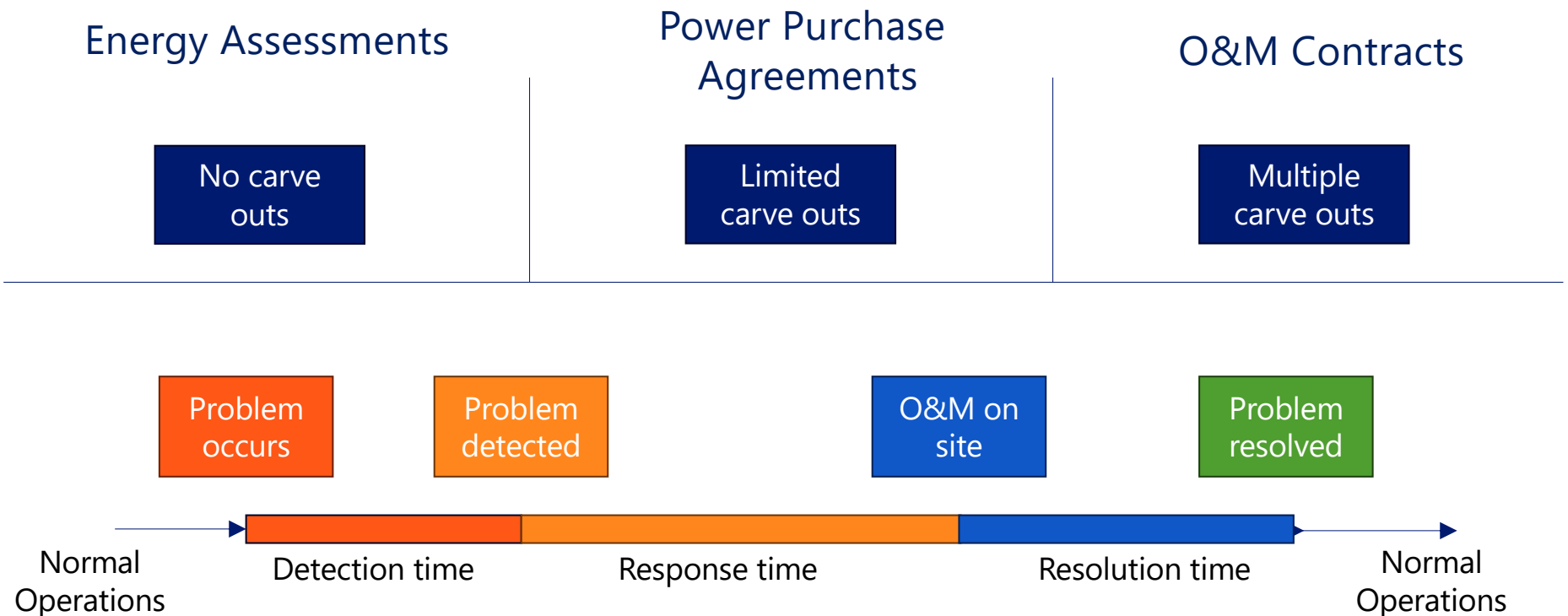


Substation
Grid



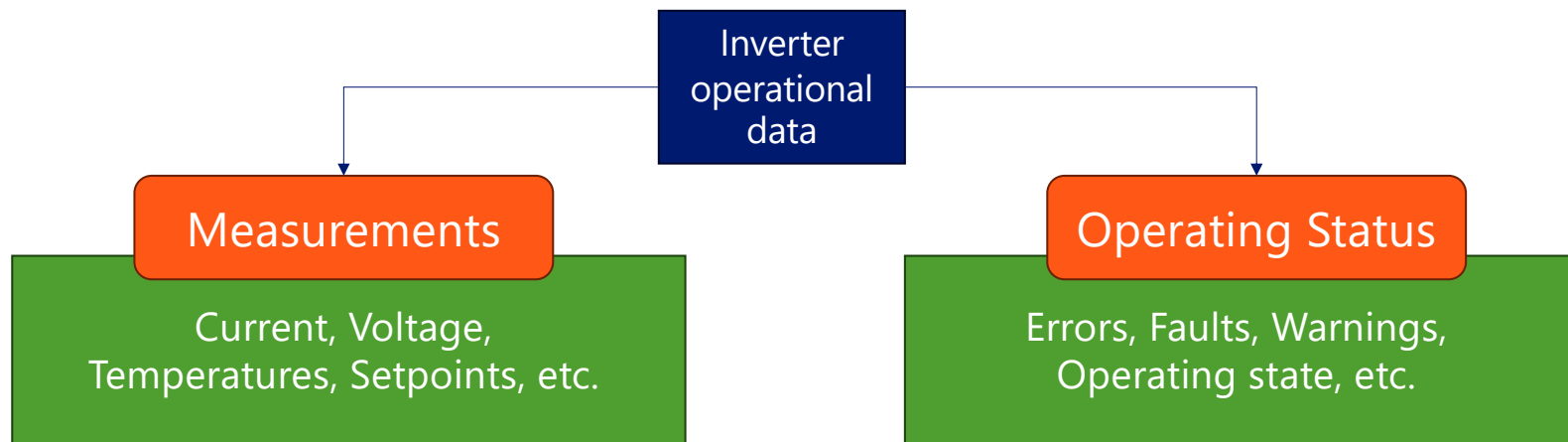
Factors impacting availability can be within or beyond our control

Availability across various stakeholders



Availability is subjective, and this makes it difficult to standardize

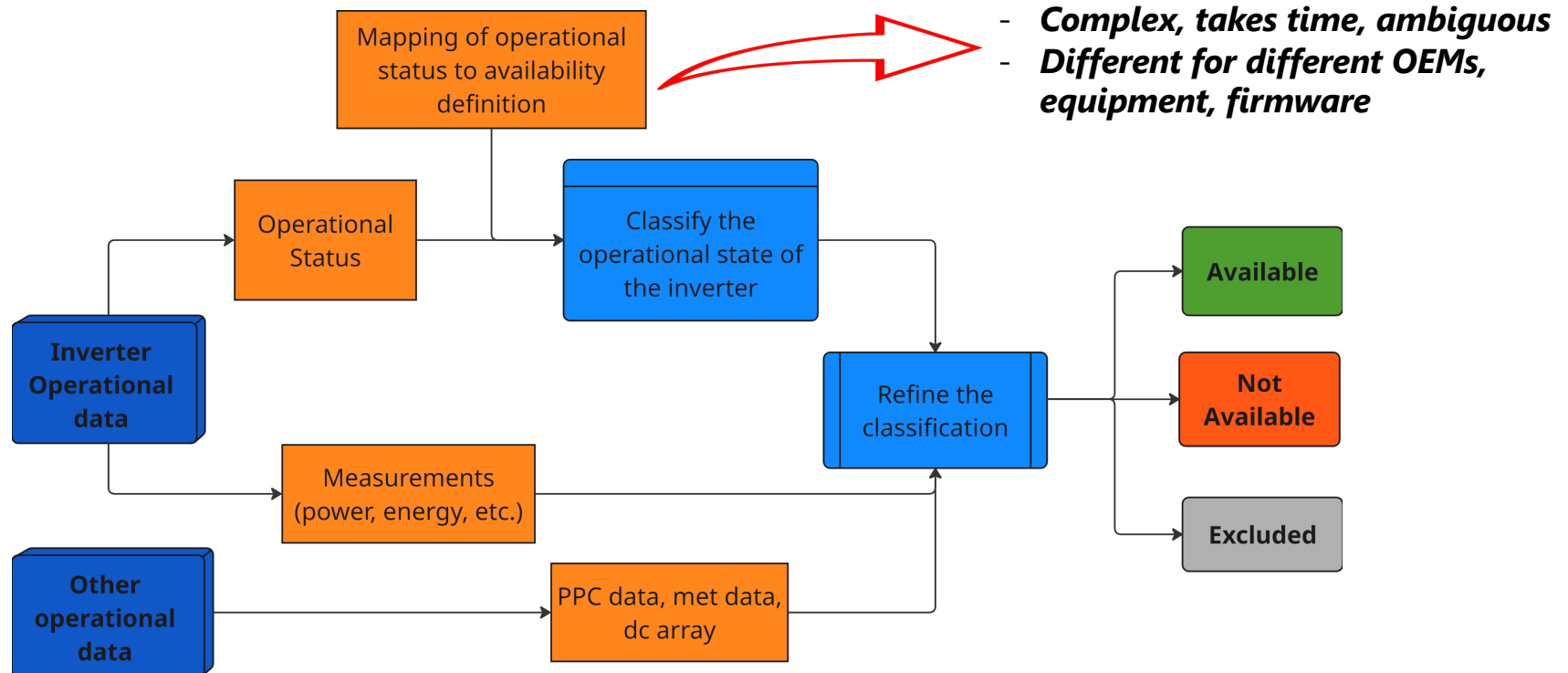
Inverter operational information reporting



- *Most OEMs report a common set of measurements.*
- *Operating status reporting styles can vary significantly.*
 - *Not all OEM-reported codes are useful.*

Inverter's Operating Status reporting varies across different OEMs, models, and firmware

Calculating availability without standard reporting



A standard providing us a mapping of the inverter faults with standardized event categories can be helpful.

What can a standard bring?

Better comparison across different OEMs and projects.

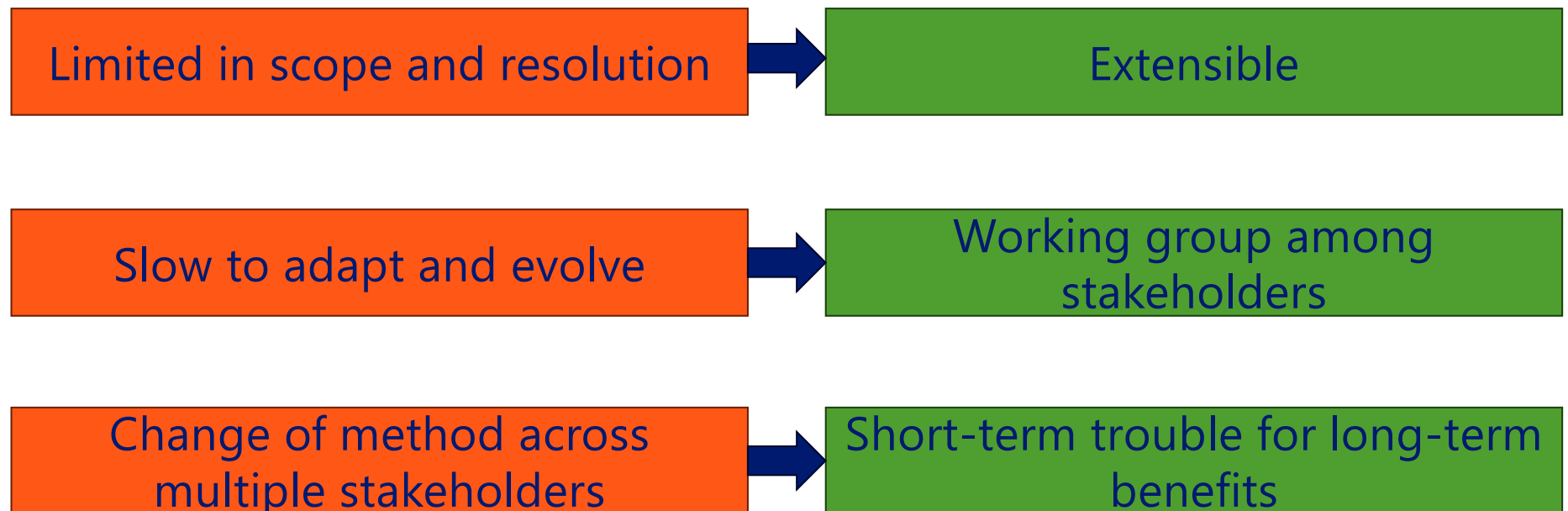
Clear definitions of availability.

Framework for managing risk.

Less ambiguity in the interpretation of inverter status.

Easier to do what-if analysis.

Headwinds



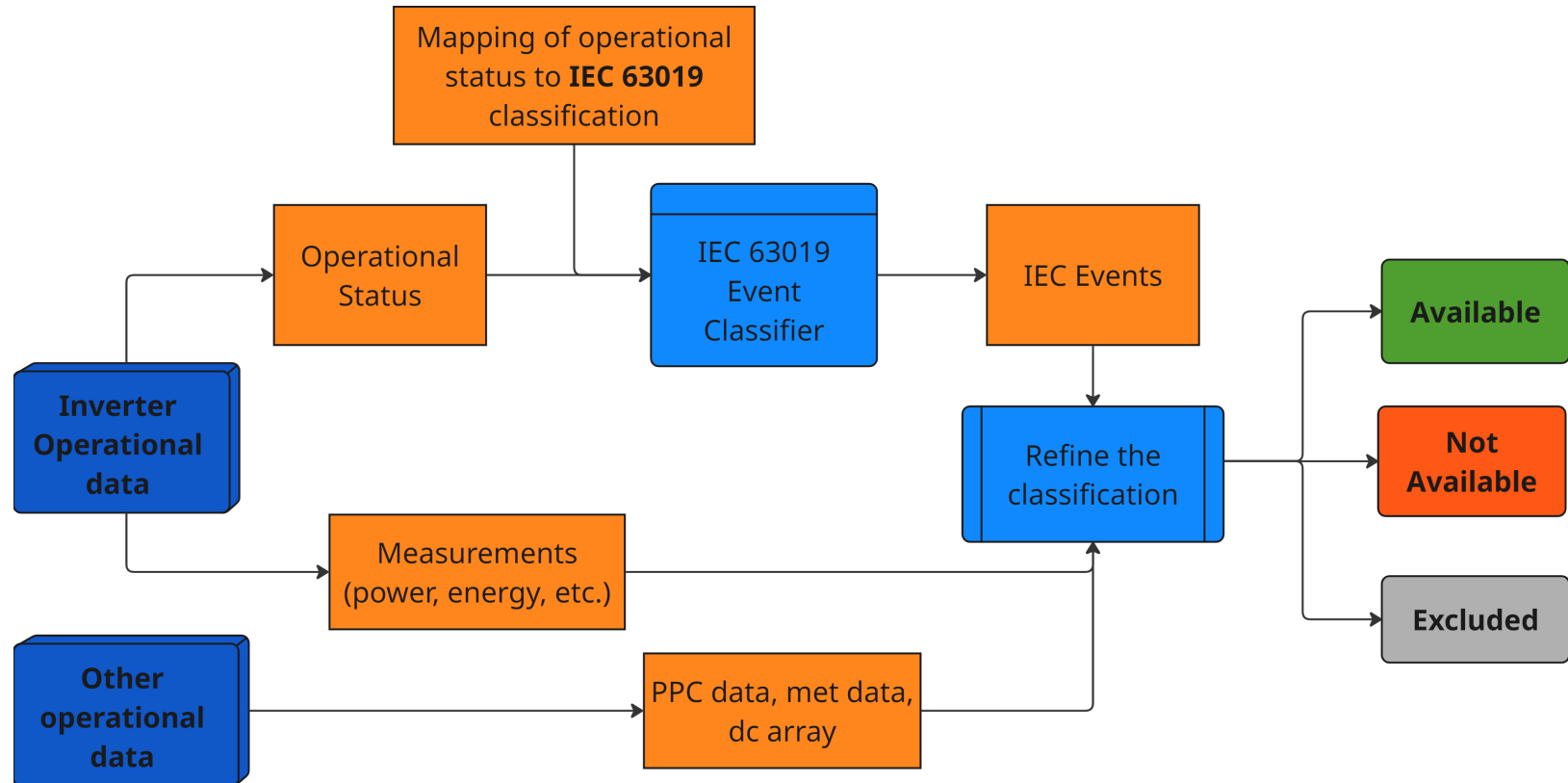
IEC 63019 and GADS reporting

IEC 63019 defines a common basis for the exchange of information on photovoltaic power system availability metrics

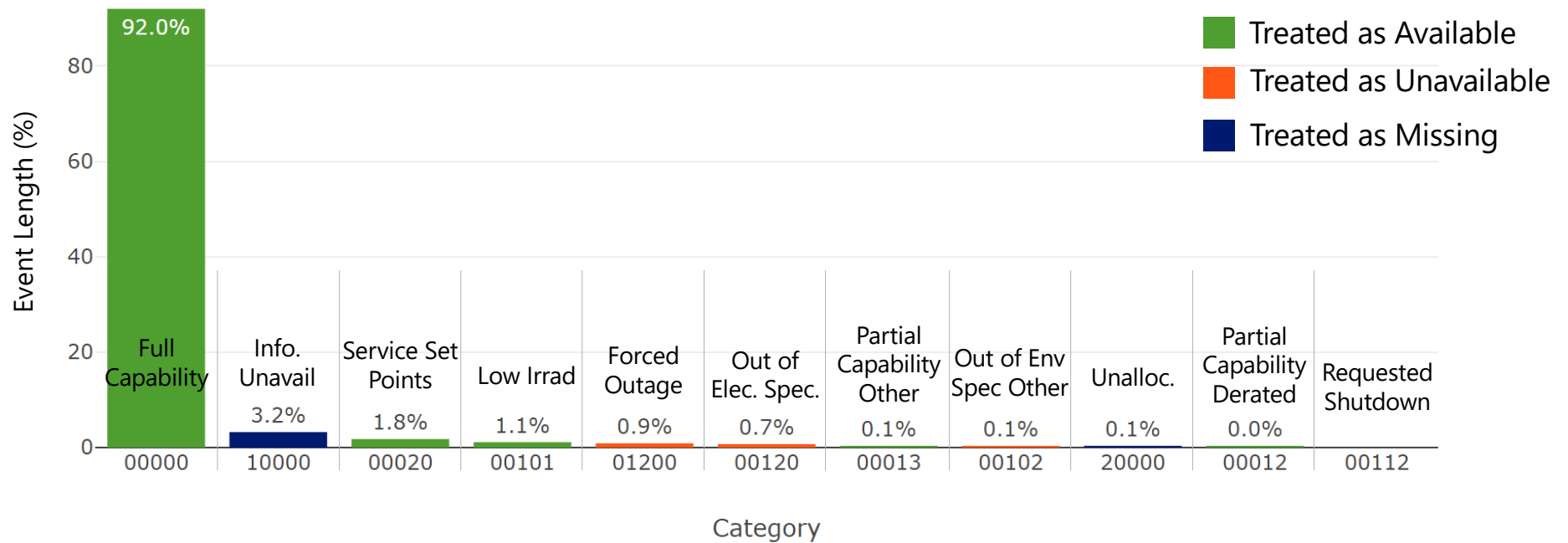
- The standard defines reporting of information in 5 levels.
- IEC 63019 (level 4) categories roll up to GADS categories.
- Inverter OEM provided IEC 63019 mappings facilitate generation of GADS Inverter Group Performance Records.

Effective January 1, 2025, all solar plants with a total installed capacity of 20 MW or more, regardless of interconnection, are required to do GADS reporting.

Calculating availability with IEC 63019



IEC event distribution teaser plot



Conclusion

- Availability is simple but hard.
- Standards can help to bring transparency across stakeholders.
- Through collaboration, the different interests of various stakeholders can be addressed.

Thank you

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