



Powering the Future: AI-Optimized Energy Solutions for Next-Gen Data Centers

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ENGINEERED
TO OUTFIT

Presenter

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Key shifts in market



Rapid demand change and technology innovation

- From kW to MW to GW
- Direct Current implementation



People and competence availability

- Larger sites to build
- Shorter build up times



Supply chain availability and optimization

- Solutions to support design changes
- Modularity, Digital solutions

DC Benefits

Direct Current benefits

- Less conversion steps in total system
- Higher system efficiency ca 5% (less heat)
- Easier to replicate for bigger power
- Integration of renewables and alternative power sources

Where fits AC and where does DC



AC:

- Brownfield sites with existing equipment
- Mixed density sites
- Supply chain/code familiarity

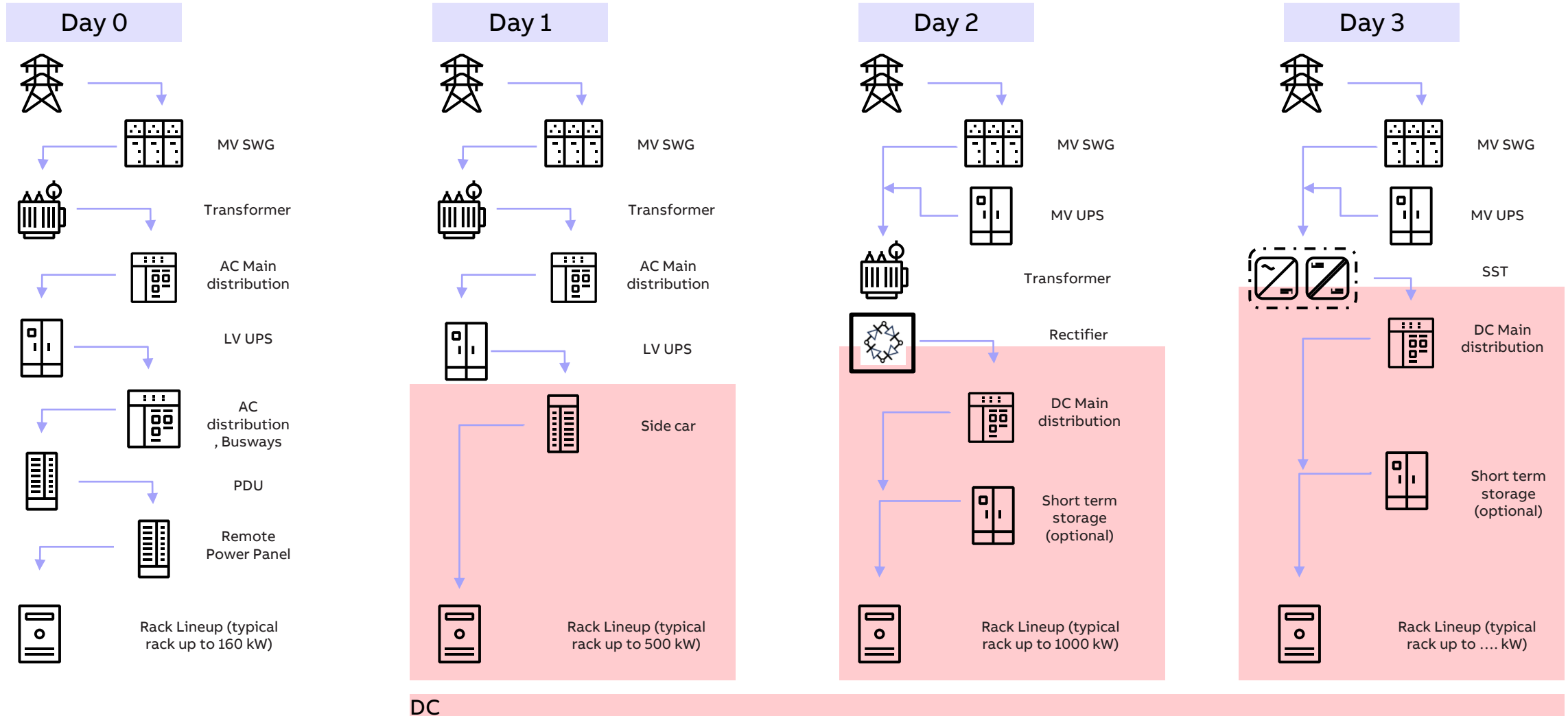


DC:

- High Tensity GPUs
- Campuses with BESS or renewable integration
- Greenfield builds

Evolution of topologies in the short to mid-term future

Simplified overview



Steps to consider

Define the **Purpose**:

- AI training
- AI inference
- Edge
- Telecom

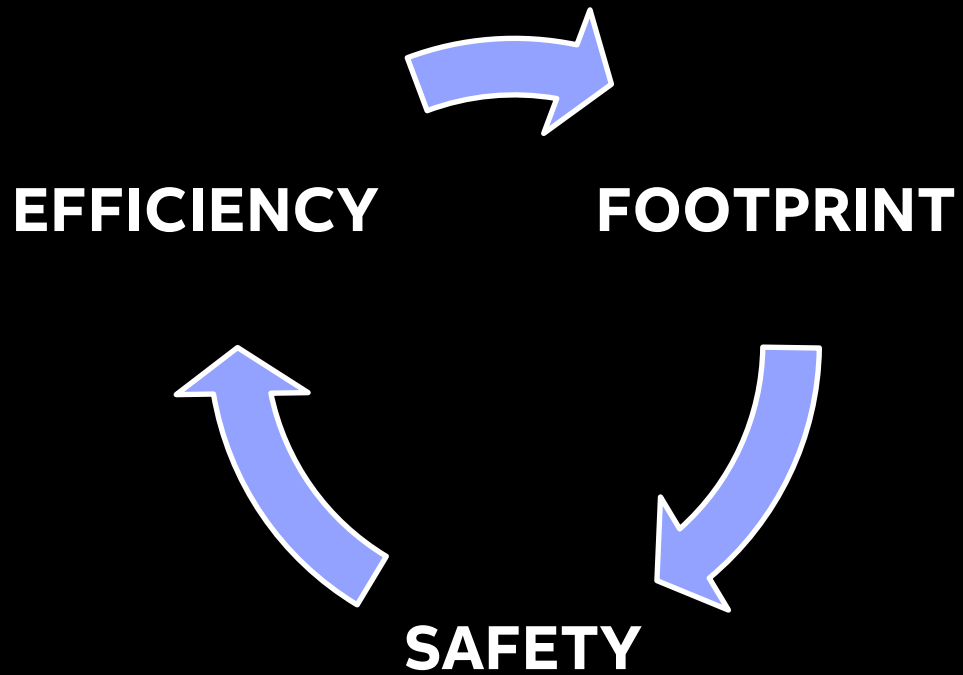
Plan the **Scalability**:

- What Power you have today
- What max power is achievable in the location

Prepare for **Future**:

- Consider upcoming Technologies
- New improvements for grid optimization
- Run leaner

Balance to consider



Technical challenges:

Selectivity

- Digital
- Mechanical

Safety

- Voltage level

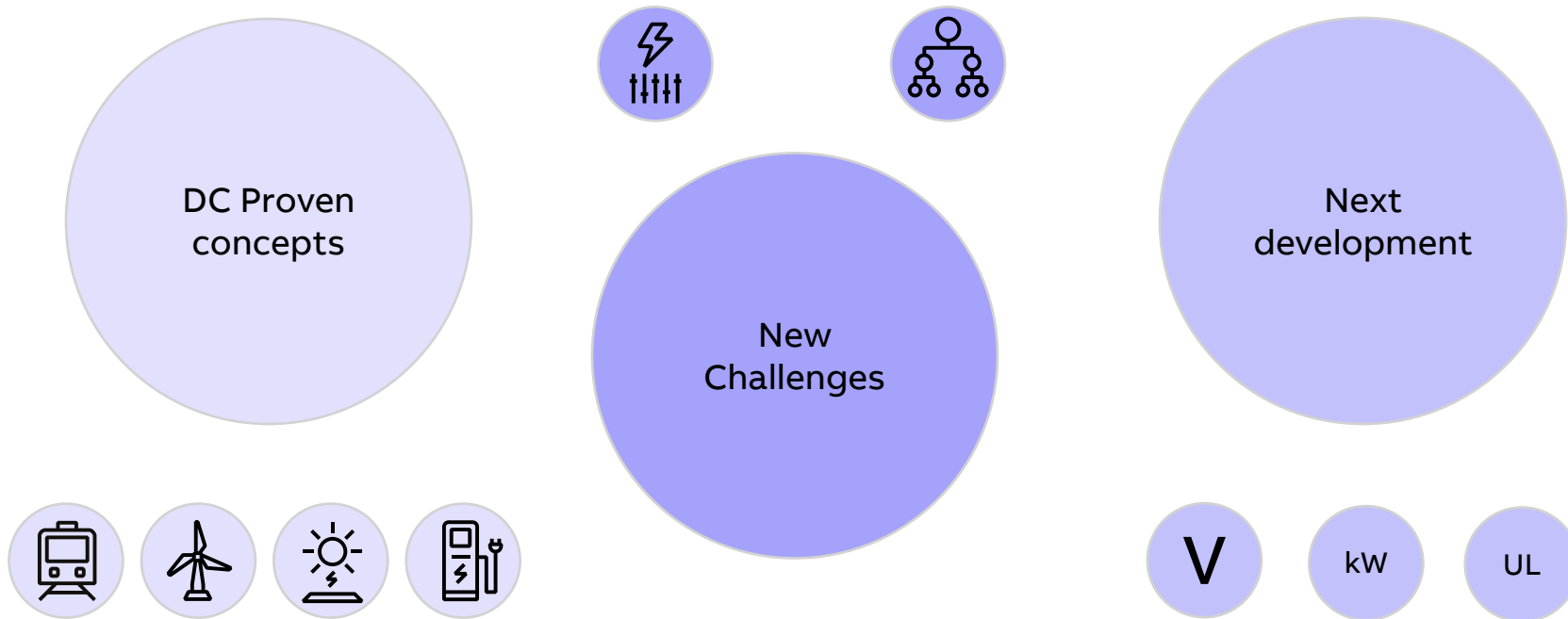
Efficiency

- Equipment choices

SOLID STATE TEHCHNOLOGY

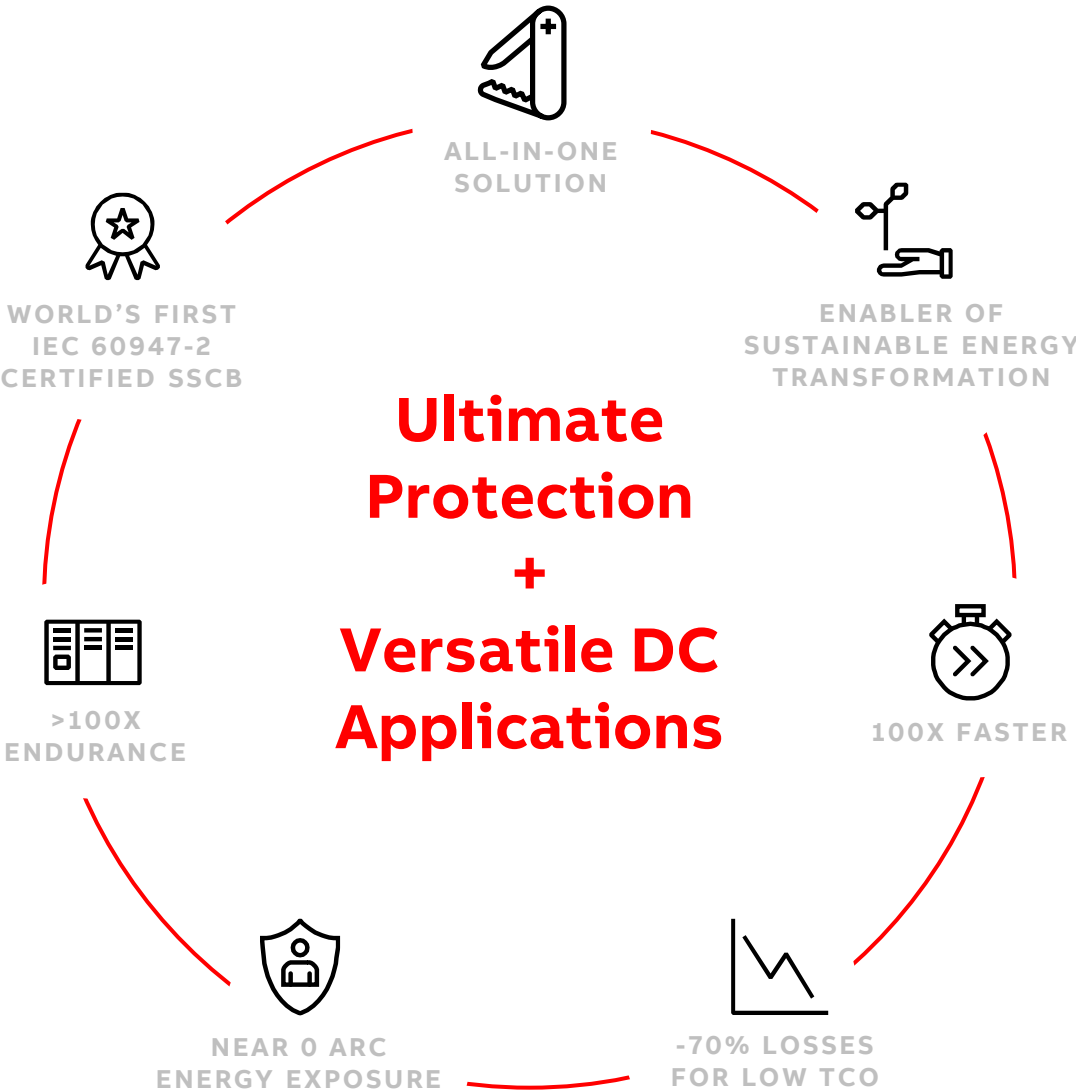
Roadmap to high compute data center

Today's planning for Tomorrow's architecture



Evolving Technology that will be game changer for high compute efficiency.

SACE Infnitus Solid-State Circuit Breaker



SACE Infinitus

The first true solid-state circuit breaker (IEC 60947-2)

Liquid cooling system

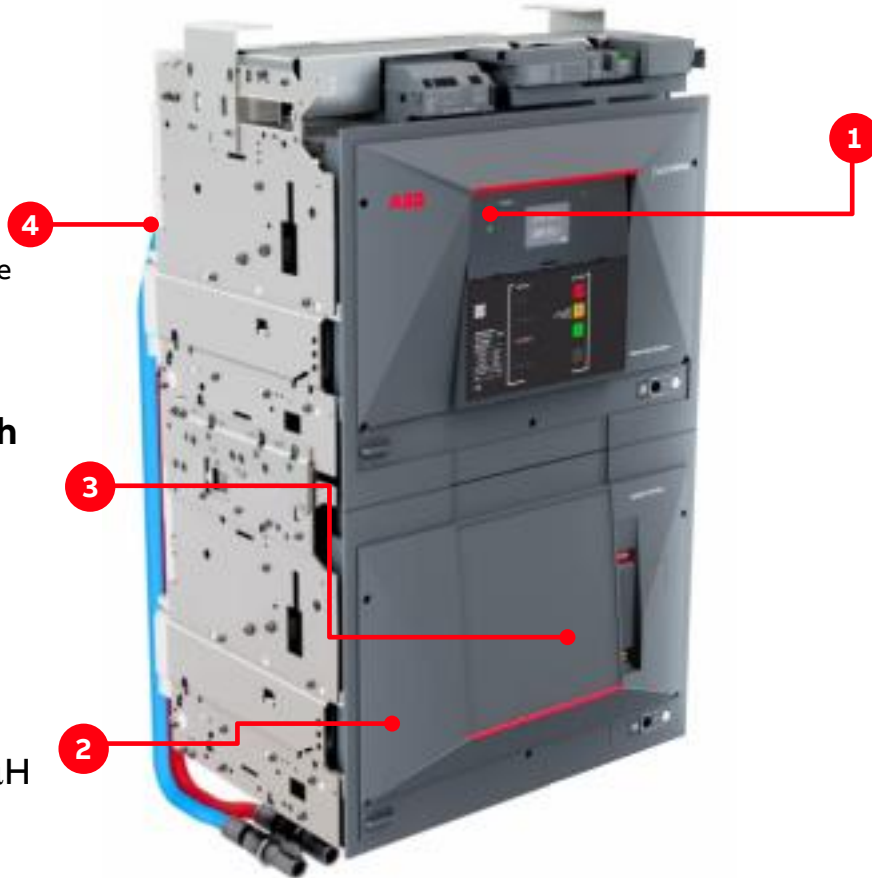
Water/glycol mixture

Isolation switch

2 poles
Motor-controlled

Inductance

0 – 3.5 - 16 μ H



Power electronic

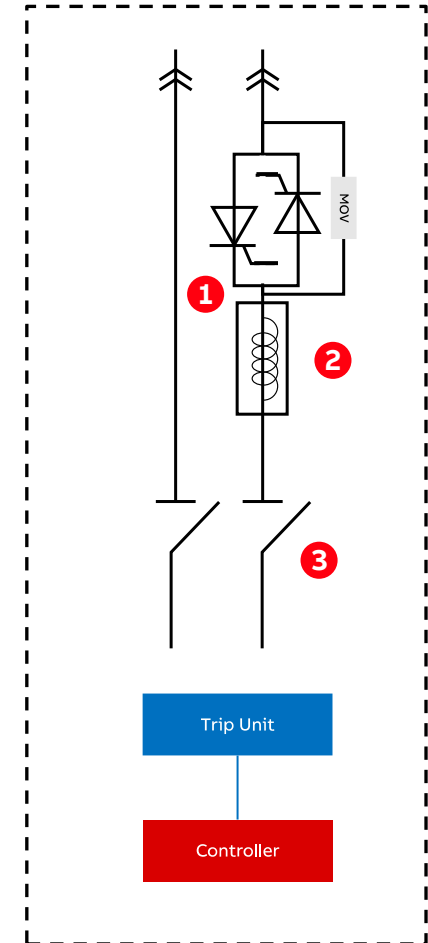
- Low loss optimized semiconductor
- Energy absorbing MOV
- Fully bi-directional

Protection unit

- Advanced protections (LSIG, UV, OV, UP, OP, ...)
- Monitoring/Metering
- Communication modules

Withdrawable frame

- 2 independent sections for rack in/out
- Simple maintenance



**UPS
FUNCTIONALITY
IN HIGHER
VOLTAGES**

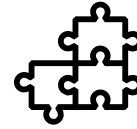
HiPerGuard MV UPS

Why HiPerGuard?



High Performance

IEC 62040-3 VI SS 111 Class 1 load protection providing load isolation from the network with sub-cycle response load conditioning



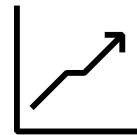
High Scalable Power

from 2.5 MW **up to 25 MW**
in parallel, allows load growth capacity, minimising CAPEX



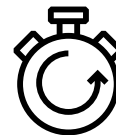
High levels

Of the system's energy reserve
Available for **grid support services** or **peak shaving**



High Efficiency

Leading efficiency UPS **up to 98%**
from 50 to 100% loading



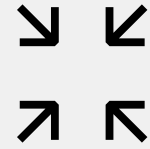
High Availability

15 years' lifetime design
Up to 10 years intervals between intrusive maintenance

AI & Mega data centers

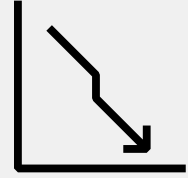
Why going MV UPS?

A large data center needs a **power protection scheme** that can supply a **sizeable & scalable amount of power** in a very reliable and efficient waya power protection & distribution approach at the **medium-voltage (MV) level provides the perfect solution**



Reduction in valuable floorspace with additional possibility to move power protection outside of whitespace

2 x less functional units required, that leads to **85% less labor** and **70 % less maintenance** need.

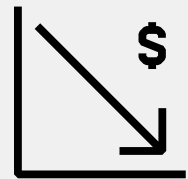


Reduced energy losses due: optimized power path without transformers; low cable thermal losses plus a high MV UPS efficiency

14 x less copper compared to traditional UPS architecture



Increased reliability with reduced number of breakers and inherently more reliable MV distribution systems



Savings in material cost & cable thermal losses reduction with MV power distribution infrastructure,

160 x times smaller **CO2** footprint compared to traditional data Center average architecture

SCALE AND SPEED



Why it matters?

2020
Avg 28 MW

2026
Avg 52 MW

2030
Avg 100+
MW

2020
Avg 2 years

2026
Avg 3 years

2030
Avg 1,5 years

Improve speed to deployment with prefabricated solutions

01 Traditional on-site build "stick built"



02 Prefabricated off-site eHouse or skid



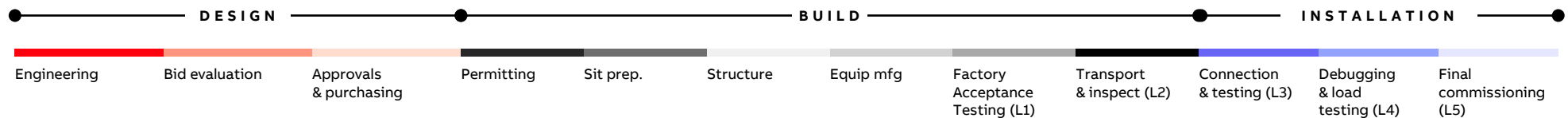
30% improvement over traditional

03 Predesigned, prefabricated off-site eHouse or skid



50% improvement over traditional

20% improvement over prefabricated



Modular data centers PowerFlex family



GridLink

Prefabricated eHouse for utility connection. Up to 9 panel primary switchgear to connect to grid and feed up to 7 ring networks



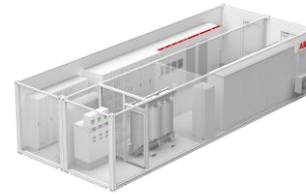
Bridge

Outdoor medium voltage connection pod to connect up to 4 MV feeds.



Core MV

Inside Colocation ring feed, Usually connected to primary swg and UPS Pods in downstream



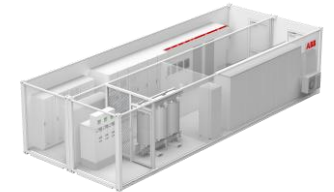
Core LV

Inside Colocation ring feed. Typically connected do step down transformer LV side.



Shield

Inside Colocation ring feed, Usually connected to primary swg and UPS Pods in downstream LV SWG for cable protection purpose only



QuickDeploy

All-in-1 pod to speed up installation time on site.

| Consists: | | Consists: | | Consists: | | Consists: | | Consists: | | Consists: | |
|-----------|---|-----------|---|-----------|---|-----------|---|-----------|---|-----------|---|
| MV | X | MV | X | MV | X | MV | | MV | X | MV | X |
| TR | | TR | | TR | X | TR | | TR | X | TR | X |
| LV | | LV | | LV | | LV | X | LV | X | LV | X |
| UPS | | UPS | | UPS | | UPS | X | UPS | | UPS | X |

Fault management in RMU-based self-healing rings

REX615 as an enabler

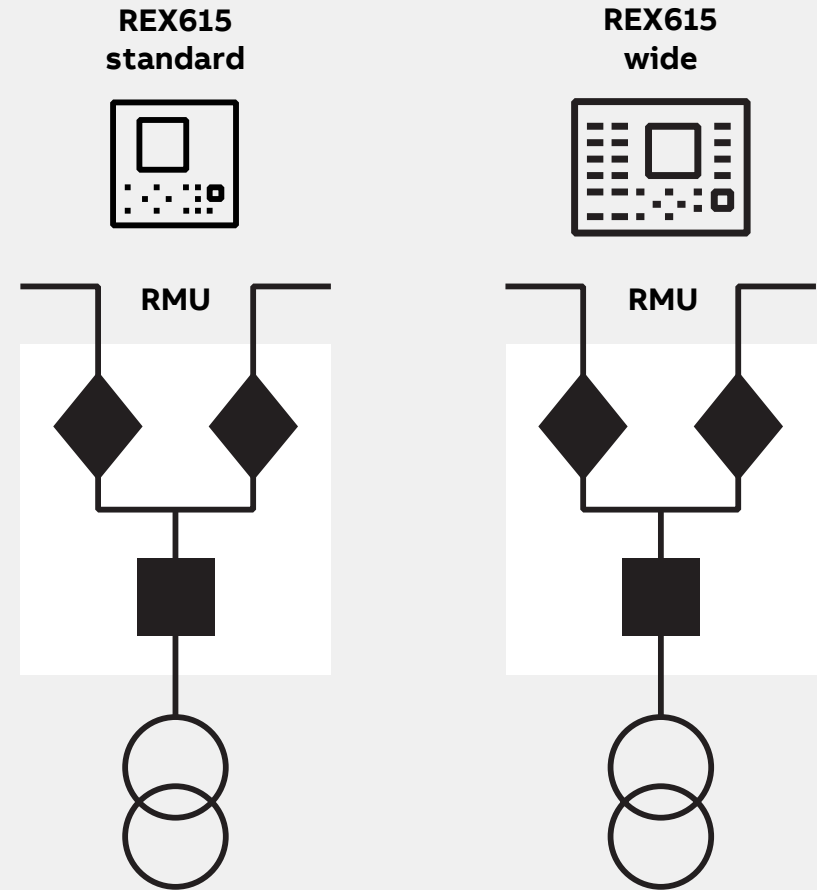


**Real-time simulation, testing and verification
of the whole system in the laboratory =**

- Facilitates engineering and commissioning to minimize testing on site
- Convenient ordering of preconfigured relays for extensions and future projects once the system has been verified – no engineering needed in the extension phase



**Compliance with the IEC 62443-4-2 standard
and readiness for the EU Cyber Resilience Act
(2027) to promote secure connectivity and
safeguard the evolving electrical network**



The all-in-one protection and control relay REX615 is an excellent choice for a cost-effective, RMU-based self-healing ring solution.

Wrap up

Power and grid availability



Rapid Technology development

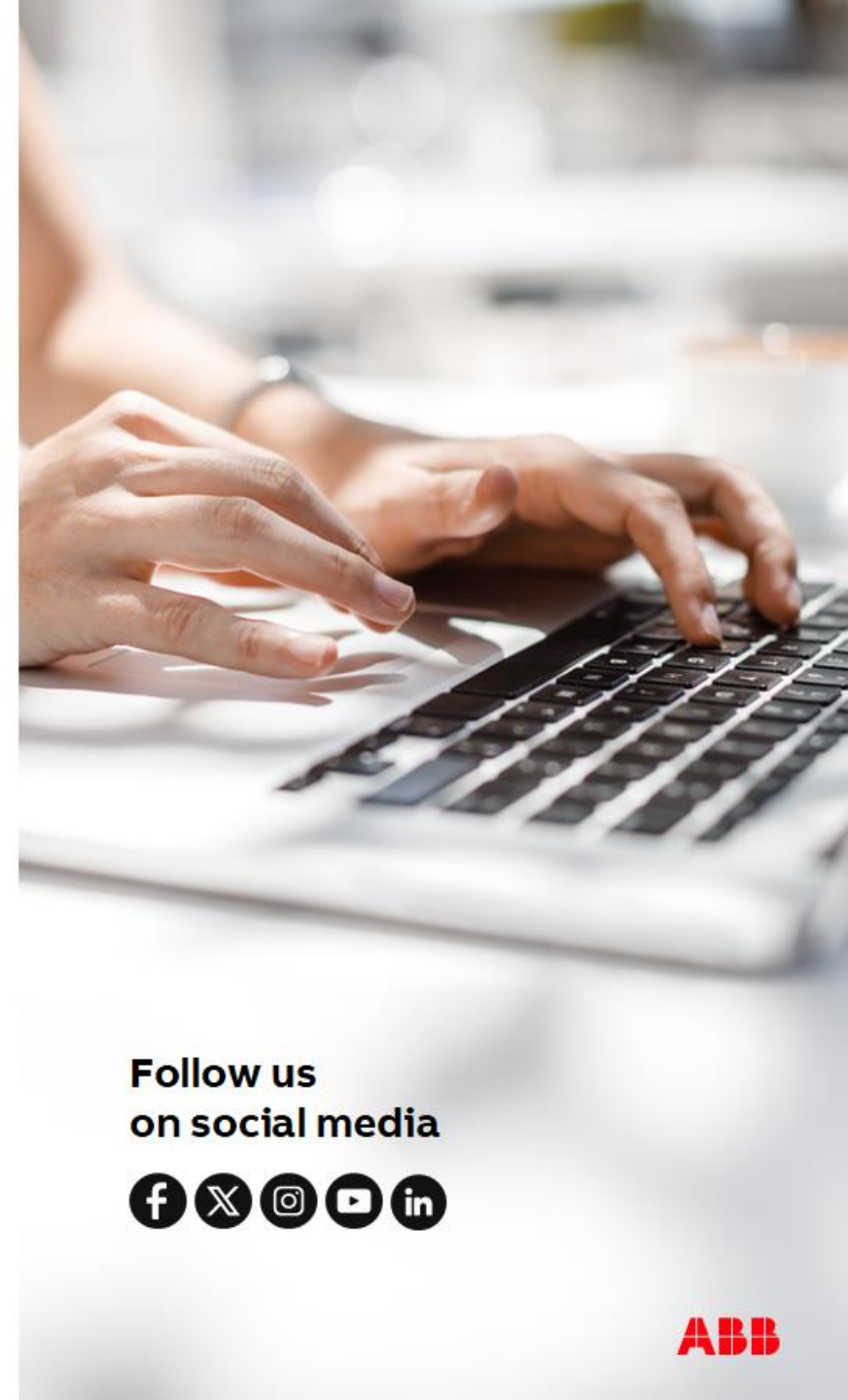


Flexibility to adopt



Thank You!

Do You have
any questions?



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