

# Smart DC, Building the Green Future

Huawei Data Center Solutions

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# Huawei: Leading provider of ICT infrastructure and smart devices



## Vision & mission

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

**170+**  
countries and regions

**207,000**  
employees

**55.4%**  
of employees work in R&D

**No. 4**  
in global R&D investment

**120,000+**  
active patents held globally

(\*Huawei has one of the world's largest patent portfolios.)

# 23 Years in Europe, Huawei will continuously Create more Value for Customers and Partners

2000~

2010~

2020~

Enters the European market and develops rapidly

Achieves the leadership in LTE

5G + Energy + Industrial digital transformation



2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022

# Huawei offering

In Europe, for Europe:  
Facilitating the twin green & digital transitions



**Carrier**



**Enterprise**



**Consumer**

## Carrier

A leader in the telecom industry

5G-enabled industrial digitalization

Ultimate network experience

Enabling green development of the telecom industry

## Enterprise

Enabling industrial digitalization

ICT infrastructure solutions

OpenLabs

A prosperous partner ecosystem

## Cloud

Top5 global cloud service vendor

Public cloud

Hybrid cloud

Partner cloud (OTC/FE)

## Digital Power

Facilitating green & energy transition

Smart PV

Data center facility & critical power supply

DRIVEONE

## Consumer

Full-scenario life experience

Smartphones

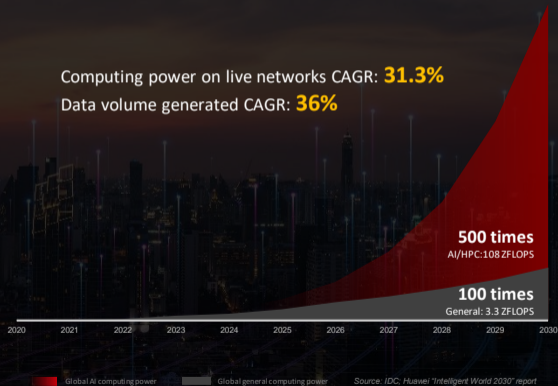
Wearables

Smart home devices

# Sustainable Data Centers, Demands of the Intelligent Era

## DC surge by computing power explosion

Computing power on live networks CAGR: **31.3%**  
Data volume generated CAGR: **36%**



## Essential factors of data center development

### Carbon neutrality

Policies: **PUE 1.3** or less VS 1.55 avg.\*  
Green energy, heat Reuse

### Business agility

Short TTM: Simplified deployment  
On-demand, ChatGPT: **100M users in 3 months**

### O&M efficiency

Large scale: hundreds → **thousands of racks**  
Shortage of O&M Personnel: **53%\***

### Service availability

Single rack availability: **99.999%**  
Huge loss: **3.5M** websites out of service

\* Data source: Uptime annual report 2022

# GSSR, the Way to Future-proof Data Center

## Green

- Energy saving
- Space saving
- Carbon reduction

## Simple

- Simple deployment
- Simple maintenance

## Smart

- Smart O&M
- Smart optimization

## Reliable

- Reliable architecture
- Preventive maintenance

# Green: Maximize Energy Utilization, Minimize Environmental Impact

## Energy saving by improving efficiency

### E2E highly efficient power supply

- Shorten transmission path
- Reduce conversion levels
- Improve conversion efficiency



### Multiple highly efficient cooling technologies

- Heat exchange times(N→1)
- Maximum free cooling
- AI optimization

CLF  
> 0.3 → < 0.1

CLF: cooling load factor

## Space saving by increasing density

Component size  
Power module 50%↓, Switch width 80%↓

Structure layout  
4 switches inside 1 cabinet

Convergence  
5 elements → 1 system

Power room size 50%+↓

## Carbon reduction throughout lifecycle

Material	Halogen-free, Li, steel, ...
Manufacture	AIoT, digitalization, green energy, ...
Transportation	Green packaging, BEV/PHEV, ...
Construction	Prefabrication, less waste, ...
Operation	Low PUE, WUE, ...
Recycling	Material recycle, heat reuse, ...

# Simple: Fast Deployment & Efficient Maintenance by Modularity & Prefabrication

## Simple deployment

Easy installation & commissioning



Prefabrication: cabling free, pre-integration, pre-commissioning

Easy expansion



Modularity: Lego-style expansion, plug & play capacity increase by module

## Simple maintenance

Independent maintainability



Modular function unit(power module/control unit/bypass module/fan driver...)

Fast recovery



Hot swap  
Online maintenance

Large DC: TTM 18 months → **9-12 months**  
Small and medium DC: TTM 1 month → **1 week**

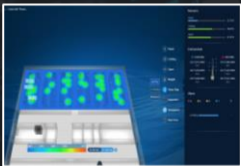
Recovery 8 hours → **5 mins**  
Service "**0**" interruption



# Smart: Achieve Maximum Efficiency by AI Technologies

## Smart O&M

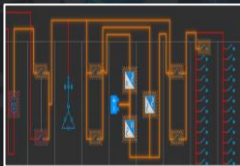
Automatic inspection



Inspecting thousands of racks

Hours → minutes

AI-based Fault identification

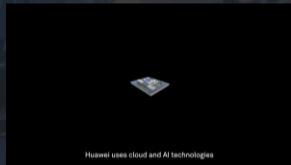


Alarm compression: display root cause

Impact analysis: identify the range of affected links

## Smart energy efficiency optimization

Manual optimization  
→ AI energy efficiency optimization



The PUE is optimized by 8% - 15%

# Reliable: Ensure Service Availability by Architecture Design & Fault Prediction

## Reliable architecture

Modular design, lossless switchover, and always-on



**System availability > 99.9995%**

## Preventive Maintenance

Life prediction  
of key component

Capacitance  
(temperature, load rate)

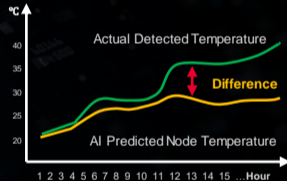


Fan  
(Speed, temperature)



Remind to replace it  
before failure

Temperature prediction  
of key nodes



Warning is issued if the actual  
temperature is higher than the AI  
predicted temperature

# Innovative Data Center Solutions Based on Four Characteristics

## Innovative solutions for the smart green data center

Green

Simple

Smart

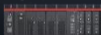
Reliable

### Large DC

Colo/OTT, carriers' IDC, bank headquarters DC, national data center, etc.

#### Smart power

FusionPower



PowerPOD 3.0



SmartLi



PowerPOD(Outdoor)

#### Smart cooling

FusionCol



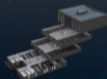
Indirect Evaporative  
Cooling EHU



High temperature  
chilled water fan wall

#### Prefabricated modular DC

FusionDC



FusionDC1000C

### Small and medium DC

Education, healthcare, bank branches, and SME EDC, etc.

#### Smart modular DC

FusionModule



FusionModule2000



FusionModule800/500

#### Small and medium PMDC

FusionDC



FusionDC1000A

### Critical power

Manufacturing, transportation, etc.

#### Smart power

FusionPower



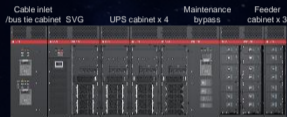
UPS5000



UPS2000

# Power System: PowerPOD Solution, Highly Integrated and Highly Efficient

## Huawei PowerPOD 3.0 (Excluding transformer, 2.5MW)



## Outdoor Type (1.8-3MW)



### Footprint saving

#### Component integration

50%↓ footprint  
21 → 10 cabinets

#### Innovative Power Module

100kVA/3U



#### Innovative Load Switch

80% width reduced



### Power saving

#### E2E high efficiency

3 PCT ↑

95.4% → 98.4% @S-ECO

Electricity cost saved by  
170k USD per year

Model: 1500 cabinets, 8 kW/R, 2N, 50% load rate, electricity cost 0.1USD/kWh

### Time saving

#### Product prefabrication

TTM 75% ↓, 2 months → 2 weeks

#### Prefabricated busbar

180 cables + 35 busbar → 35 busbar, **cablings free**



### Worry free

#### Predictive maintenance

from reactive to proactive

#### Life prediction



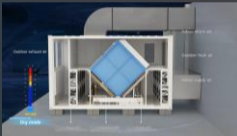
#### Temperature Prediction

150+NTC temperature measuring points covering key nodes

# Cooling System: Indirect Evaporative Cooling & Smart Fan Wall Cooling Solution

## Indirect evaporative cooling solution: EHU

Applicable to the areas:  
Low annual average temperature



### Power saving

Maximum free cooling:  
PUE 1.30 → **1.15**@Ireland

### Time saving

Highly integrated:  
TTM 6 → **3 months**

### Water saving

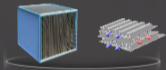
Water utilization:  
WUE as low as **0.37**

### Easy O&M

Qty of O&M item:  
52 → **21**

## Innovative Technologies

### EHU Polymer heat exchanger



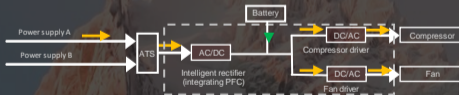
- Lower water quality requirements
- Field-based enhanced heat exchange technology saving water by **30%+**

### EC fan



- Separated architecture: air volume **45%+**, efficiency **6%+ ↑**, online maintenance in **1-minute**

## Convergence of cooling & back-up power



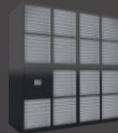
No UPS required

Uninterruptible cooling

THDi < 5%  
PF > 0.99

## Smart fan wall solution

Applicable to the areas:  
High annual average temperature



### Capacity:

110/220/330/440kW

### Power saving

Supply & return water temp. 20-28°C  
Chiller efficiency improved by **15%**

### Time & Cost saving

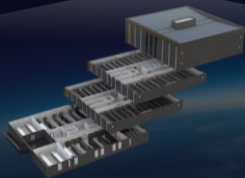
No raised floor  
saving deployment time and cost

# Integrated Data Center Solution: Smart Modular DC and Prefabricated Modular DC

## FusionDC (Outdoor)

Applicable scenarios:

large & medium data center without buildings, support single floor and multi-floors



### Simple

TTM **9-12** months

TTM reduced by 50%  
engineering production

### Green

**80%**

80% less "wastes"  
80% recycling rate

### Reliable

**8** intensity seismic

Resistance to level 12 typhoons,  
and fire protection for 120 mins

Model: 1000 cabinets, 8 kW/cabinet, 2N

## FusionModule (Indoor)

Applicable scenarios:

Small & medium data centers with buildings, support 4-48 cabinets per IT module



### One module one DC

New design in conjunction with  
Swedish aesthetics team

### Green

**30%** ↓

PUE 1.6 → 1.111 @Beijing  
21k USD saved per year

### Simple

**75%** ↓

30 days → 1 week  
Simple deployment

### Reliable

**"0"** interruption

Cooling "0" interruption  
New architecture for continuous cooling

Model: 20 cabinets, 5 kW/R, 50% load rate, electricity cost 0.1USD/kWh

**GSSR - Green, Simple, Smart, Reliable**

**Power the Green Future**



# Thank you.

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

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