Empowering designers to Build a Greener & more Sustainable Data Center





Reducing carbon footprint

Every day **we rely more and more on a DTC** to manage our daily business and personal tasks however this **can come with considerable environmental costs and challenges.**

Manufacturers, European and local policy makers and end-users are **constantly introducing new ways of how to reduce carbon** and every little bit counts.



Reducing carbon footprint

Achieve the energy efficiency trends and targets (EU EED) for Data Centers >500kW



Francisco De La Torre Ramos
Specification Engineer
Africa



Jerome NUSS
Product Line Manager
Energy Efficiency



Understand the trends and achieve the energy efficiency targets (EU EED) for DTC

Compliance MEET THE ENERGY PERFORMANCE TARGETS	**Continuity** UPGRADE WITHOUT DISRUPTION OF SERVICE
Scalability RIGHTSIZE WITH TRULY MODULAR POWER MODULES	**Efficiency** BENEFIT FROM SMART CONVERSION

The **EU Energy Efficiency Directive (EED)** aims to reduce overall energy consumption with solutions that provide **a Greener and More Sustainable DTC…**

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Understanding the new EED obligations for a DTC IT ≥ 500kW

Timeline 2012 – 2023…

European Commission

Energy, Climate change, Environment

Energy

Energy efficiency directive (EED):
First adopted in 2012, the directive was updated in 2018 and 2023, setting rules and obligations for achieving the EU's ambitious energy efficiency targets



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Understanding the new EED obligations for a DTC IT ≥ 500kW

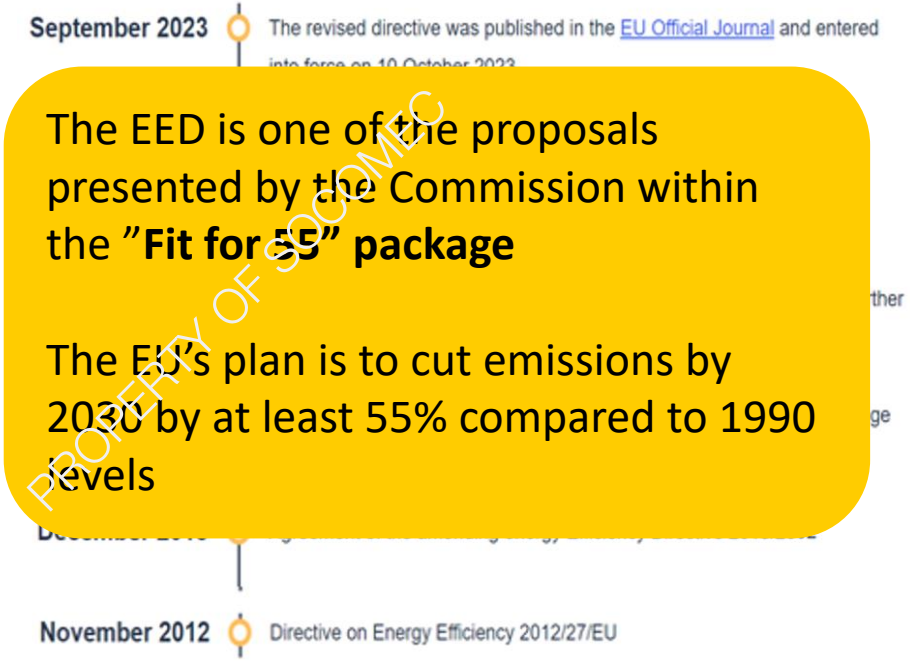
Timeline 2012 – 2023…

European Commission

Energy, Climate change, Environment

Energy

Energy efficiency directive (EED):
First adopted in 2012, the directive was updated in 2018 and 2023, setting rules and obligations for achieving the EU's ambitious energy efficiency targets



The EED is one of the proposals presented by the Commission within the "**Fit for 55" package**

The EU's plan is to cut emissions by 2030 by at least 55% compared to 1990 levels

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Understanding the new EED obligations for a DTC IT ≥ 500kW

What documents should I refer to?

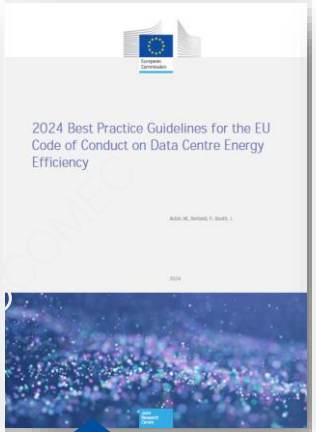


Energy Efficiency Directive

Task A : refers to EN 50600-4 and the PUE, WUE, REF indicators for data reporting

Task B : based on the reporting data, is there a minilum PUE to achieve?

Task C : formalises access to publications of statistical data from performance declarations.



Code of conduct which lists best practices. The EE directive refers to it for DC > 1MW

EN 50600- 4: this is the standard which defines PUE, WUE, REF, … indicators

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Understanding the EE Directive - Article 12 : DTC IT ≥ 500kW

1. By 15 May 2024 and every year thereafter, Member States shall require owners and operators of data centres in their territory with a power demand of the installed information technology (IT) of at least 500kW, to make the information set out in Annex VII publicly available, except for information subject to Union and national law protecting trade and business secrets and confidentiality.

COMMISSION DELEGATED REGULATION (EU) 14.3.2024 : 1st publication now rescheduled on 15 sept. 2024

Currently, the publication has started country by country

2. Paragraph 1 shall not apply to d… defence and civil protection.

3. The Commission shall establish a European database on data centres that includes information communicated by the obligated data centres in accordance with paragraph 1. The European database shall be publicly available on an aggregated level.

4. Member States shall encourage owners and operators of data centres in their territory with a power demand of the installed IT equal to or greater than 1 MW to take into account the best practices referred to in the most recent version of the European Code of Conduct on Data Centre Energy Efficiency.

5. By 15 May 2025, the Commission shall assess the available data on the energy efficiency of data centres submitted to it pursuant to paragraphs 1 and 3 and shall submit a report to the European Parliament and to the Council, accompanied, where appropriate, by legislative proposals containing further measures to improve energy efficiency, including establishing minimum performance standards and an assessment on the feasibility of transition towards a net-zero emission data centres sector, in close consultation with the relevant stakeholders. Such proposals may establish a timeframe within which existing data centres are to be required to meet minimum performance.

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Understanding the EE Directive - Article 12 : DTC IT ≥ 500kW

EED minimum requirements for monitoring

ANNEX VII

MINIMUM REQUIREMENTS FOR MONITORING AND PUBLISHING THE ENERGY PERFORMANCE OF DATA CENTRES

The following minimum information shall be monitored and published with regard to the energy performance of data centres referred to in Article 12:

(a) the name of the data centre, the name of the owner and operators of the data centre, the date on which the data centre started its operations and the municipality where the data centre is based;

(b) the floor area of the data centre, the installed power, the annual incoming and outgoing data traffic, and the amount of data stored and processed within the data centre;

(c) the performance, during the last full calendar year, of the data centre in accordance with key performance indicators about, inter alia, energy consumption, power utilisation, temperature set points, waste heat utilisation, water usage and use of renewable energy, using as a basis, where applicable, the CEN/CENELEC EN 50600-4 'Information technology – Data centre facilities and infrastructures', until the entry into force of the delegated act adopted pursuant to Article 33(3).

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Understanding the EE Directive - Article 12 : DTC IT ≥ 500kW

What if we do nothing?

Article 32

Penalties

Member States shall lay down the rules on penalties applicable to infringements of national provisions adopted pursuant to this Directive and shall take all measures necessary to ensure that they are implemented. The penalties provided for shall be effective, proportionate and dissuasive. Member States shall by 11 October 2025 notify the Commission of those rules and of those measures and shall notify it without delay of any subsequent amendment affecting them.

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Note: *COMMISSION DELEGATED REGULATION (EU) of 14.3.2024*
Established a grace for the first reporting period on 15 September 2024

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Achieve the EU's EED targets for DTC IT ≥ 500 kW Quickly!

Thanks to the simple addition of non-intrusive Digiware Metering

Add power metering to any part of your installation

The addition of metering in a DTC is made easy with **Diris Digiware…**

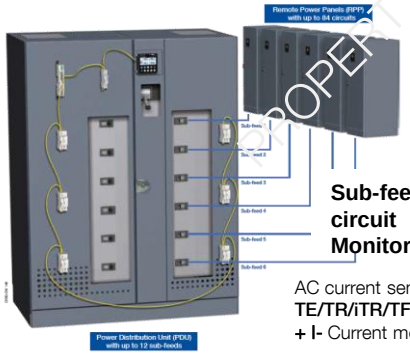
Seamless integration throughout the entire AC and DC power distribution…

From Power Quality Metering at the incoming level to low voltage switchboards to PDUs, RPPs and even busway tap-off units…!



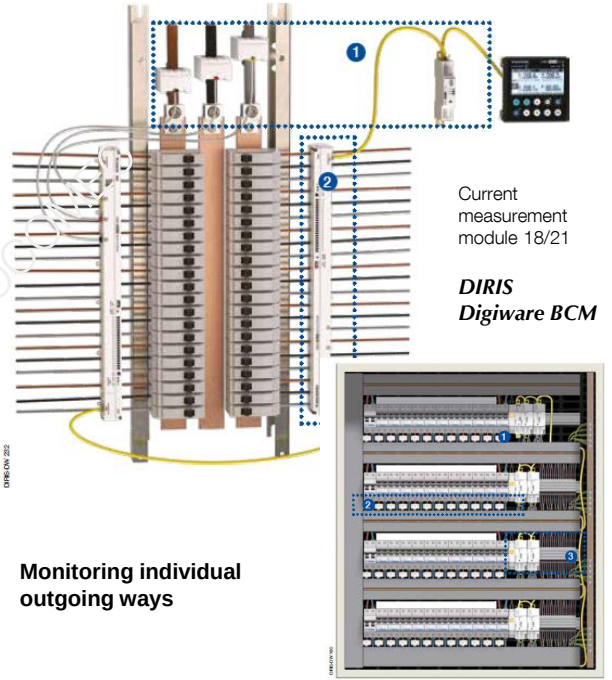
Busway Monitoring

Current measurement module with integrated sensors ***DIRIS Digiware S***



Sub-feed circuit Monitoring

AC current sensors **TE/TR/iTR/TF** **+ I-** Current modules



Current measurement module 18/21

DIRIS Digiware BCM

Monitoring individual outgoing ways

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socomec
Innovative Power Solutions

Achieve the EU's EED targets for DTC IT > 500 kW Quickly!

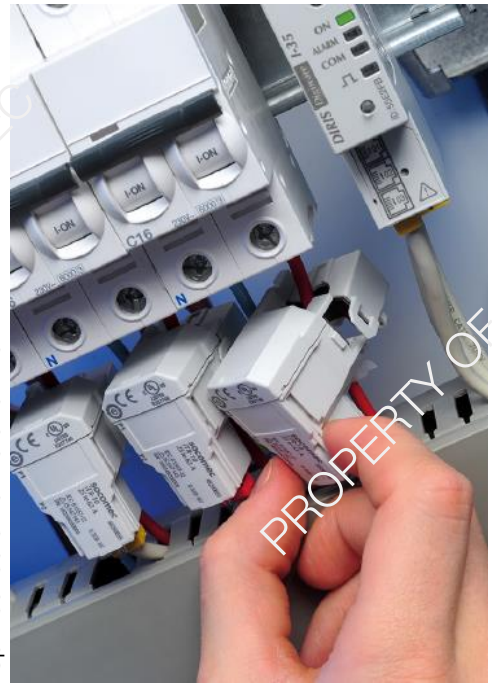
Examples of the non-intrusive addition of sensors for retrofitting metering points

Add power metering to any part of your installation

Adding metering points within an existing DTC installation is no longer complicated…

…and this includes critical installations where it is not possible or extremely costly to disconnect the supply

- Split-core (TR) sensors
- Flexible (TF) current sensors



Split sensors from 0.5 to 720 A



Rogowski sensors from 3 to 7200 A

Understanding the EE Directive - Article 12 for DTC IT ≥ 1 MW

1. By 15 May 2024 and every year thereafter, Member States shall require owners and operators of data centres in their territory with a power demand of the installed information technology (IT) of at least 500kW, to make the information set out in Annex VII publicly available, except for information subject to Union and national law protecting trade and business secrets and confidentiality.

2. Paragraph 1 shall not apply to data centres used for, or providing their services exclusively with the final aim of, defence and civil protection.

3. The Commission shall establish a European database on data centres that includes information communicated by the obligated data centres in accordance with paragraph 1. The European database shall be publicly available on an aggregated level.

4. Member States shall encourage owners and operators of data centres in their territory with a power demand of the installed IT equal to or greater than 1 MW to take into account the best practices referred to in the most recent version of the European Code of Conduct on Data Centre Energy Efficiency.

5. By 15 May 2025, the Commission shall assess the available data on the energy efficiency of data centres submitted to it pursuant to paragraphs 1 and 3 and shall submit a report to the European Parliament and to the Council, accompanied, where appropriate, by legislative proposals containing further measures to improve energy efficiency, including establishing minimum performance standards and an assessment on the feasibility of transition towards a net-zero emission data centres sector, in close consultation with the relevant stakeholders. Such proposals may establish a timeframe within which existing data centres are to be required to meet minimum performance.

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EED for DTC ≥1MW : EU Code of conduct



EED Article 12 Item 4:

- Encourages to take into account the **2023 best practice guidelines for the EU Code of Conduct on DTC EE**

Code of conduct:

- Section 6: Power Equipment

Details and recommendations for how to select a UPS for a better overall impact on efficiency

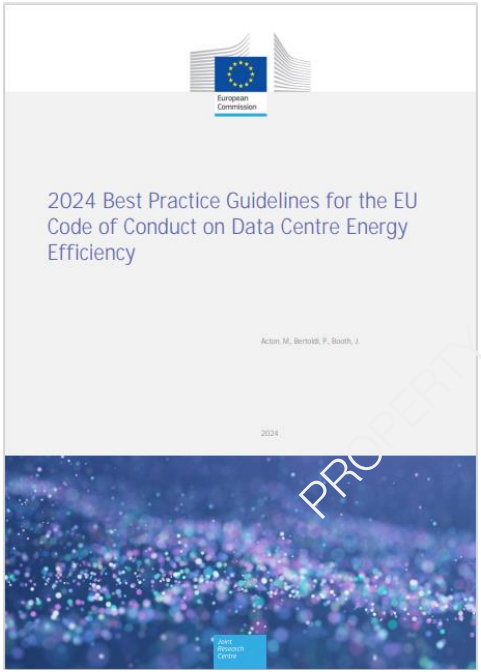
- Section 9: Monitoring

Description including the granularity of metering points where and how to measure the PUE … and publish the data

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EED for DTC ≥1MW : EU Code of conduct

Section 9.1 from the Best Practice Guidelines (Monitoring Granularity)



No	Name	Description	Expected	Value
9.1.1	Incoming energy consumption meter	Install metering equipment capable of measuring the total energy use of the data centre including all power conditioning, distribution and cooling systems. This should be separate from any non data centre building loads. Note: This is required for Code of Conduct reporting.	Entire Data Centre	4
9.1.2	IT Energy consumption meter	Install metering equipment capable of measuring the total energy delivered to IT systems. This may also include other power feeds where non UPS protected power is delivered to the cabinets. Note: This is required for Code of Conduct reporting.	Entire Data Centre	4
9.1.3	Room level metering of supply air temperature and humidity	Install metering equipment at room level capable of indicating the supply air temperature and humidity for the IT equipment.	Entire Data Centre	2
9.1.4	CRAC / CRAH unit level metering of supply or return air temperature	Collect data from CRAC / CRAH units on supply and return (dependent upon operating mode) air temperature.	Entire Data Centre	3
9.1.5	Distribution board level metering of Mechanical and Electrical energy consumption	Improve visibility and granularity of data centre infrastructure overheads	New build or retrofit	3
9.1.6	Cabinet level metering of IT Energy consumption	Improve visibility of IT energy consumption by metering at the cabinet level and individual power strips.	Optional	3
9.1.7	Row or Cabinet level metering of temperature	Improve visibility of air supply temperature in existing hot / cold aisle environments to assist in recognising and dealing with air flow management issues and both over-cooling and under-cooling of IT equipment. Note: This would be applicable in both contained and non-contained aisles.	Optional	3
9.1.8	IT Device level metering of temperature	Improve granularity and reduce metering cost by using built in device level metering of intake and / or exhaust air temperature as well as key internal component temperatures. Note: Most new servers provide this feature as part of the basic chipset functionality.	Optional	4
9.1.9	IT Device level metering of energy consumption	Improve granularity and reduce metering cost by using built in IT device level metering of energy consumption. Note: Most new servers provide this feature as part of the basic chipset functionality.	Optional	4

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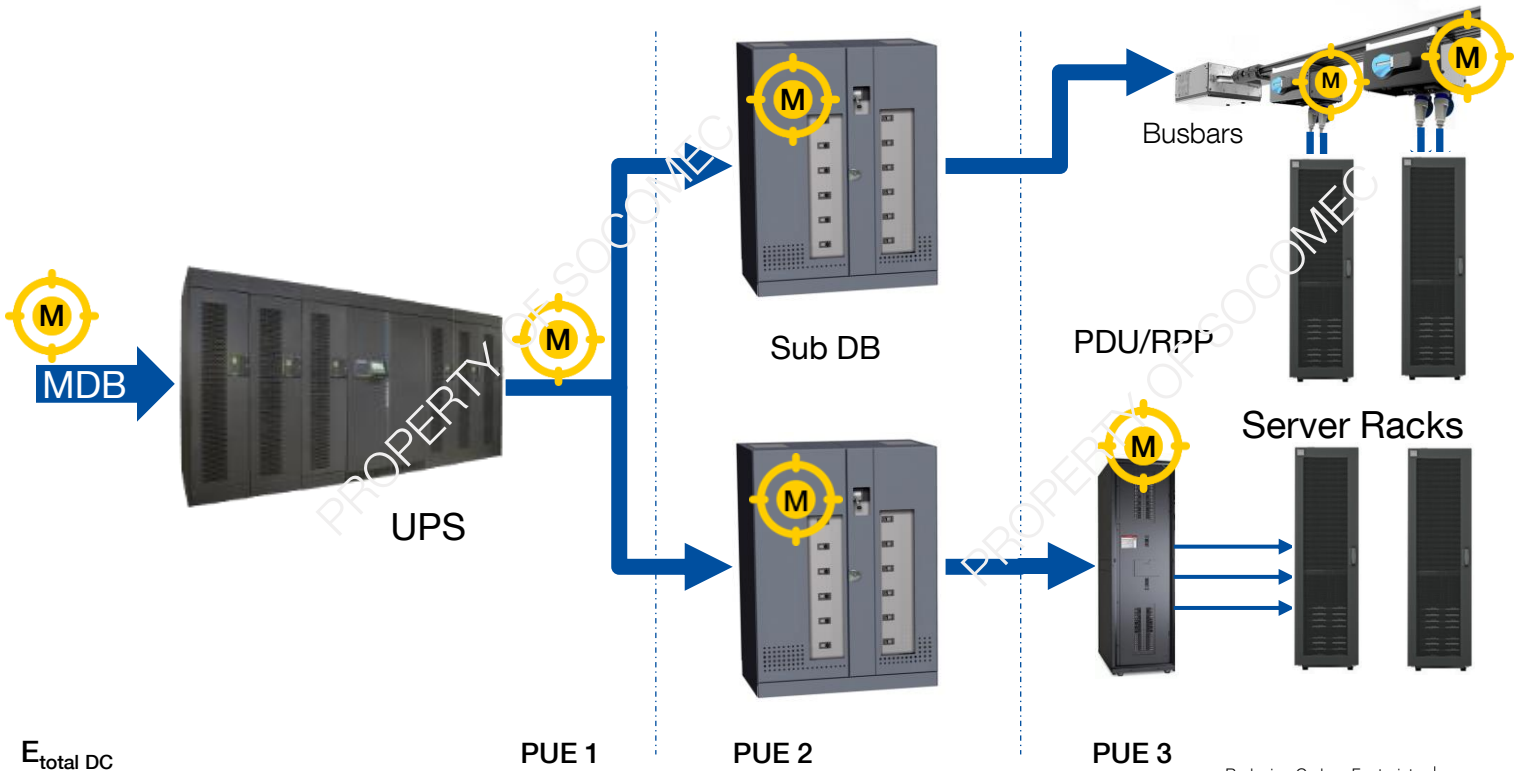
In Essence: Section 9.1 Monitoring

- 9.1.1: Incoming energy consumption meter
- 9.1.2: IT energy consumption meters
- 9.1.3: Room level air temp and humidity
- 9.1.4 : CRAC / CRAH unit level metering
- 9.1.5 : DB level meters (Mech & Elect. Energy)
- 9.1.6 : Cabinet level metering of IT energy
- 9.1.7 : Row or Cabinet air temp.
- 9.1.8 : IT Device level of temp. metering
- 9.1.9 : IT Device level of energy metering

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EED for DTC ≥1MW : EU Code of conduct

Section 9.1 : Examples of where the measurement points should be located



$E_{total\ DC}$ PUE 1 PUE 2 PUE 3

EED for DTC ≥1MW : EU Code of conduct

Section 6.1 from the Best Practice Guidelines (UPS Equipment)

6 Data Centre Power Equipment

The other major part of the facility infrastructure is the power conditioning and delivery system. This normally includes uninterruptible power supplies, power distribution units and cabling but may also include backup generators and other equipment.

6.1 Selection and Deployment of New Power Equipment

Power delivery equipment has a substantial impact upon the efficiency of the data centre and tends to stay in operation for many years once installed. Careful selection of the power equipment at design time can deliver substantial savings through the lifetime of the facility.

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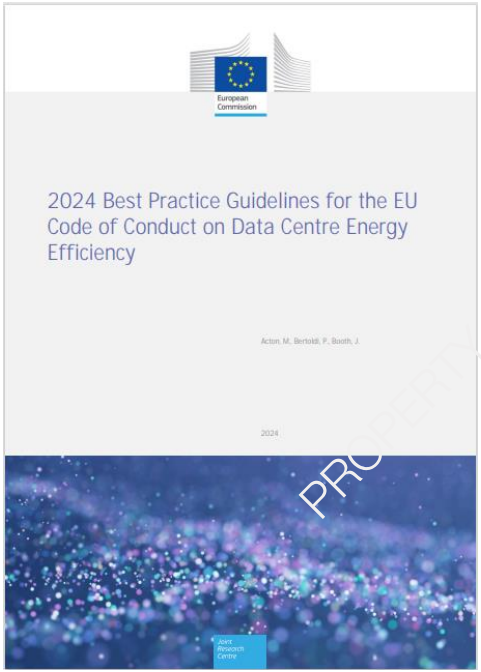
POWER CONVERSION



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EED for DTC ≥1MW : EU Code of conduct

Section 6.1 - Selection and Deployment of New Power Equipment (UPS)



No	Name	Description	Expected	Value
6.1.1	Modular UPS deployment	It is now possible to purchase modular (scalable) UPS systems across a broad range of power delivery capacities. Physical installation, transformers and cabling are prepared to meet the design electrical load of the facility but the sources of inefficiency (such switching units and batteries) are installed, as required, in modular units. This substantially reduces both the capital cost and the fixed overhead losses of these systems. In low power installations these may be frames with plug in modules whilst in larger installations these are more likely to be entire UPS units.	New build or retrofit	3
6.1.2	High efficiency UPS	If static AC UPS systems are to be installed select energy efficient UPS systems that are compliant with the "elite requirements" of the 2021 version of the EU Code of Conduct on Energy Efficiency of AC Uninterruptible Power Systems. A UPS compliant to this Code of Conduct requirement should also be compliant to *IEC 62040* series for UPS systems, which also provides environmental operating conditions. A UPS conforming to this standard should be able to perform as rated when operating within the following minimum ambient ranges: Temperature 0°C to +40°C. Relative Humidity 20% to 80% Note: Rotary and Direct Current UPS systems are not included in the 2021 version of the EU Code of Conduct on AC Uninterruptible Power Systems, but this does not in any way suggest that rotary or Direct Current UPS should not be used, rather that these technologies are not currently covered by an EU Code of Conduct providing shared evidence of meeting high efficiency requirements for these systems.	New build or retrofit	3
6.1.3	Use efficient UPS operating modes	Deploy UPS units in their most efficient operating modes where appropriate. Note Use of alternative UPS technologies such as rotary or direct current systems may be considered. The comparison and evaluation of the technologies shall be based on latest and non-biased information about available products in the market. Some UPS systems may have technologies allowing energy optimisation at partial load levels and these shall be taken into account as appropriate for the application. This may also be particularly relevant for any UPS system feeding mechanical loads e.g. CRAC/CRAH fans.	New build or retrofit	2
6.1.4	Elimination of Isolation Transformers	Isolation transformers in power distribution to IT equipment down to 120V are typically not required in Europe and should be eliminated from designs as they introduce additional transformer losses unnecessarily.	New build or retrofit	3
6.1.5	Efficient part load operation	Electrical infrastructure should remain energy efficient under partial fill and variable IT electrical loads as described in Practice 3.3.4.	New build or retrofit	3

In Essence:

6.1.1: Modular (scalable) UPS systems

6.1.2: Efficient UPS systems that are compliant with "elite requirements"

6.1.3: Use of efficient UPS operating modes *(Smart conversion)*

6.1.4 : Elimination of Isolation Transformers

6.1.5 : Efficient part load operation *(Energy saver – response to dynamic loads)*

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EED for DTC ≥1MW : EU Code of conduct

Section 6.1.**1**: How to comply → Example of SOCOMEC Modular (scalable) UPS

Right-size
LIMIT
YOUR CAPEX

Upscale fast
PLUG & PLAY
ADDITIONAL POWER



MODULYS XM
50 to 600 + 50 kVA

DELPHYS XL
200 to 1200//4800 kVA

MODULYS XL
200 to 1200//4800 kVA

Modular UPS

- Adapt power to the needs
- Optimise energy efficiency
- Minimise energy losses
- Grow as you go…

* Note: consider the design of the rest of the installation for final load

EED for DTC ≥1MW : EU Code of conduct

Section 6.1.2: How to comply → Example of SOCOMEC High Efficiency “Elite UPS”

Socomec UPS comply with the EU Code of Conduct for **Elite level UPS efficiency** that’s fit for the future.

A **voluntary commitment** to reduce energy losses and gas emissions caused by equipment.

→ Maximize UPS efficiency.

- Efficiency greater than 93.5% in VFI mode,
- Efficiency greater than 98% in VFD mode,
- Class 1 according to IEC 62040-3 standard



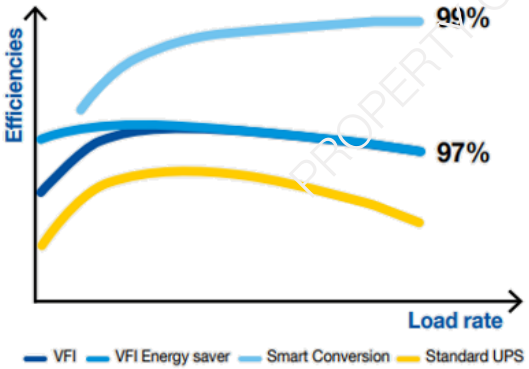
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EED for DTC ≥1MW : EU Code of conduct

Section 6.1.**3**: How to comply → Example of SOCOMEC Smart Conversion operating mode

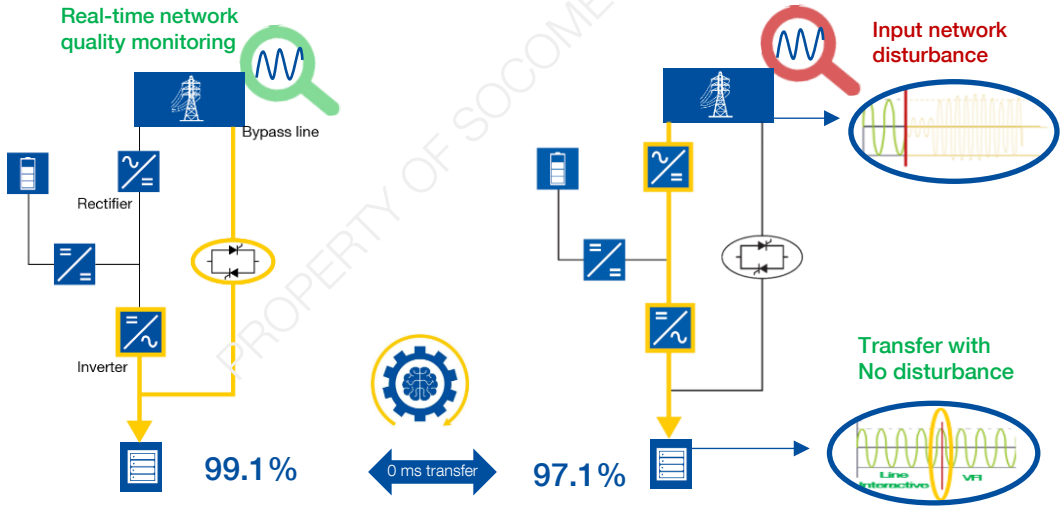
SMART Conversion

- Obtain 99.1% Ultimate Efficiency without compromise!
- Monitor the PQ & switch between VFI & Smart Conversion



- Inverters compensate reactive power & harmonics
- Real-time network quality monitoring

- Instantaneous 0 ms transfer between modes
  - no disturbance seen by the critical load
  - 3rd party certified IEC 62040-3 : Class 1



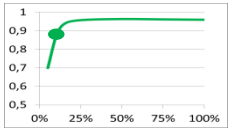
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EED for DTC ≥1MW : EU Code of conduct

Section 6.1.**5**: How to comply → Example of SOCOMEC Efficient partial load operation

VFI mode without energy saver

94%



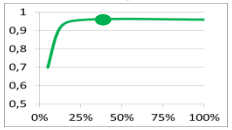
5 modules
@ 12% load rate



12%

VFI mode with energy saver

97%

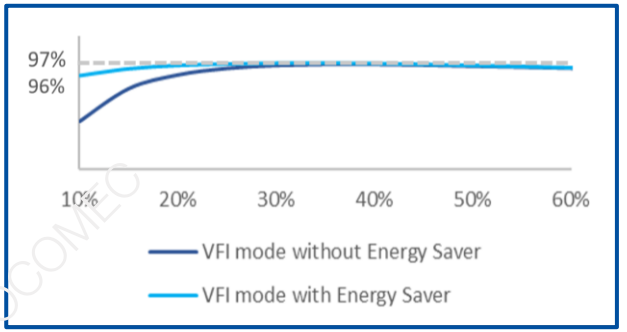


2 modules
@ 30% load rate

3* modules in
hot stand-by



12%



96,5% from 10% load rate

Auto start & stop of power modules to **optimise system efficiency** according to the load rate.

Energy saver mode ensures all **batteries are charged** and **intelligently selects alternate operating power bricks** to balance aging.

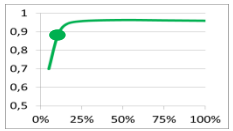
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EED for DTC ≥1MW : EU Code of conduct

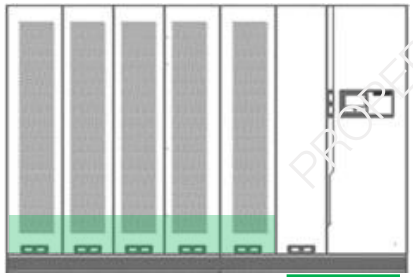
Section 6.1.**5**: How to comply → Example of SOCOMEC Efficient partial load operation

VFI mode without energy saver → **VFI mode with energy saver**

94%

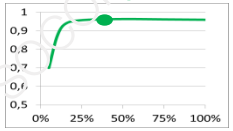


5 modules
@ 12% load rate



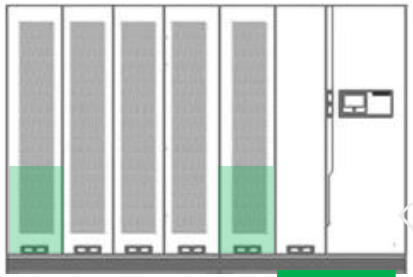
12%

97%



2 modules
@ 30% load rate

3* modules in
hot stand-by



12%

Energy saver also possible within a parallel system



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EED for DTC ≥1MW : EU Code of conduct

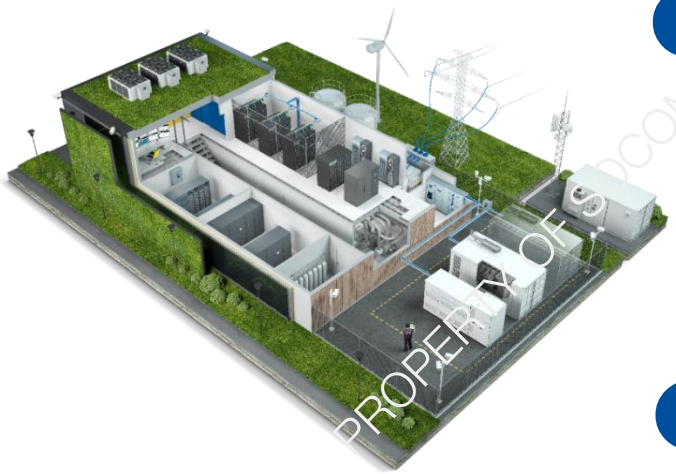
SOCOMEC UPS in compliance with the EED & EU Code of conduct

	Section 6.1.1 Modular UPS	Section 6.1.2 Elite UPS	Section 6.1.3 SMART conv.	Section 6.1.5 Energy Saver
 ***MODULYS XL*** 200-1200//4800 kW	✓+	✓	✓	✓
 ***DELPHYS XL*** 1000-1200//4800 kW	✓	✓	✓	✓
 ***MODULYS XM (NEW)*** 50 to 600 + 50 kW	✓+	✓	✓	✓
 ***DELPHYS XM (NEW)*** Up to 800 kW	✓	✓	✓	✓

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KEY TAKEAWAYS

EU EED and Trends for DTC >500kW and Code of conduct for DTC >1 MW



1 EED > 500 kW

- Communicate publicly PUE (EN50600)
- Universal metering system for New/Retrofit to comply

2 Code of Conduct > 1MW

- Multi point Metering defined for specific locations
- Elite UPS : Modular, Smart Conversion, Energy Saver

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thank you SO much!