



DC Ready-Smart DC , Building the Future

Huawei ICT Day

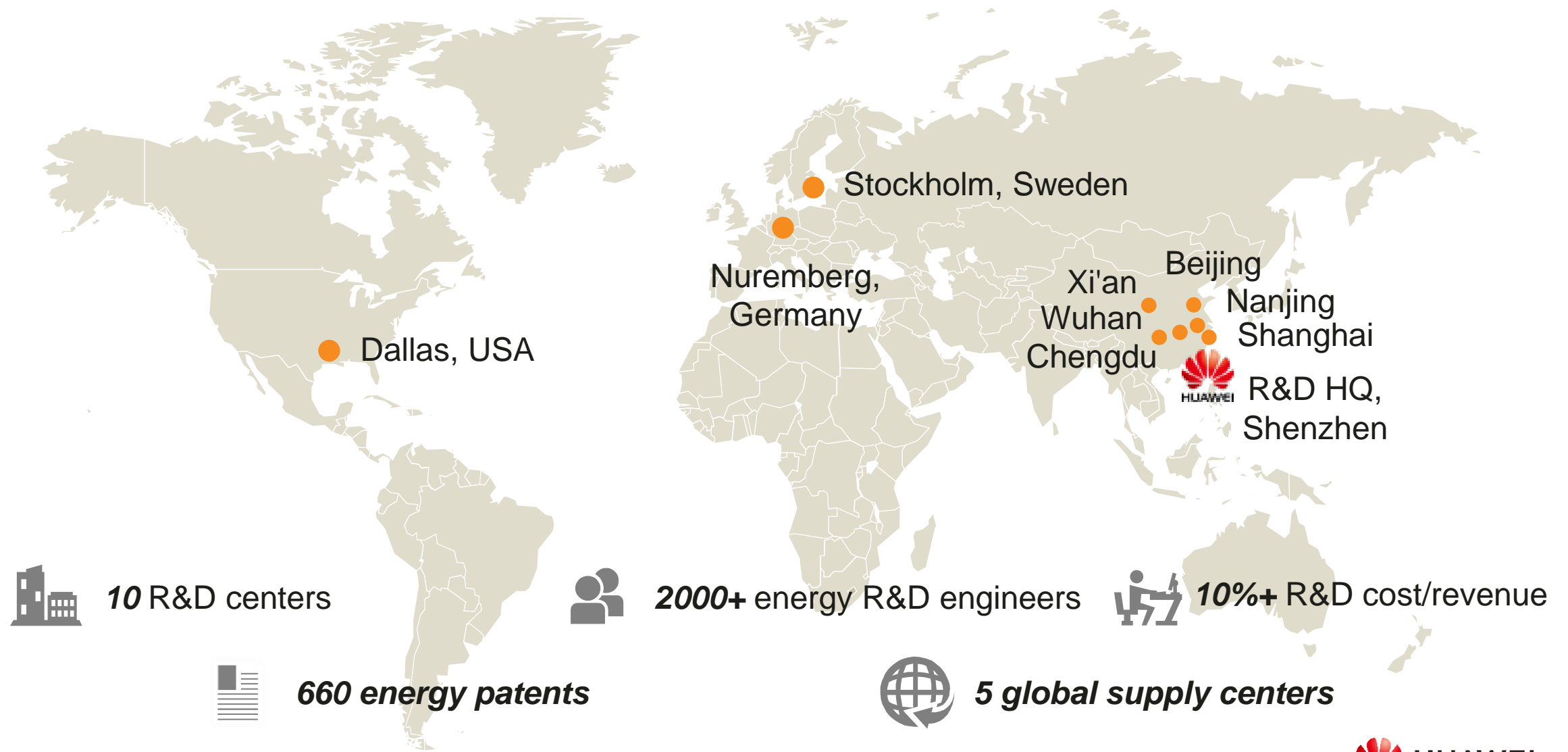
Piero, Data center energy product manager



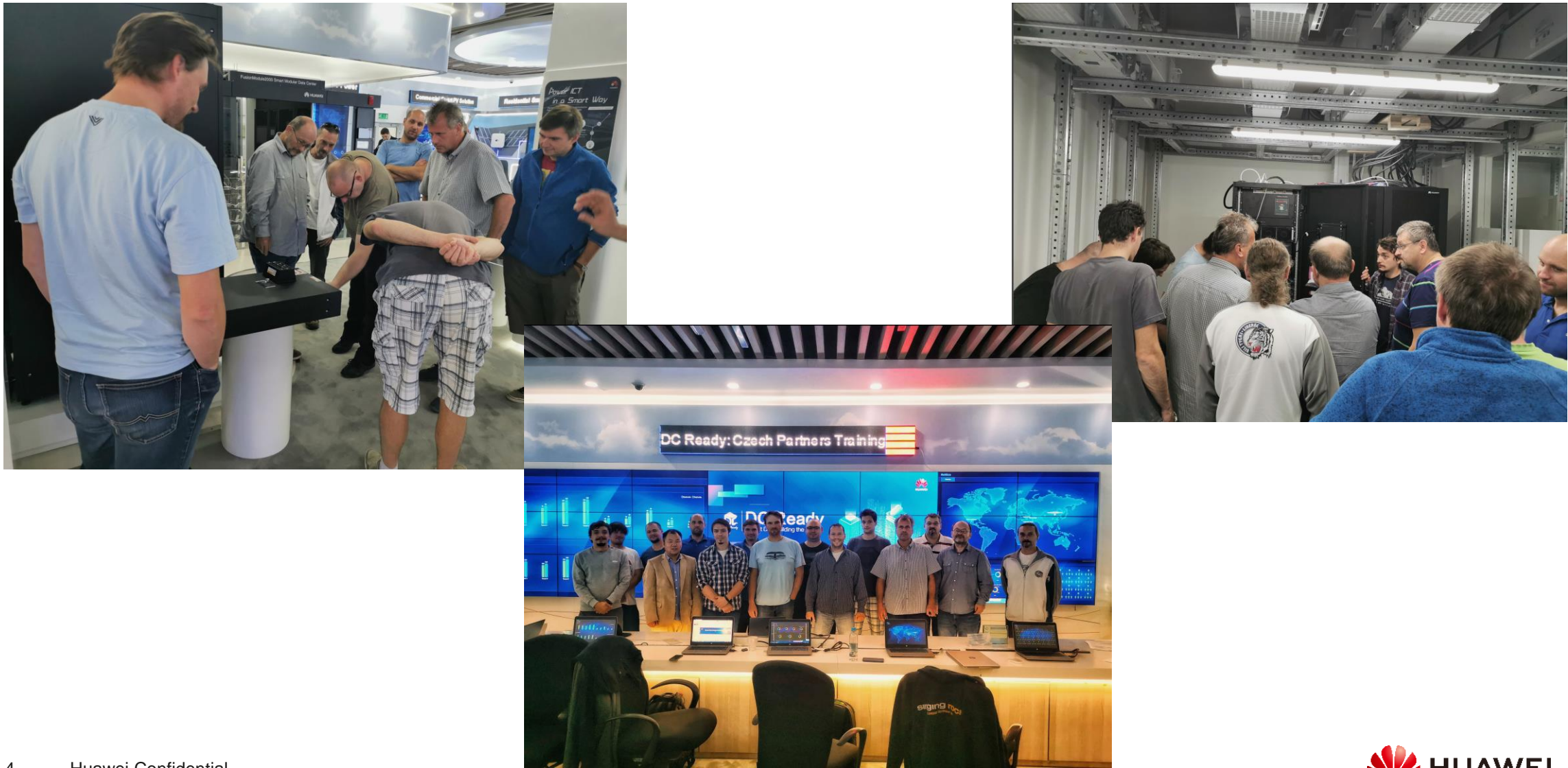
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HUAWEI Data Center Energy

Outstanding Data Center Energy R&D Team All Over the World



Czech Partners training in Nuremberg Innovation Experience Center



Our R&D Laboratories wait for your Factory Test



Systems Test Platform



Load Room

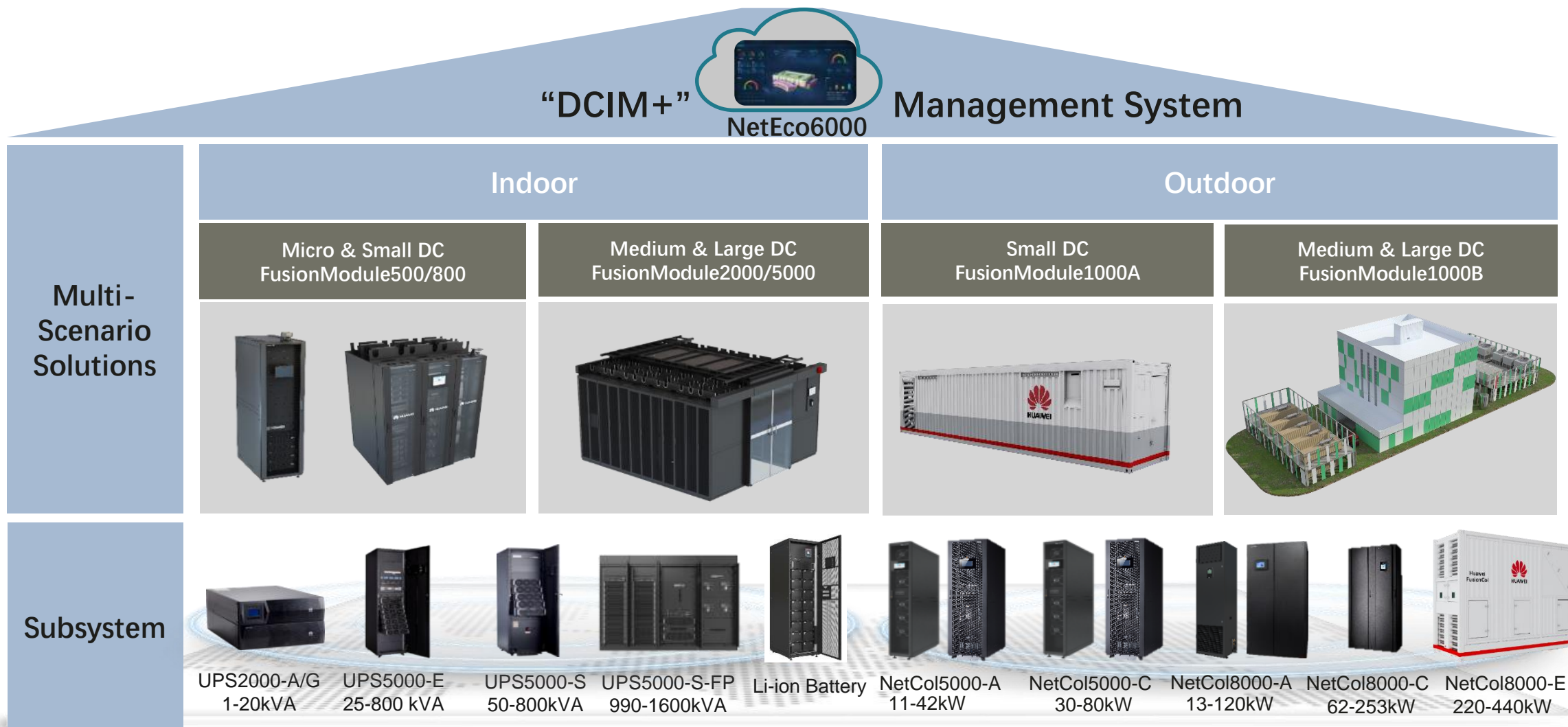
Huawei UPS R&D team deploys 4 laboratories around the world (Dongguan, Xi'an, Nuremberg and Stockholm). The floor area of Tuanbowa UPS Laboratory is 4,300m², which is used for research, development and verification of medium and large UPS, with industry-leading and highly automated test environment.

- 6MVA total power supply capacity: Meet multiple large UPS full load tests
- 12MVA load capacity (R, RCD, L, C): Simulate UPS output characteristics in different scenarios
- 20 system test platforms: Meet multiple UPS parallel tests
- Maximum 2.4MW power capacity platform: Meet ultra-high power FusionPower full load test and major FAT
- 22 module test platforms: Meet multiple modules (power module and bypass module) and boards parallel test and major FAT
- 6 movable auto test equipment: Support 24/7 R&D test under unattended conditions, greatly improving test efficiency

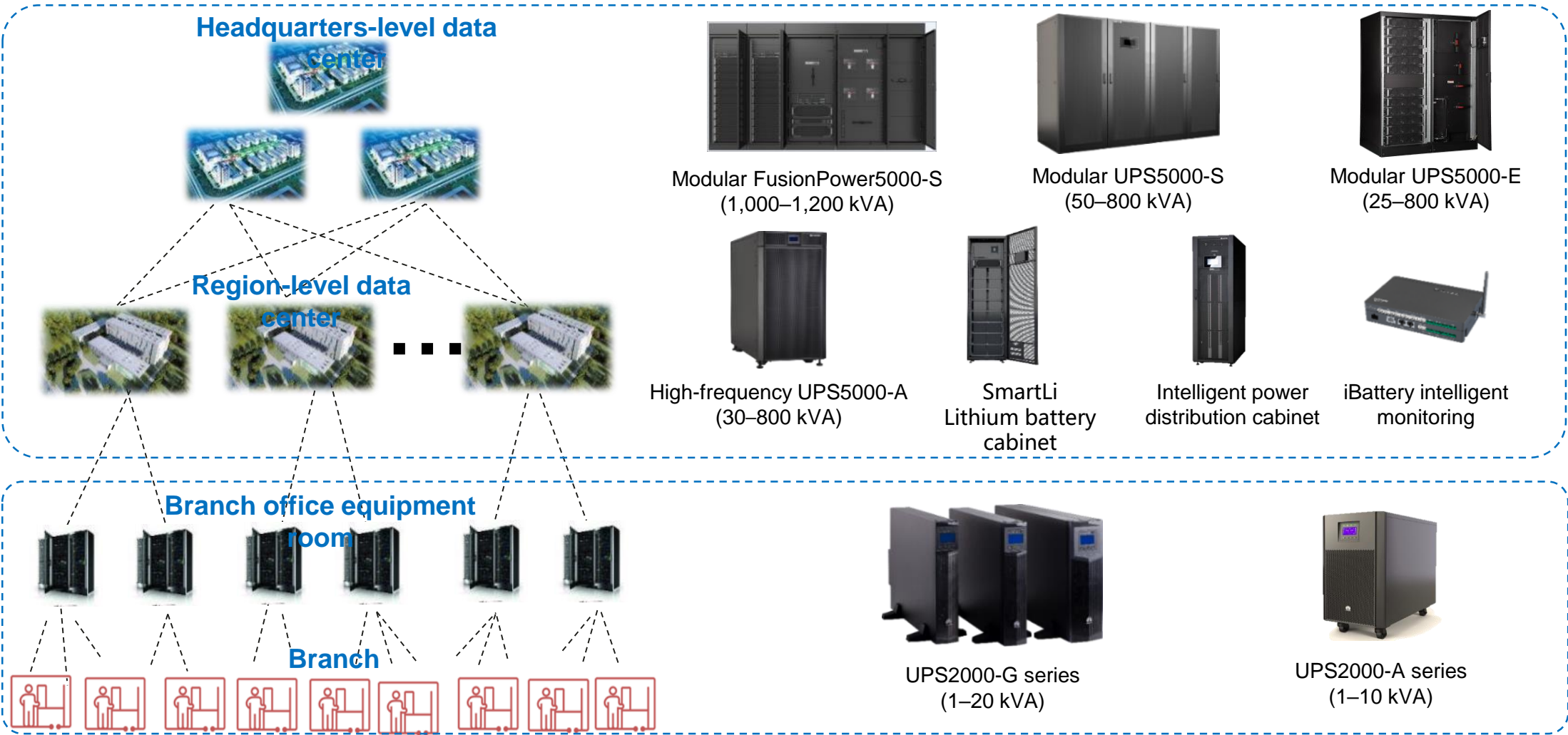
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Huawei Products & Solutions

Huawei Smart Modular DC Solution Adapts to Diverse Scenarios



Huawei Intelligent Power Supply and Distribution Solution for All Scenarios



Modular UPS: More Reliable, Efficient, and Simple



UPS5000
25-1200kVA

50kVA/25KVA Power Module
3U /2U high & **97.5%** Efficiency



Reliable

Full
redundancy
design



Component :
1+1
Redundancy

Module : N+X
Redundancy

System: Dual
communication
bus redundancy

Efficient

System at
97.1% efficient

1% efficiency increment saves about \$30k
in a life cycle

96%

VS

97.1%

Take 400kVA and 40% load rate as examples

Simple

5 minutes
complete module
maintenance

Traditional UPS



Take professional
engineer **8+ hrs**

Huawei Modular UPS



Take labor **5 mins**

Why Huawei Modular UPS ?

	Item	Tower UPS	Modular UPS	Huawei Modular UPS
Parallel reliability	Hardware design	Power controller combined with parallel controller	Power controller + parallel controller	Power controller + parallel controller *2
	Communication	Single or dual CAN	Single or dual CAN	Dual CAN in and between cabinet
Power unit reliability	Control system	Module control	Module control	ECM centralized control
	Component	Less redundancy design	Partly redundancy design	Important parts has redundancy
Transportation& Installation	Size & weight	Big	Small	The highest power density
Maintenance	Maintenance	Need long time to locate issue and replace	Power modules can hot swap online	All modules can hot swap online

Modular UPS is the Future

Modular Design Makes a Engineer to Finish Maintenance in 5min

Traditional

UPS:

1

experienced
engineer

8 hours

Huawei

UPS:

1

regular
engineer

5 min

Different Modular UPS adapt to different requirements

category	model	capacity	One power module	Power factor	System efficiency	Positioning
UPS5000-S Large modular UPS High efficiency	UPS5000-S-1.2MW	990-1200kVA	55kVA	1	97%	High-end customer Large Data center
	UPS5000-S-1.6MW	990-1600kVA				
	UPS5000-S	50-800KVA	50kVA			
UPS5000-E Large modular UPS Standard efficiency	UPS5000-E (50kVA)	50-800kVA	50kVA	1	96%	Cost-effective
	UPS5000-E (60kVA)	400-600kVA	60kVA	0.9		Low price
UPS5000-E Medium modular UPS	UPS5000E-125k	25-125kVA	25kVA	1		Cost-effective
	UPS5000E-75k (1m height)	25-75kVA				Low price

Choose UPS model based on UPS capacity, power factor and system efficiency

Modular UPS is our most competitive product

The Bottleneck of VRLA in DCs Becomes More and More Serious



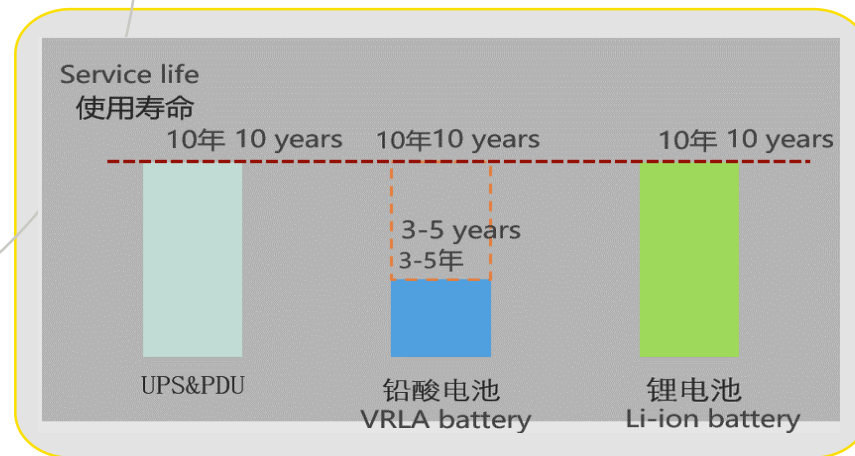
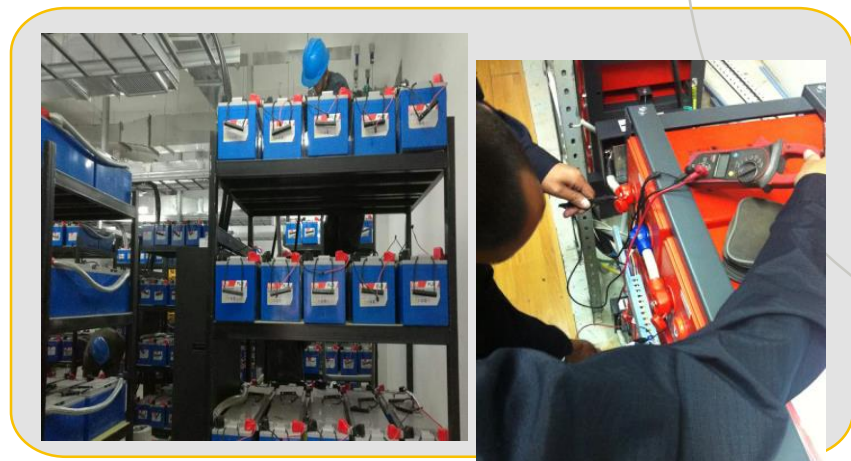
Large footprint



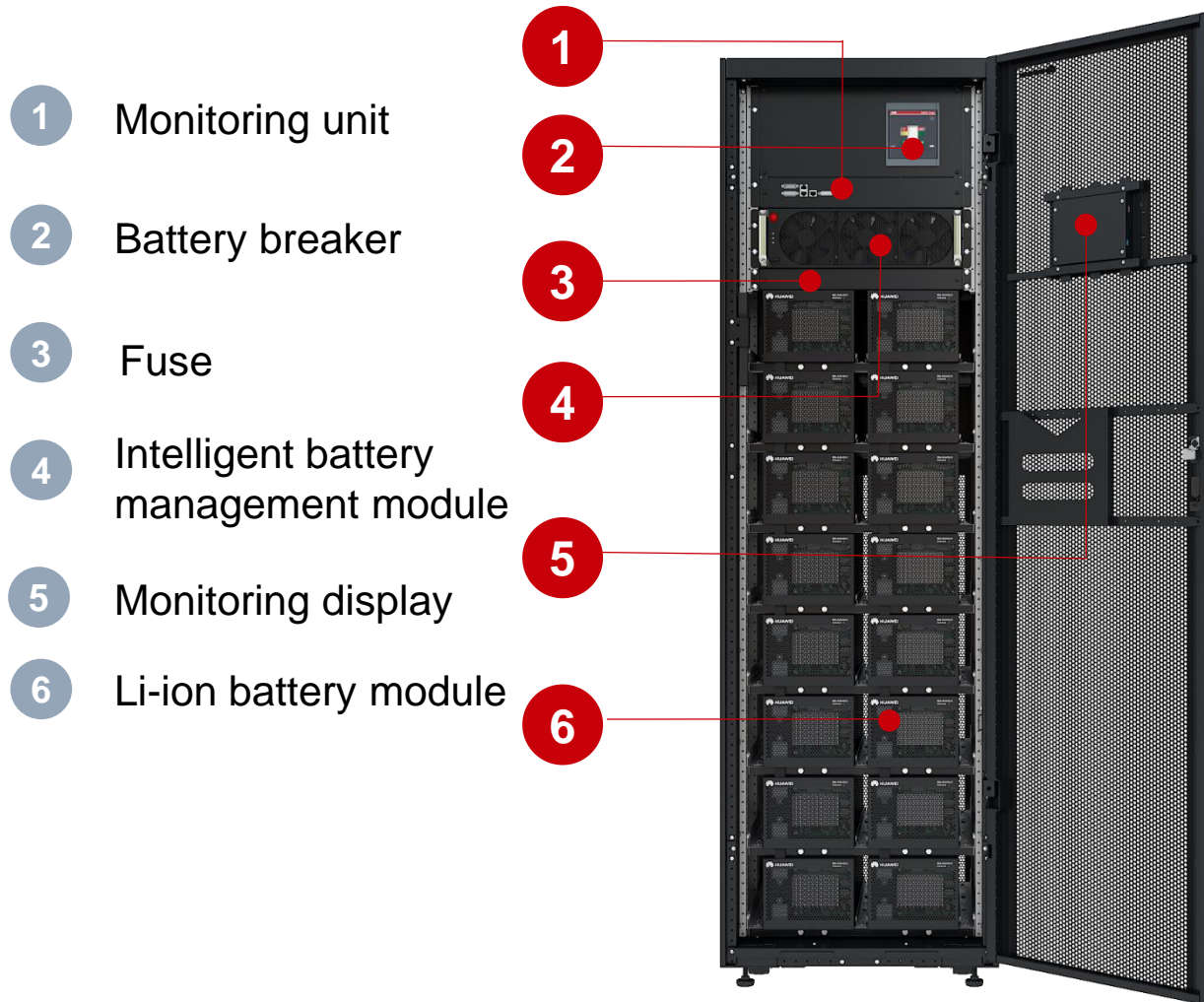
Many fire accidents

Difficult O&M

Short life



Lithium Battery is the Trend-Huawei SmartLi Battery Solution Overview



- Battery cell: **LFP (LiFePO₄)**
- Nominal voltage: 512Vdc
- Nominal capacity: 80Ah/40.96kWh
- Operation voltage range: 408 - 544Vdc
- Charging current: 0.1 - 1C
- Backup time: 10min/15min
- Maximum discharge current: 480A continuous
- Cycle life: **5000 cycles** @ 50% DOD, 25°C
- Cable Entry: top entry
- Maximum number of cabinets: 8

Why Huawei Li-ion Battery Solution **SmartLi** ?



Huawei 3 unique advantages:

- Mix use of new and old batteries.
- Faults tolerance of one battery failure
- Battery cell is safer than other vendors' by using LiFePO4

Indoor Data Center Solutions



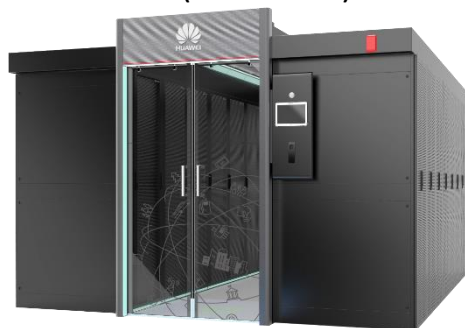
HQ data center

FusionModule5000
Large & medium modular DC
(water cooled)



Province branch

FusionModule2000
Medium & small modular DC
(air cooled)



Secondary branch,
Large outlet

FusionModule800
small modular DC

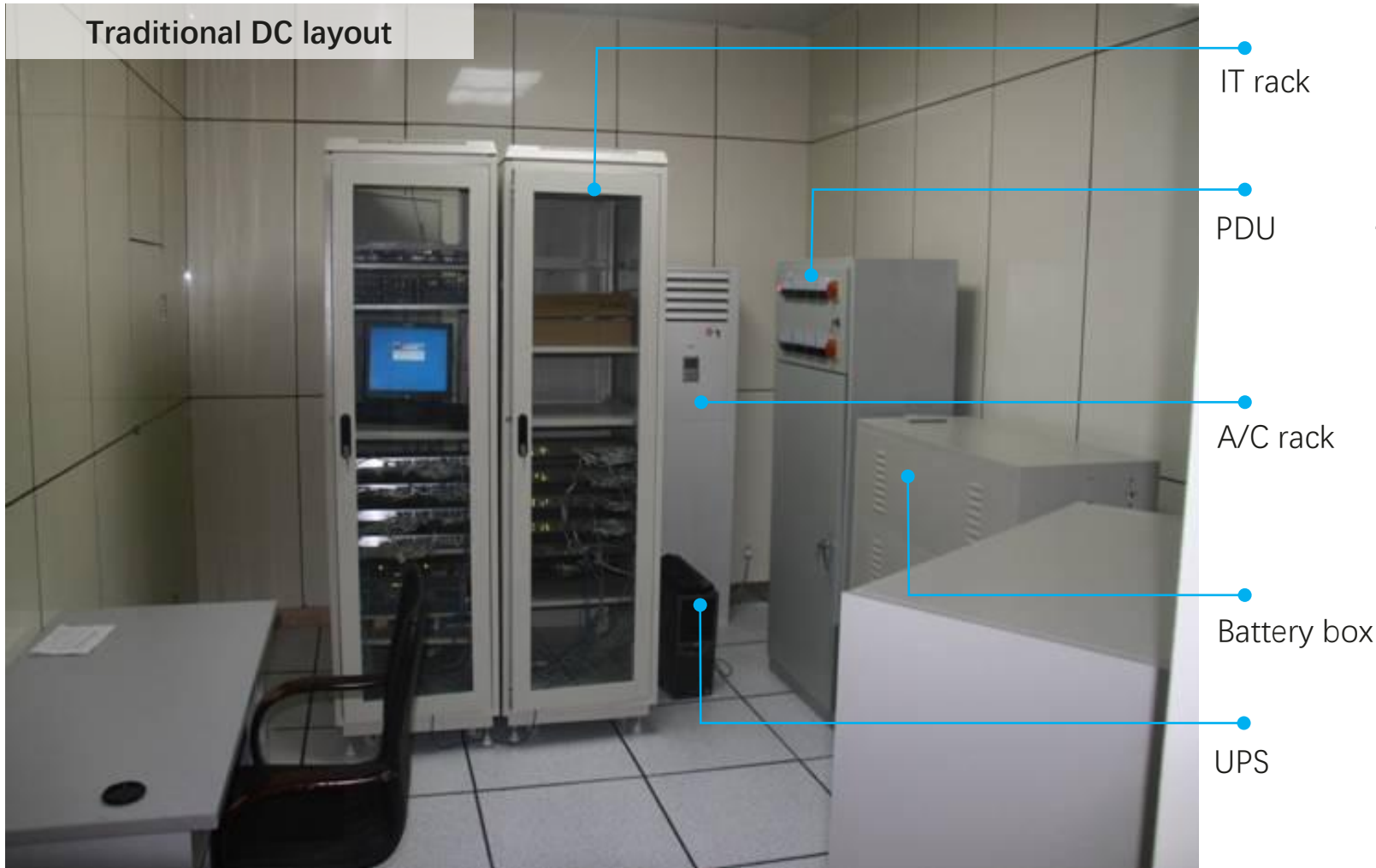


Small
operation outlet

FusionModule500
Integrated mini DC



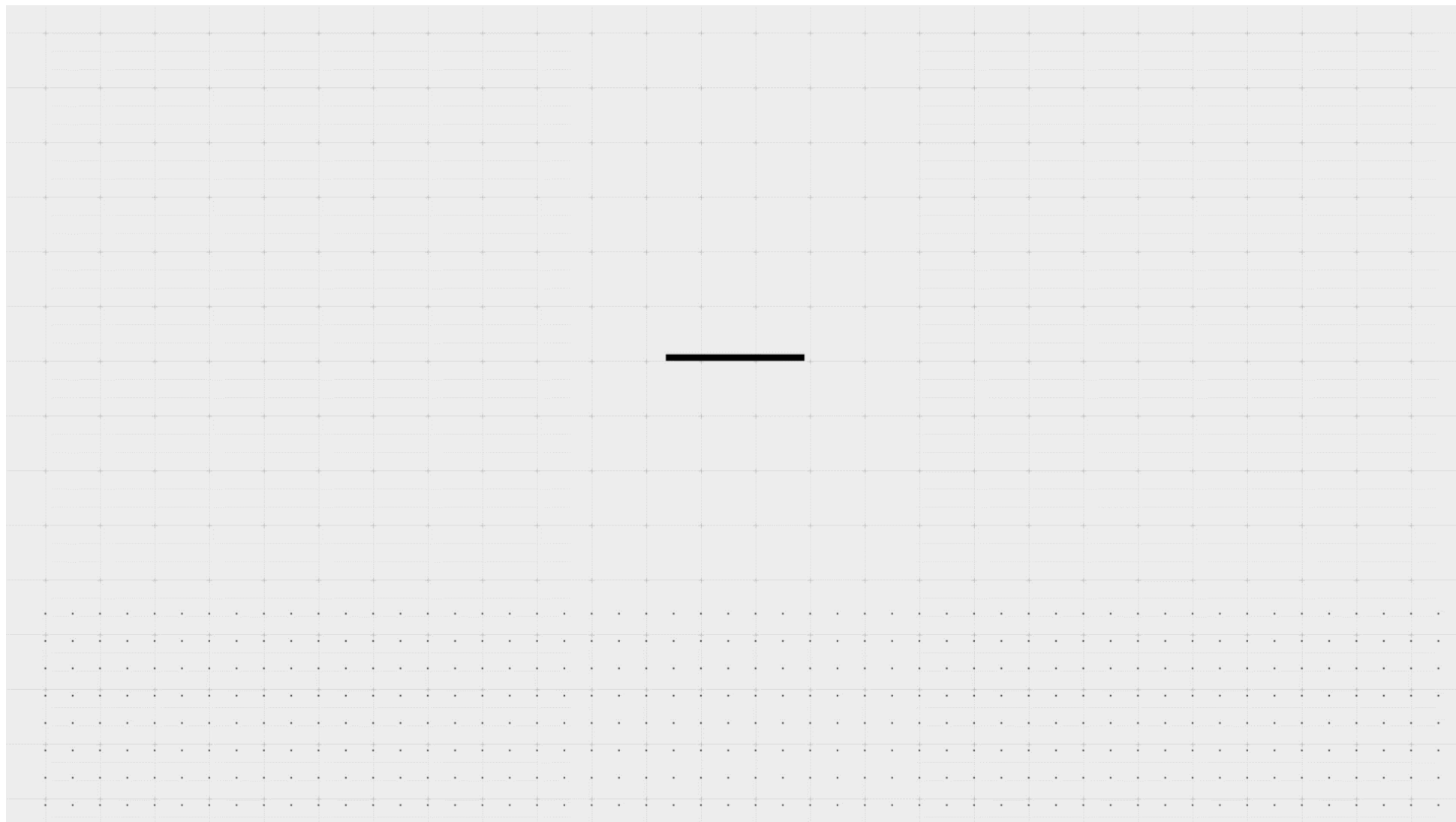
Traditional Small DC—Low Integration, Large Footprint



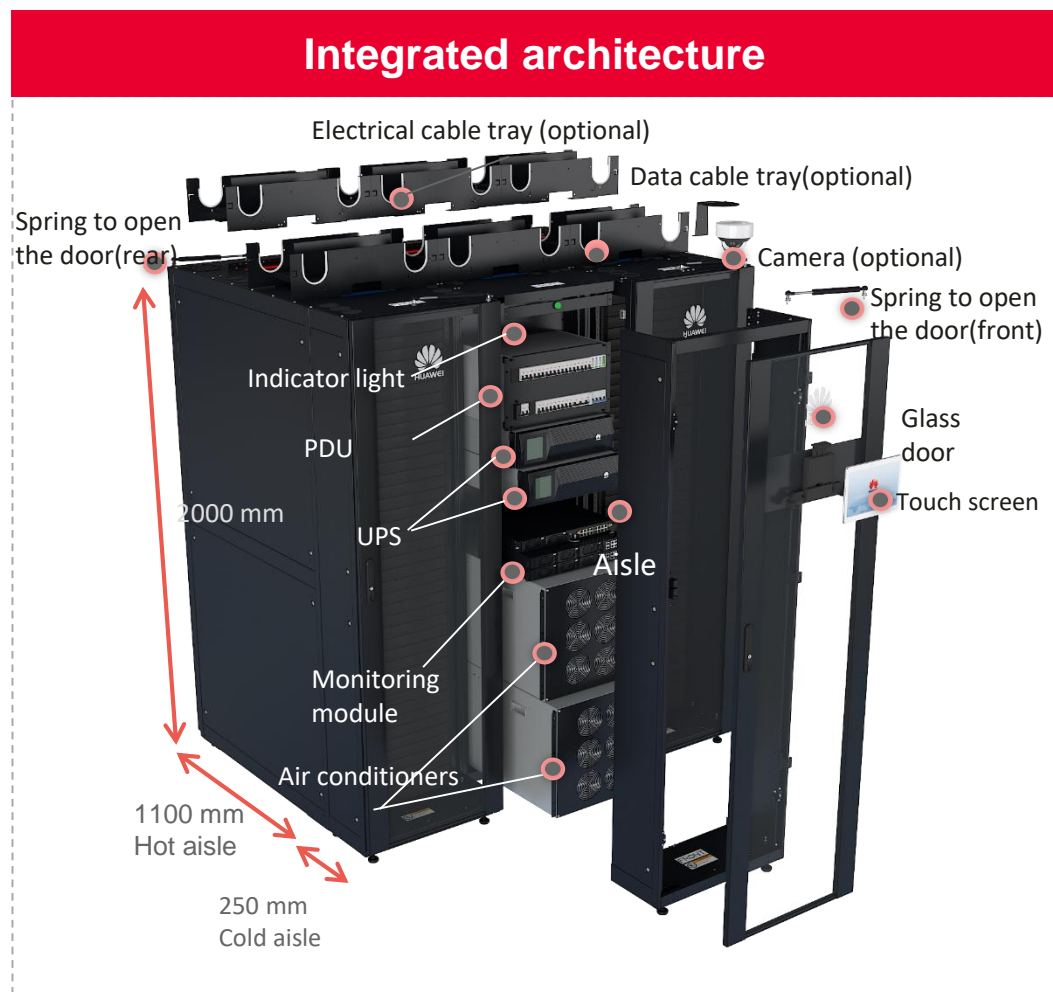
Traditional DC:

- UPS, PDU, IT racks, air conditioner are independent deployment
- Low integration
- Large footprint

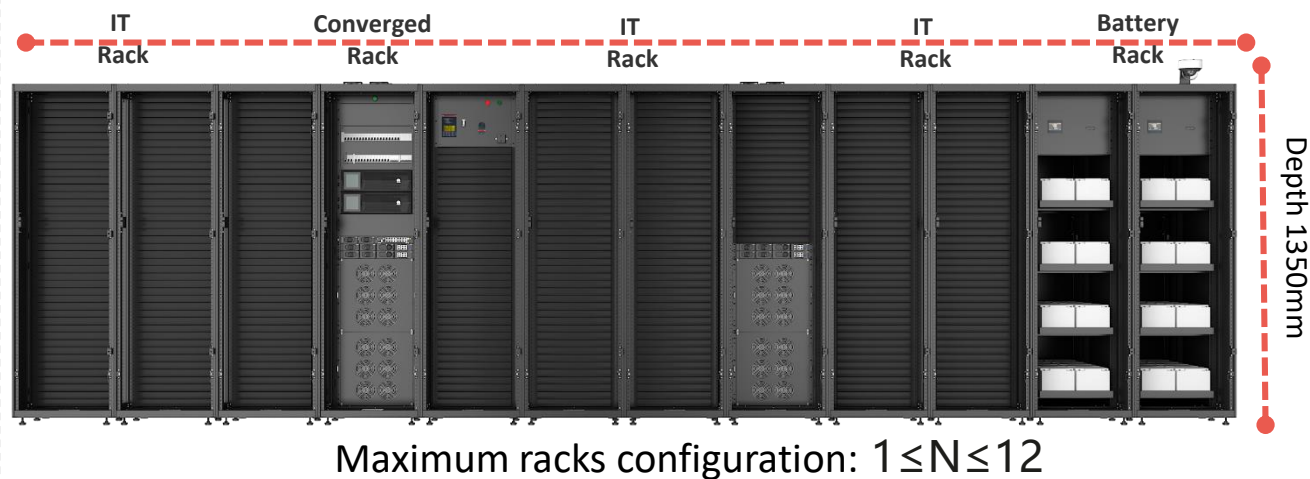
Fusionmodule 800 Installation –Simple and Quickly



Overview of FusionModule800 New version



- **Total IT racks: 0~10** rack(Total racks:1~12)
- **Cooling: Rack A/C** (12.5kW/pcs)
- **Cold and hot aisle containment:** Cold aisle containment 250mm+1100mm hot aisle containment.
- Maximum IT load: **≤25kW**



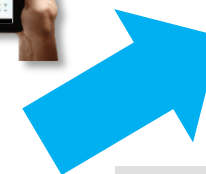
Medium & Large DC: Simple, Efficient, Reliable, All Modular Design

FusionModule2000 All-In-**One** Structure, **One**-Stop Delivery, On-Demand Expansion

NetEco6000 Management System

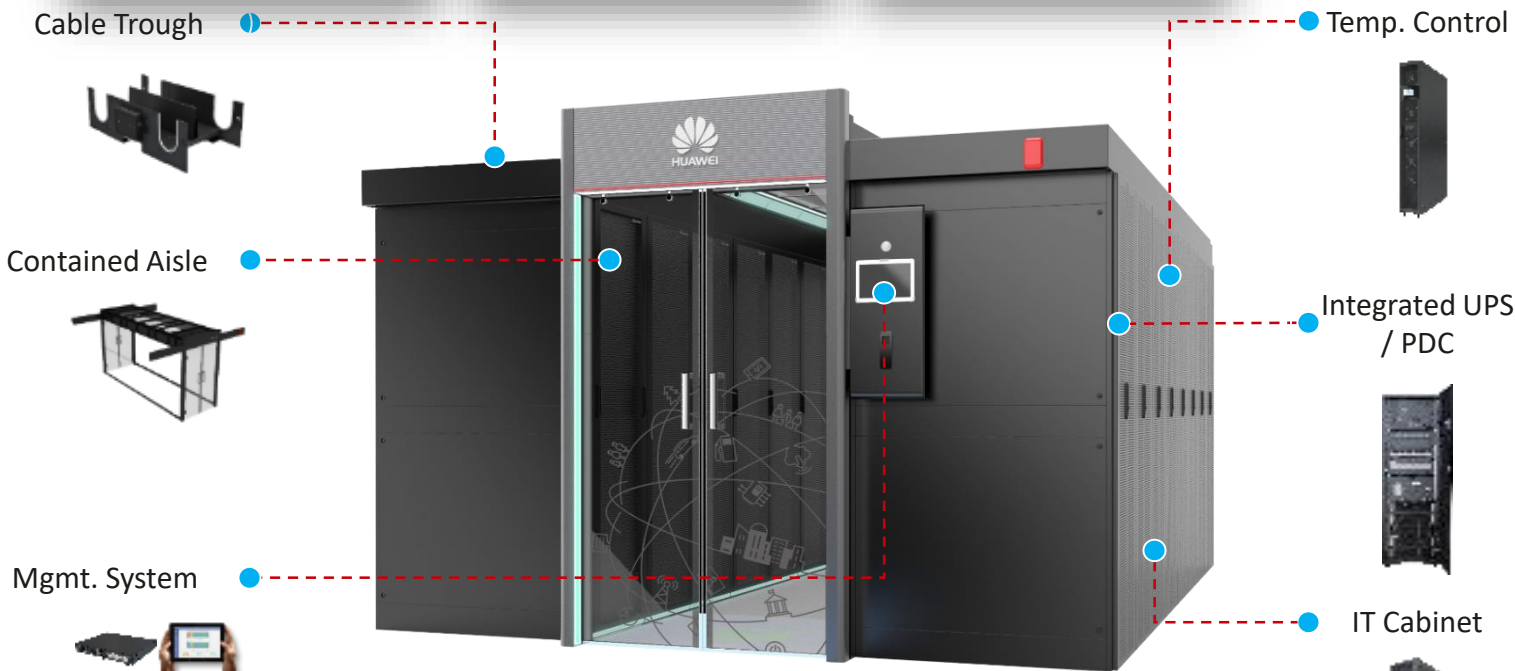


PAD



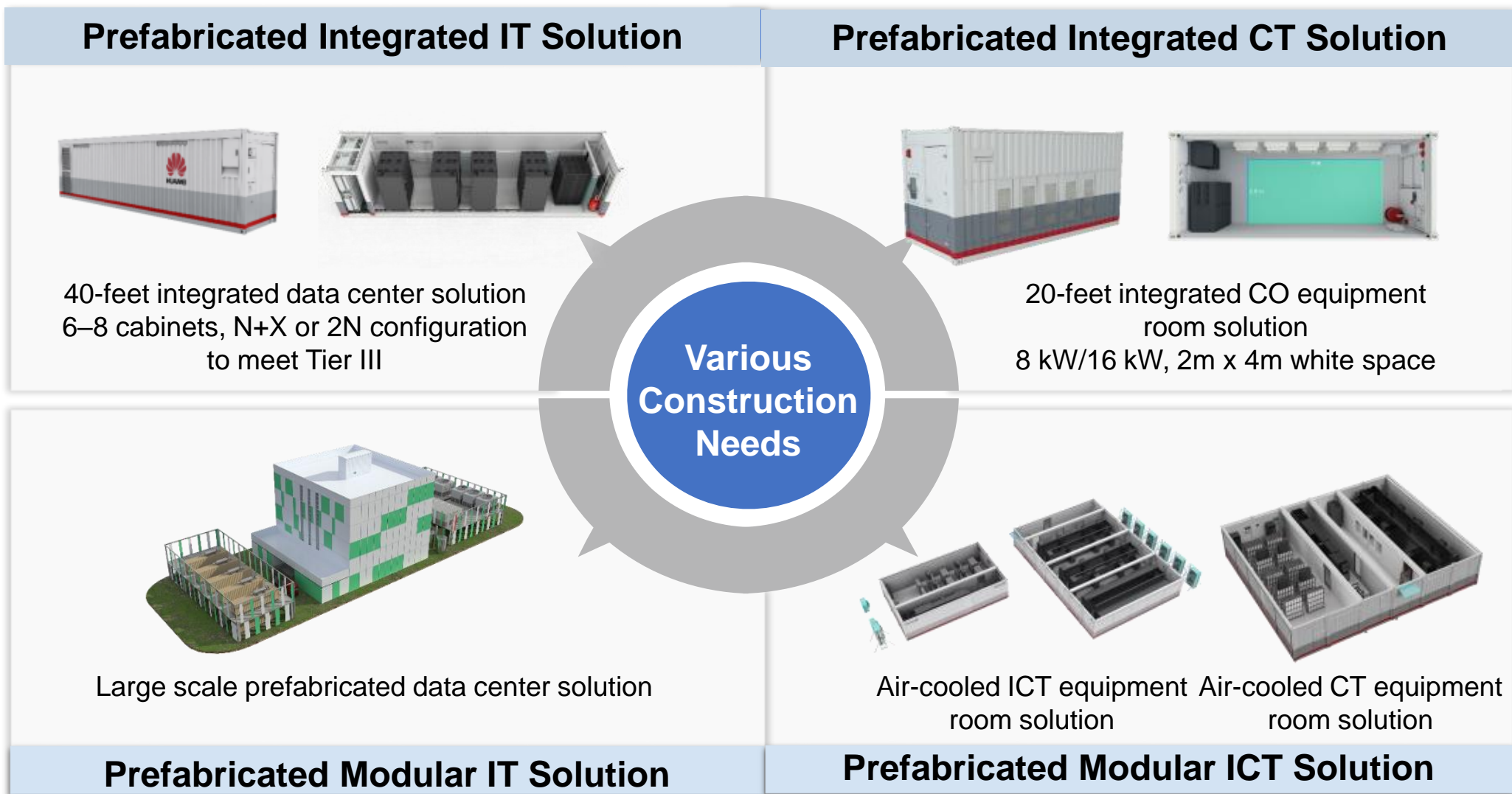
Customer Benefits

- **One-stop delivery**, lower the requirements for design, delivery and management
- **On-demand deployment & expansion**, lower the initial investment
- Energy-saving, **lower PUE by 8%+**
- **O&M efficiency improved by 20%**




For one module:
One month to manufacture;
One week to install and test on site


Prefabricated Modular DC Solutions Adapt to Diverse Scenarios




100% Prefabrication-FusionModule1000A All in One Solution




Enclosure
ISO standard 40ft




Rack
7-8x42U IT racks
Support 200mm sliding




Cooling
Air-cooled in-row
Hot aisle containment




Power
Integrated modular UPS
2N&N+X available




Fire protection
HFC-227ea (standard)
Novec1230(optional)




Management System
ECC800&NetEco DCIM+




Management Hardware
Lan switch
Server




Campus




Roadside




Oil & mining field



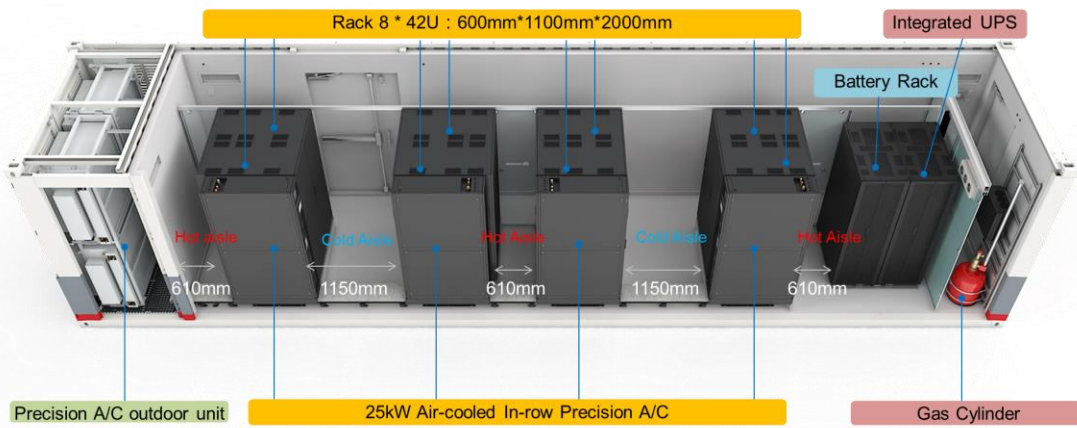
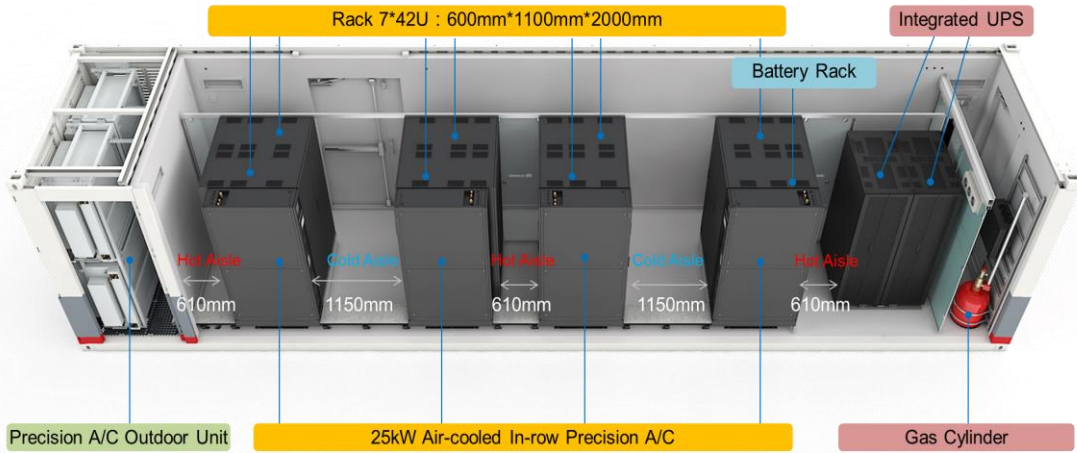
Parking lot



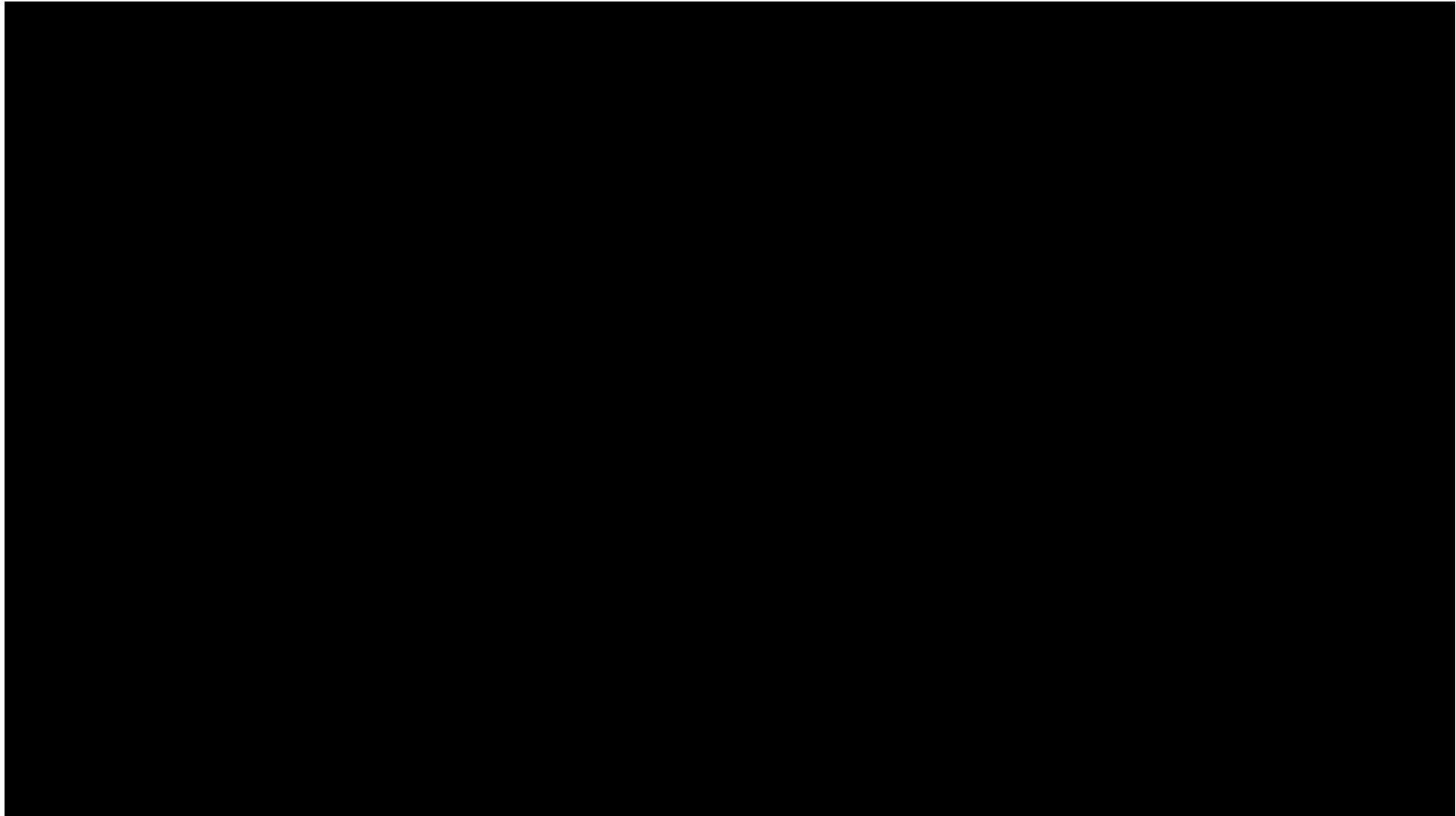
Building roof



Empty land



How to Build a Prefab DC ?



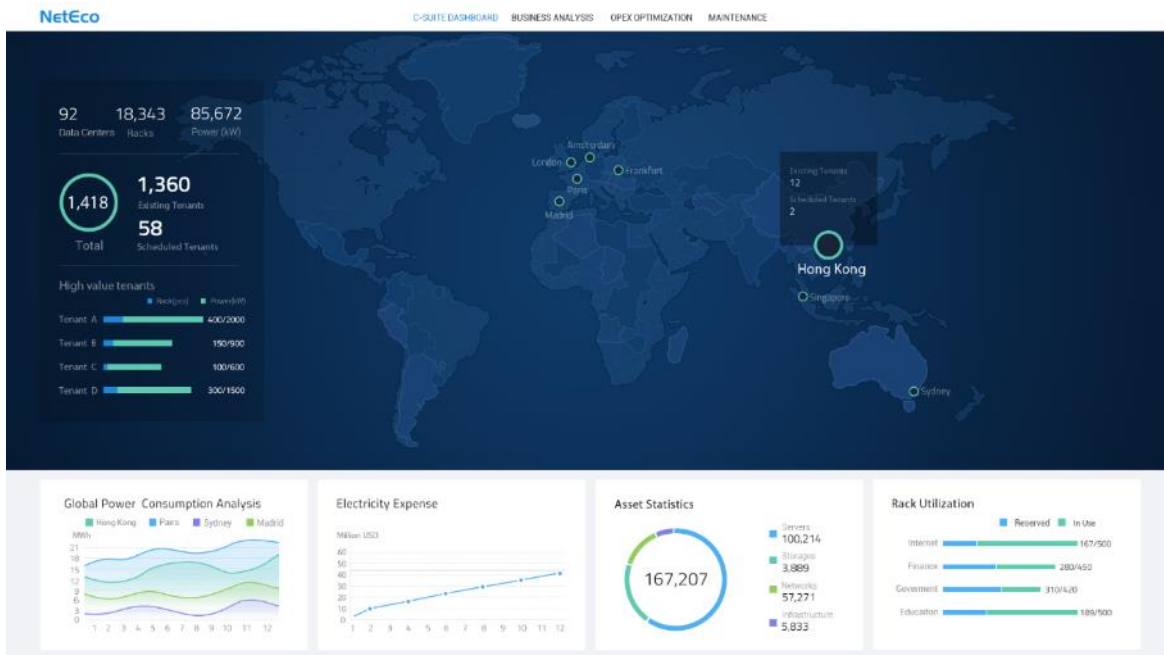
Indirect Evaporative Cooling Solution-Make full use of free cooling



Model	NetCol8000-E
Cooling Capacity	220 kW
Air Flow	55000 m ³ /h
Dimensions(L x W x H)	6058mm x 2438mm x 3600mm

Ambient T°C	Mode	Fans	Pumps	DX
Dry bulb $\leq 16^{\circ}\text{C}$	Dry Mode	ON	OFF	OFF
Dry bulb $> 16^{\circ}\text{C}$ and wet bulb $\leq 19^{\circ}\text{C}$	Spray Mode	ON	ON	OFF
$19^{\circ}\text{C} < \text{wet bulb} \leq 34^{\circ}\text{C}$	Hybrid Mode	ON	ON	ON

DCIM: Help Achieving Intelligent O&M of Data Center



NetEco6000 Management System

- Unified Monitor
- Paperless Maintenance
- Mobile Application
- Efficiency Mgt.
- Asset Mgt.
- Capacity Mgt.



Efficient Maintenance

- Paperless Maintenance
- Improve Efficiency to 210 Rack/person
- Alarm Intelligent Analysis
- Reduce Alarm Quantity by 75%



Refined Operation

- U-position Refined Capacity Mgt.
- Improve Space Usage up to 20%
- Energy Chain Analysis
- Identify Energy Abnormal Point

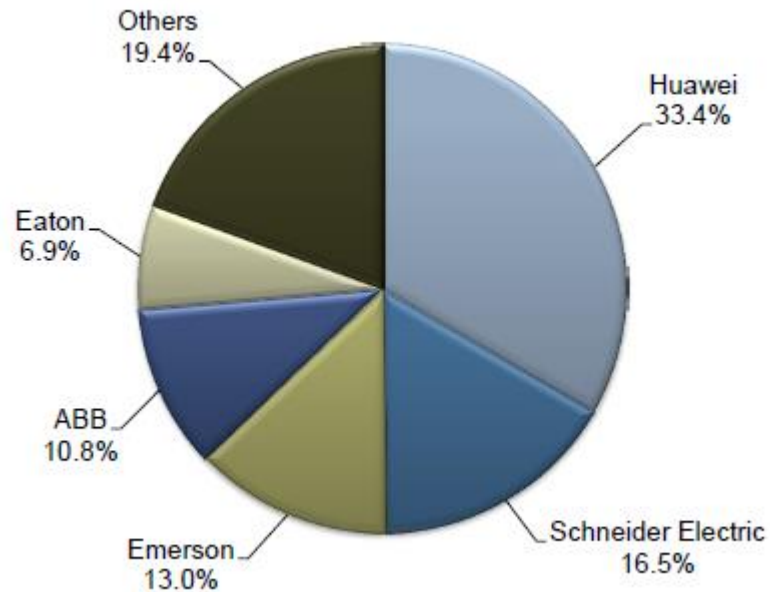


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Achievements & Cases

NO.1 Modular UPS Market Shares Globally

Modular UPS Shares NO.1 Globally



Data Source : F&S

Frost & Sullivan

“Modular UPS Company of the Year”



On Nov. 9, 2016, Frost & Sullivan formally presented Huawei an award "Modular UPS Company of the Year" in the award ceremony in Paris to recognize the innovation & industry leadership, and great contributions to the sustainable development.

2 Certificates: World's first TIER-IV Ready & TGG PUE Certification

High Reliability



Uptime Certification

World's first **Uptime TIER-IV Ready** certification, the highest availability level of the product, ensuring high reliability of the data center.

Energy-saving



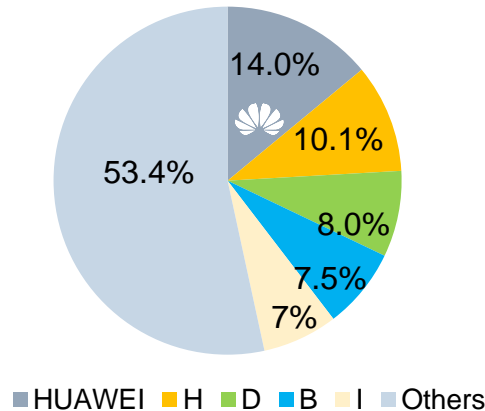
TGG PUE Certification



World's first Modular DC product PUE certification, the annual average **PUE is as low as 1.245** (@ Beijing)

HUAWEI Smart DC Solutions Rank First in Many Sectors

4-year Prefabricated MDC Shipment
World's NO.1



Source: Frost & Sullivan. 2017



- *Frost & Sullivan forecasts “Prefab. Modular data centre Unit Shipments growth is expected to register a CAGR of 10.5%. This combined with high growth in colocation and cloud segments are expected to be primary growth drivers for this market.”*
- *“IHS forecasts that at the end of 2020, there will be 13,566 Prefab. Modular data centers, or roughly 3.5 times more than are currently deployed.”*

Widely Used in Various Industries Around the World



China Mobile Huha Base
Number of racks: 4000+
UPS: 42 400kVA

Carrier



China Unicom Gui'an Cloud Base
Number of racks: Future date 22000,
phase 1 1108
Micro Modular DC: 62 sets
UPS: 52 600kVA



Hong Kong Hutchison Whampoa T9 Data Center
UPS: Four 400kVA servers



Century Interconnection Beijing
Daxing & Hangzhou Sands
Number of racks: 14000+
UPS: 100+ 400kVA

ISP



Data center of Chengdu data center
Number of racks: 3000+
UPS: 24 400kVA



Tencent
Micro Modular DC: Accumulated
200+ sets



Daoxianghu Data Center,
Agricultural Bank of China
UPS: 10 75kVA, 160kVA, and
240kVA

Finance



Data center of Qi Shang Bank
Number of racks: 200+
Micro-module: 17 sets
UPS: Four 320kVA



Government cloud data center in
Karamay, Xinjiang
Number of racks: 1580
UPS: 22 600kVA

Government



Huawei cloud data center in Ulanqab
Number of racks: 1502
Micro Modular DC: 46 sets
UPS: 30 500kVA



Shanghai Metro
UPS : 110 100kVA

Transportation



Dubai Airport
Prefabricated modular: 27 sets

Thank you.

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Bring digital to every person, home, and organization for a fully connected, intelligent world.

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