Empowering designers to Build a Greener & more Sustainable Data Center





Reducing operational cost

Rising energy costs and a premium on real-estate and floor space means that every DTC facility is **now focused on higher efficiency and an optimised power usage.**

Electrical parameters and **consumption** are now managed right **up to equipment level**, identifying potential power issues, providing **tangible cost savings** and resulting in lower billing.



Reducing operational cost

Calculate the precise measurement of power usage effectiveness (PUE)



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Energy Efficiency



Calculate the PUE, Power Usage Effectiveness thanks to measurement and monitoring systems

Performance

TRACK CONSUMPTION AT THE DATA CENTRE

Analysis

IDENTIFY THE ENERGY DEDICATED TO SERVERS

> *When you can measure what you are speaking about, and express it in numbers, you know something about it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind…*
>
> *Lord Kelvin*

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Track the consumption in all DTC facilities with the same global standard metric

- The energy performance of a data center is characterized by its PUE (Power Usage Effectiveness) calculation.
- PUE and power consumption are among the top tracked parameters for sustainability and compliance with the 2023 EED (European Efficiency Directive).

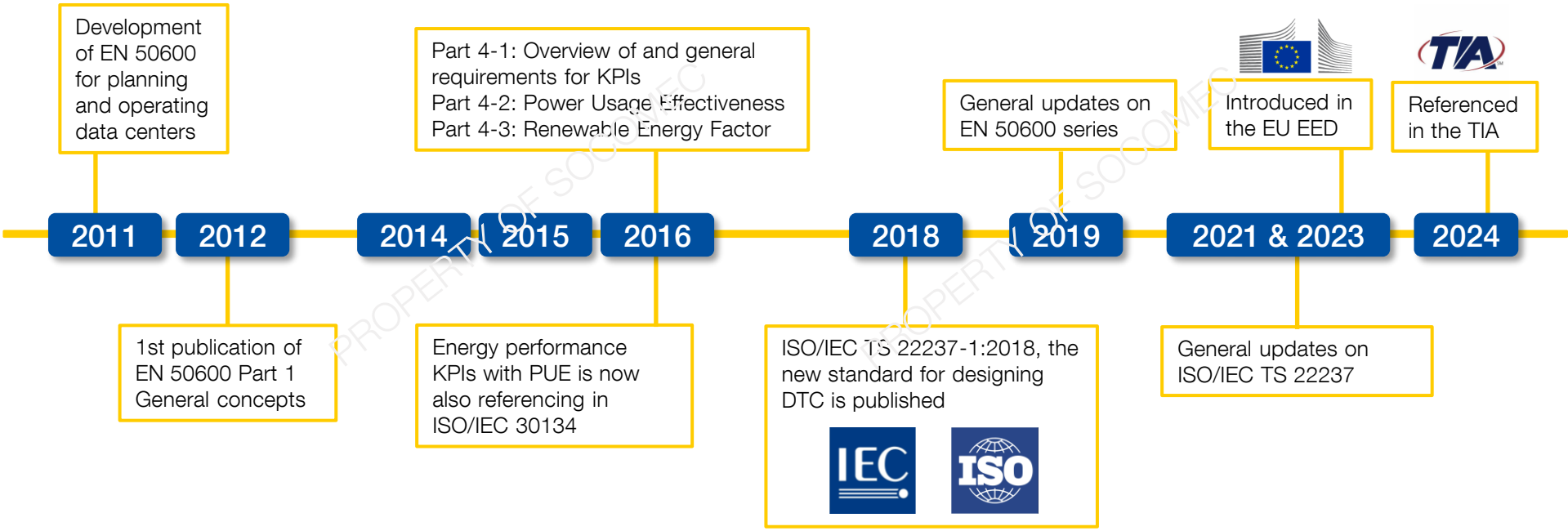
This indicator is sometimes challenged…

yet, it remains **the global reference in standards** that is essential to any facility as it allows them to qualify and **declare the DTC in terms of efficiency** and the effect of any improvements made.

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Let's have a look at the standards that govern DTC PUE ...

...international standards are in constant evolution



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WHAT IS Power Use Effectiveness and how do we calculate it…

PUE, helps data centers optimize their energy consumption

So … PUE is defined in EN 50600-4-2, ISO/IEC 30134-2 and referenced in ISO/IEC TS 22237-1

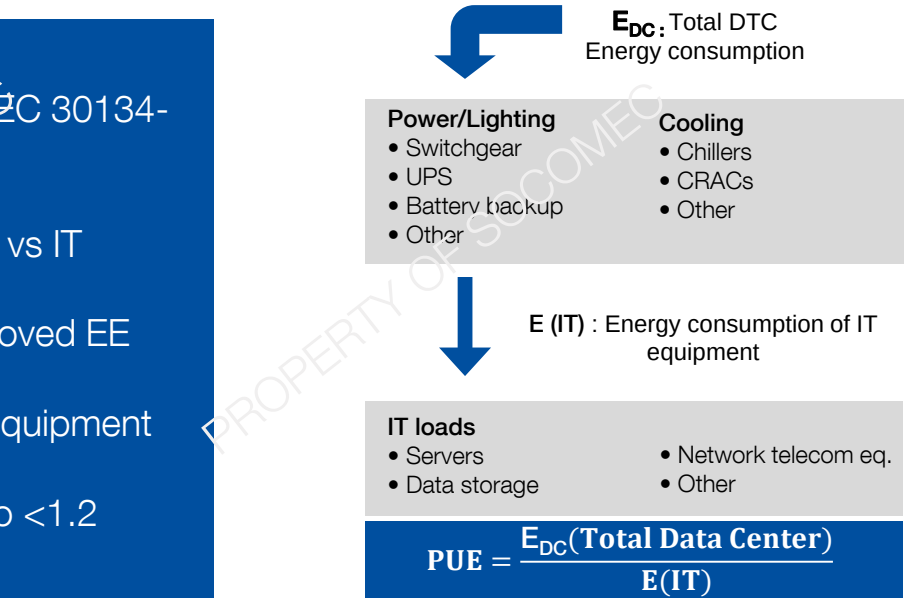
It is the ratio between total energy consumed vs IT

- It also identifies areas to investigate for improved EE

- Should be measured close to the installed equipment

- Av. PUE for DTC's goes from 1.6 (in 2020) to <1.2

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WHAT IS Power Use Effectiveness and how do we calculate it…

PUE, helps data centers optimize their energy consumption

Basically Speaking

Take the total energy used *(lighting, heating cooling…)*

and divide it by the

Total energy used by the IT systems

$$\mathbf{PUE} = \frac{\mathbf{E_{DC}(Total\ Data\ Center)}}{\mathbf{E(IT)}}$$

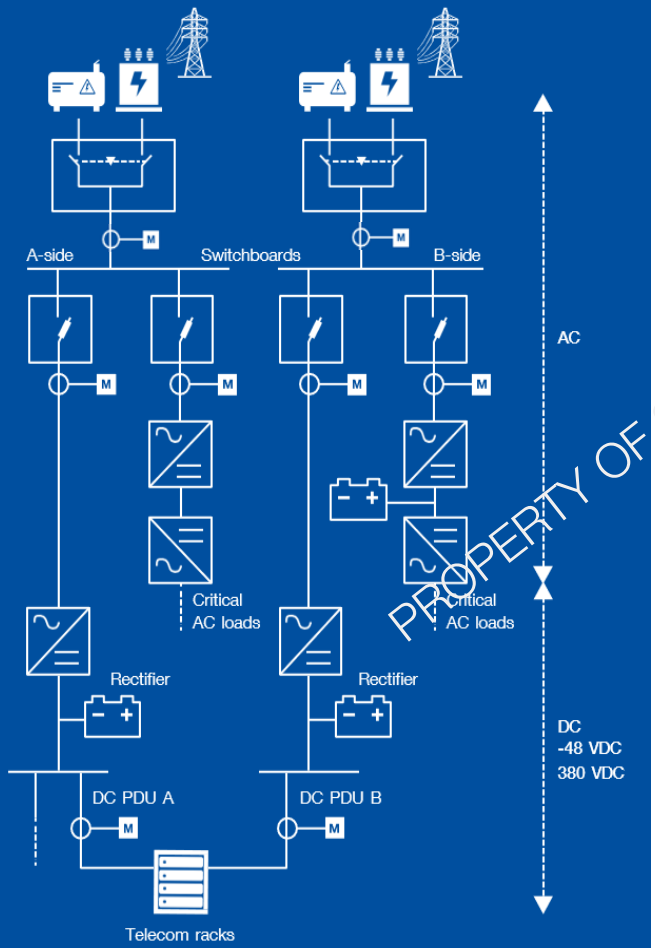
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Collect information
Power sources, electrical distribution, consumption of IT servers

Monitor the installation
- Ensuring the best power quality for IT equipment
- Power Monitoring across the electrical installation
- Analysis and correlation with other parameters

Analyse
Identify equipment that drives up energy consumptions, losses, power capacity

Improve performances
Keep monitoring continuously to quantify savings due to equipment upgrade, etc.



PUE can / should be calculated at all levels throughout the installation

Table 1 — PUE Categories

	PUE_1	PUE_2	PUE_3
Location of IT equipment energy consumption measurement	UPS output[a]	PDU output[b]	IT equipment input[c]

[a] Includes impact of fluctuating IT and cooling loads.

[b] Excludes impact of losses associated with PDU transformers and static switches.

[c] Excludes impact of losses associated with electrical distribution components and non-IT related devices.

PUE categories according to EN 50600-4-2

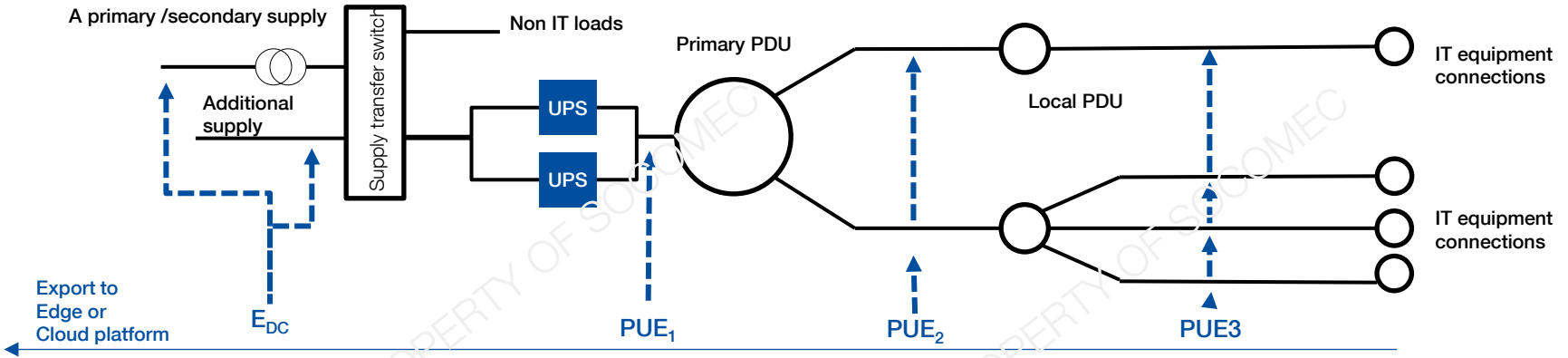
- **Category 1 (PUE1):** basic level of resolution of energy performance data. *(For PUE of >1,50)*
- **Category 2 (PUE2):** intermediate level of resolution of energy performance data. *(For PUE of >1,20)*
- **Category 3 (* PUE3):** advanced level of resolution of energy performance data. *(For PUE of <1,20)*

Recommended Category to achieve PUE values of 1.2 or less.

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Power Use Effectiveness (PUE)

Where should the measurement points be located?



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Network Analyser



DIRIS A200, ITIC curve



DIRIS Digiware

DIRIS Digiware S / BCM



Solutions by PUE categories according to EN 50600-4-2

Category 1 (PUE1)
Basic level of resolution of energy performance data.

Category 2 (PUE2)
Intermediate level of resolution of energy performance (data hall).

Category 3 (PUE3)
Advanced level of resolution of energy performance data & load balancing.

EN 50600-2-2 / 4-2 and ISO/IEC 30134-2 requirements

Key take aways on how to optimize the PUE …



Permanent Monitoring
No temporary measurements with portable equipment

Granularity
Measure as close as possible to the loads (servers)

Scalability
Measurement system shall evolve with the DTC

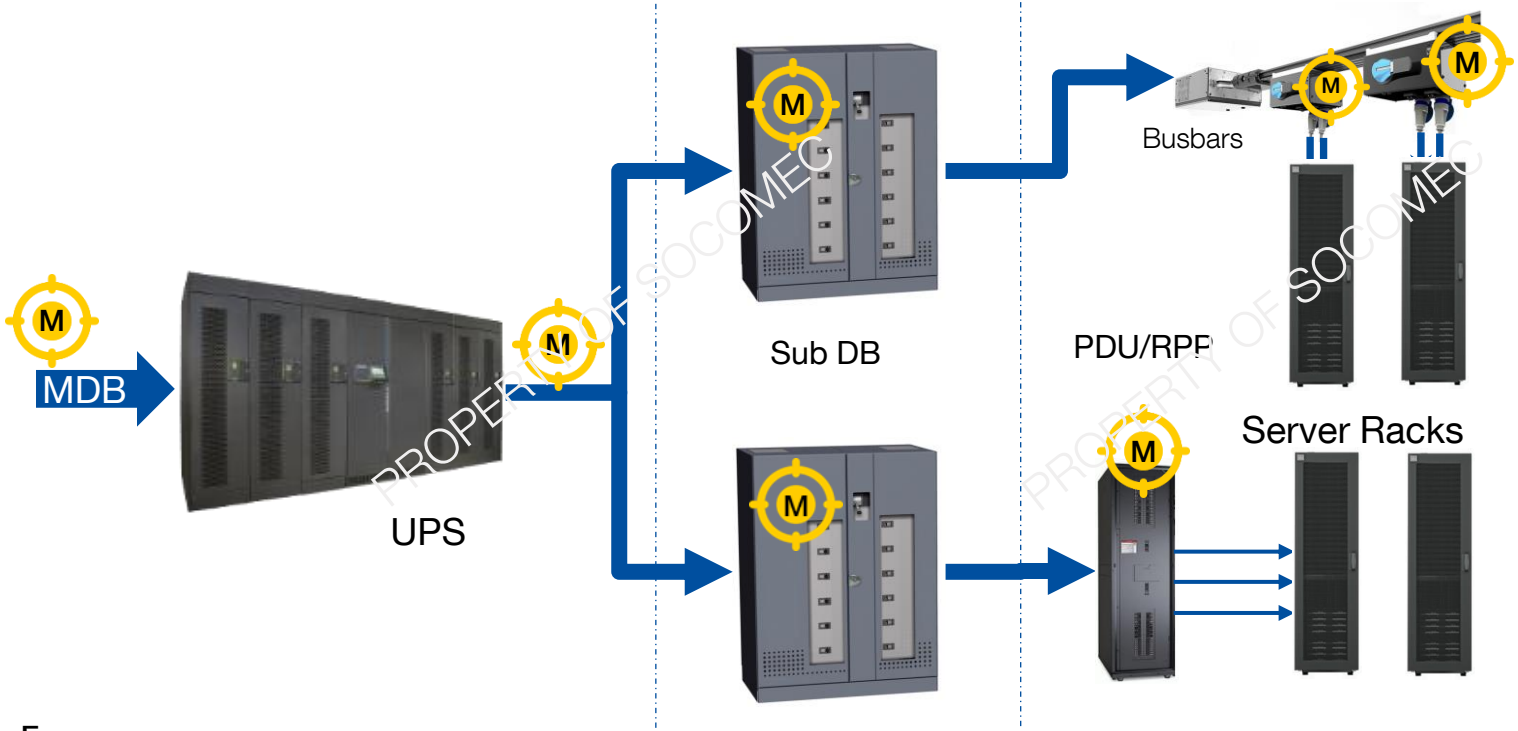
Versatility
Allow multiple measurements in all the installation

Accuracy
Reliable, accurate and repeatable measurements,

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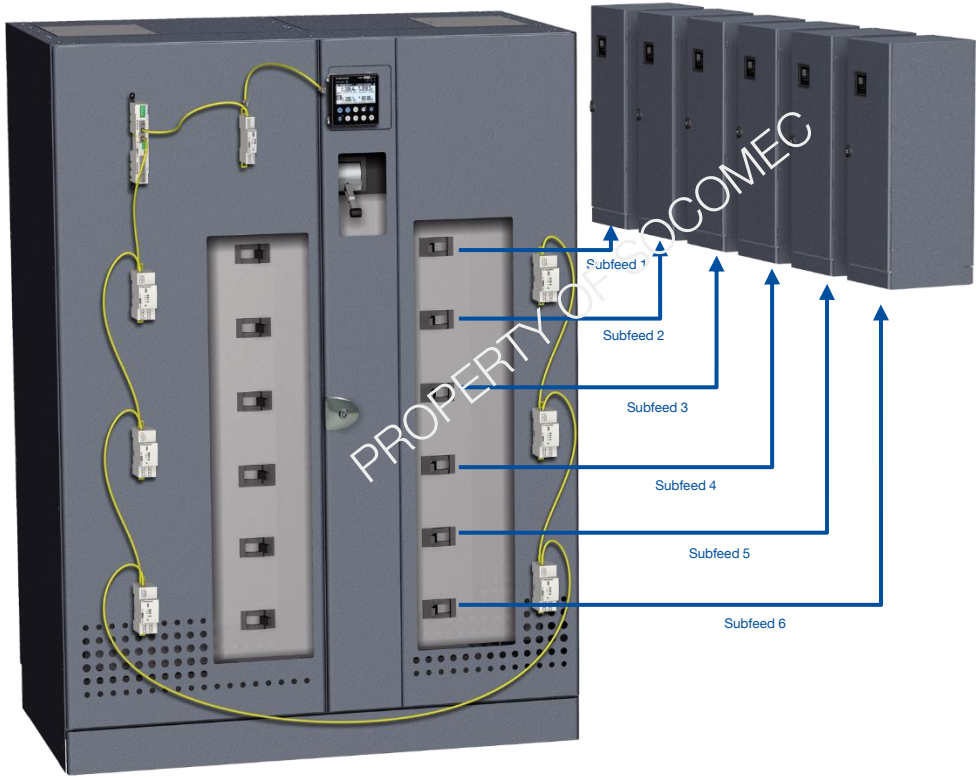
SOCOMEC measurement solutions for DTC

Examples of where the measurement points be located



SOCOMEC measurement solutions for DTC

… Example for for RPP / PDU's



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Typical DIRIS Digiware monitoring system for MAIN + 6 sub-feeds

MAIN-feed circuit 2000 A

- U-30 voltage measurement module
- I-45 current measurement modules for three-phases & neutral.
- 3 x TF-120 current sensors

Sub-feed circuits 400 A

- 6 x I-60 current measurement modules
- 18 x current sensors (TE-45)

Extra

- Display interface for RS485/Ethernet communication

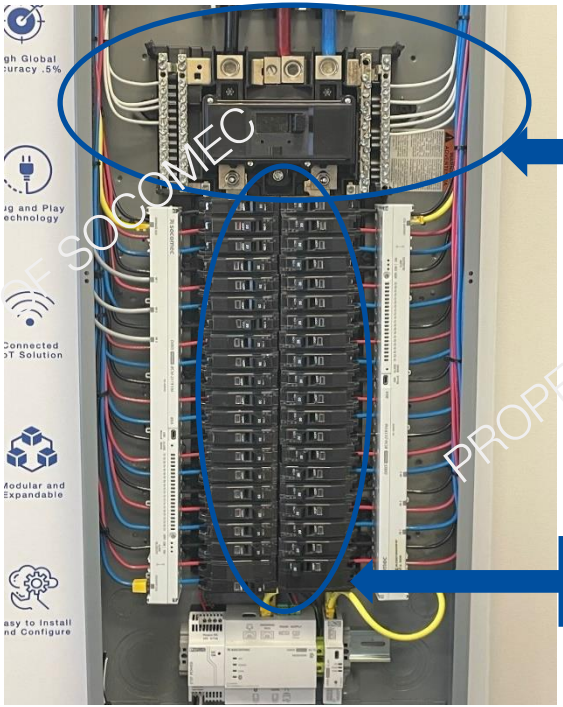
SOCOMEC measurement solutions for DTC

… Example for “Fish Bone” type PDUs

VirtualMonitor

PreciSense

AutoCorrect



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SOCOMEC measurement solutions for DTC

… Example for metering in Busway Tap Offs & End Feed boxes

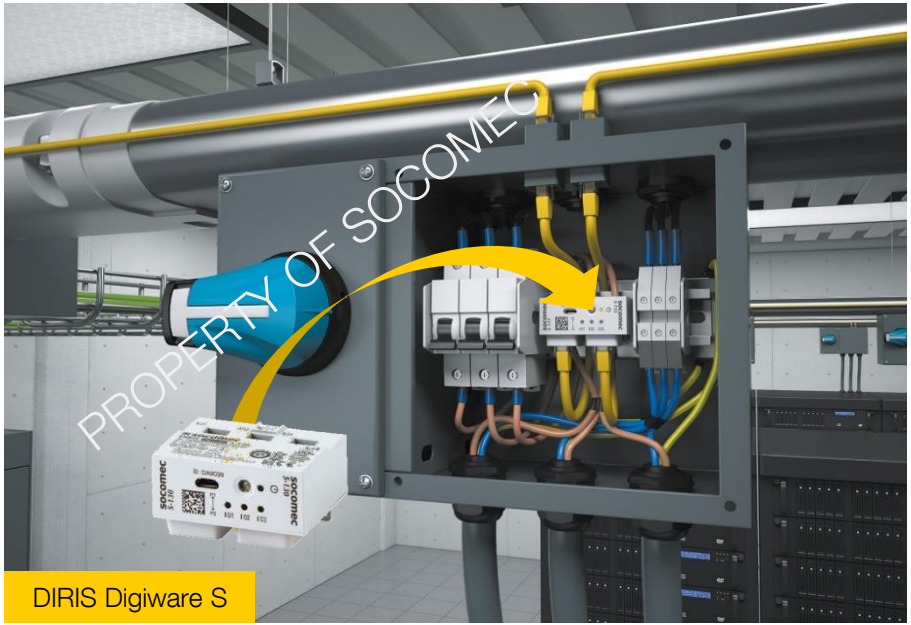




SOCOMEC measurement solutions for DTC

… Example for metering in Busway Tap Offs & End Feed boxes

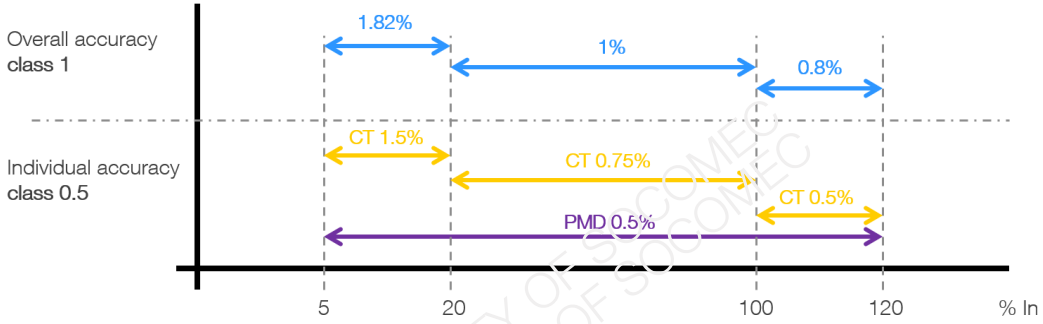




DIRIS Digiware S

And what is measurement worth without precision

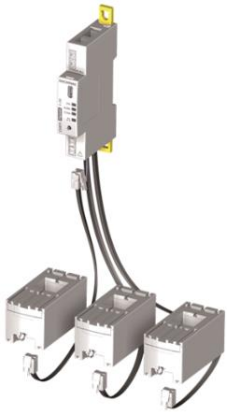
A look at individual vs overall accuracy…



Percentage of rated current	Current	PMD accuracy	Current transformer accuracy	Overall precision
1%	1A	1%	-	-
5%	5A	0.5%	1.5%	1.82%
20%	20A	0.5%	0.75%	1.04%
100%	100A	0.5%	0.5%	0.81%
120%	120A	0.5%	0.5%	0.81%

PreciSense

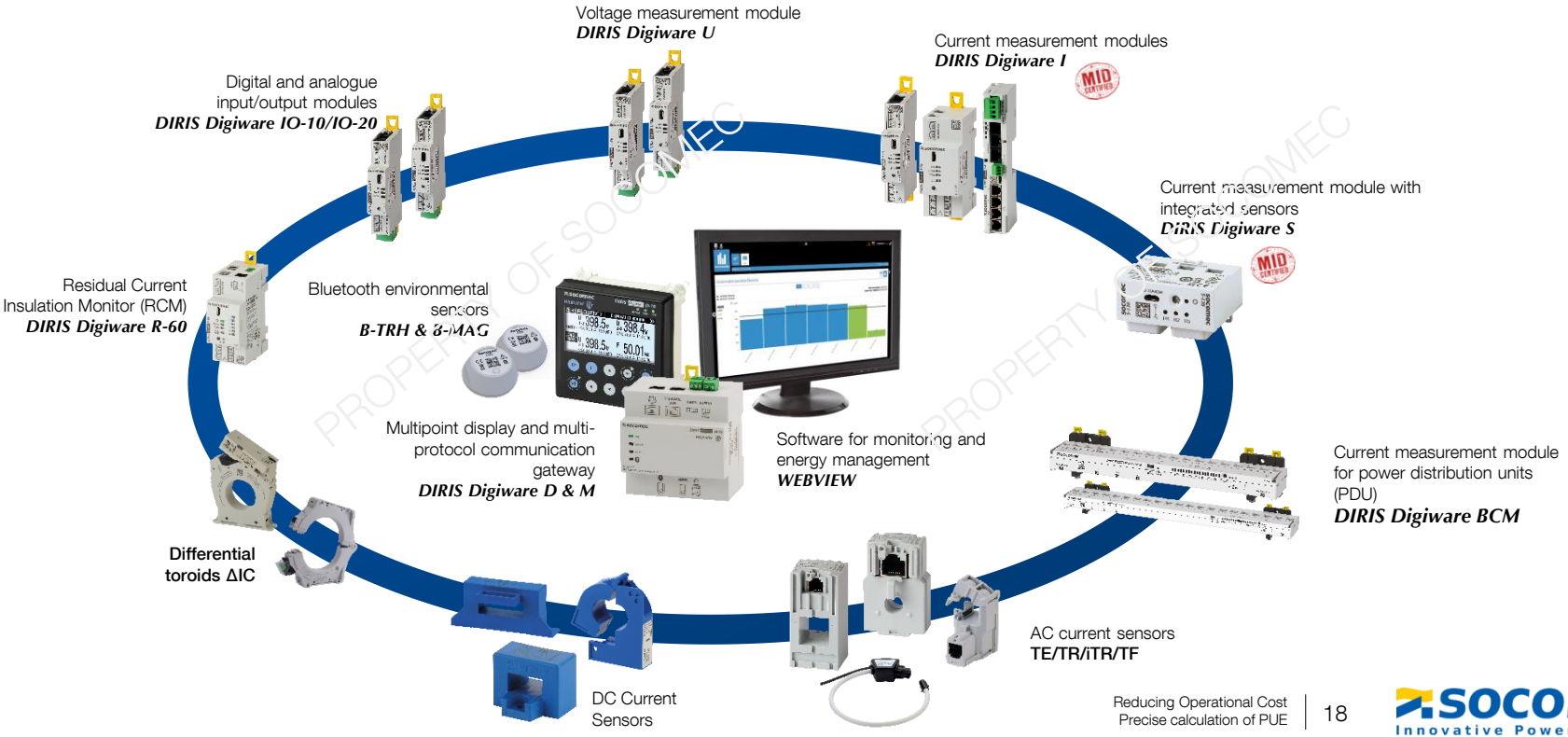
Class 0.5 Overall !
From 2% up to 120% !!
Digware + TE/iTR/TF sensors



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Your 1st step towards reducing carbon

DIRIS Digiware ecosystem for new & retrofit DTC projects



thank you SO much!