Energy saving technology for data centers

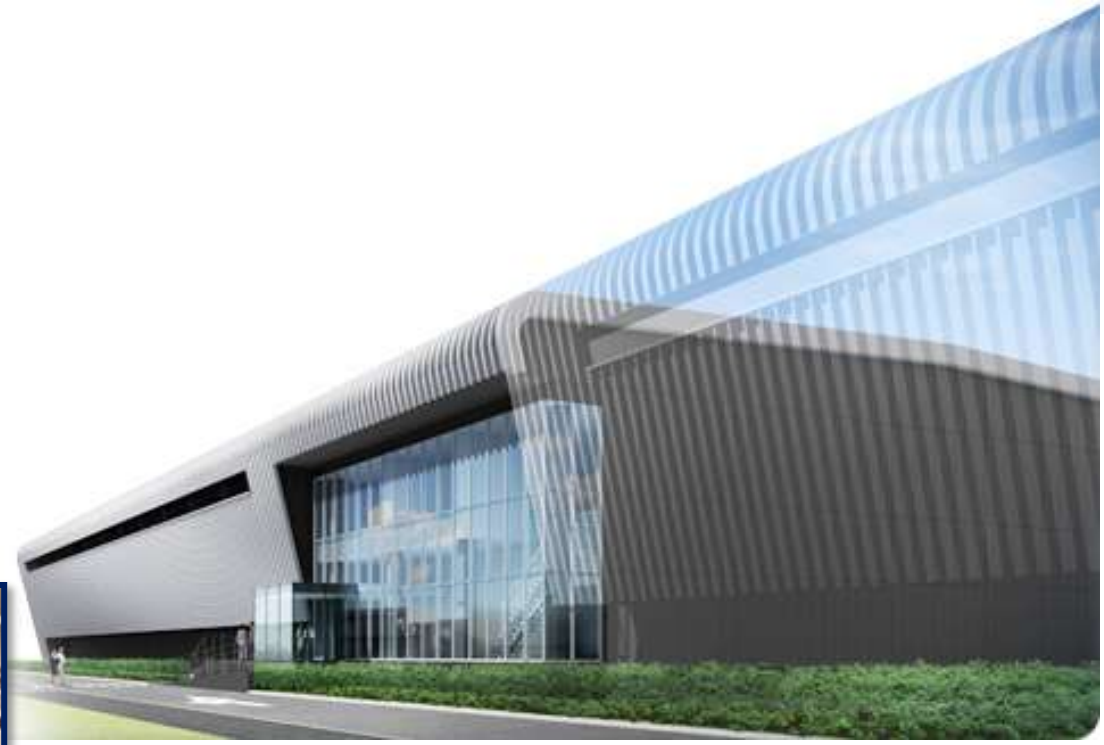
HVDC（High Voltage Direct Current）＋ 12V Server rack system

Green Solution Business Unit
Environmental Technology Division
NTT DATA INTELLILINK Corporation

NTT DATA

Case study

Service In ! / Sakura Internet Ishikari DC



- **System:**
  DC12V Type HVDC Power Supply System
  (Product: FRESH HVDC® and XECHNO® Power)
- **Location:** Ishikari DC of **Sakura Internet**
- **Range: 19Racks 140kW**

Configuration: XECHNO-Power and central power supply unit

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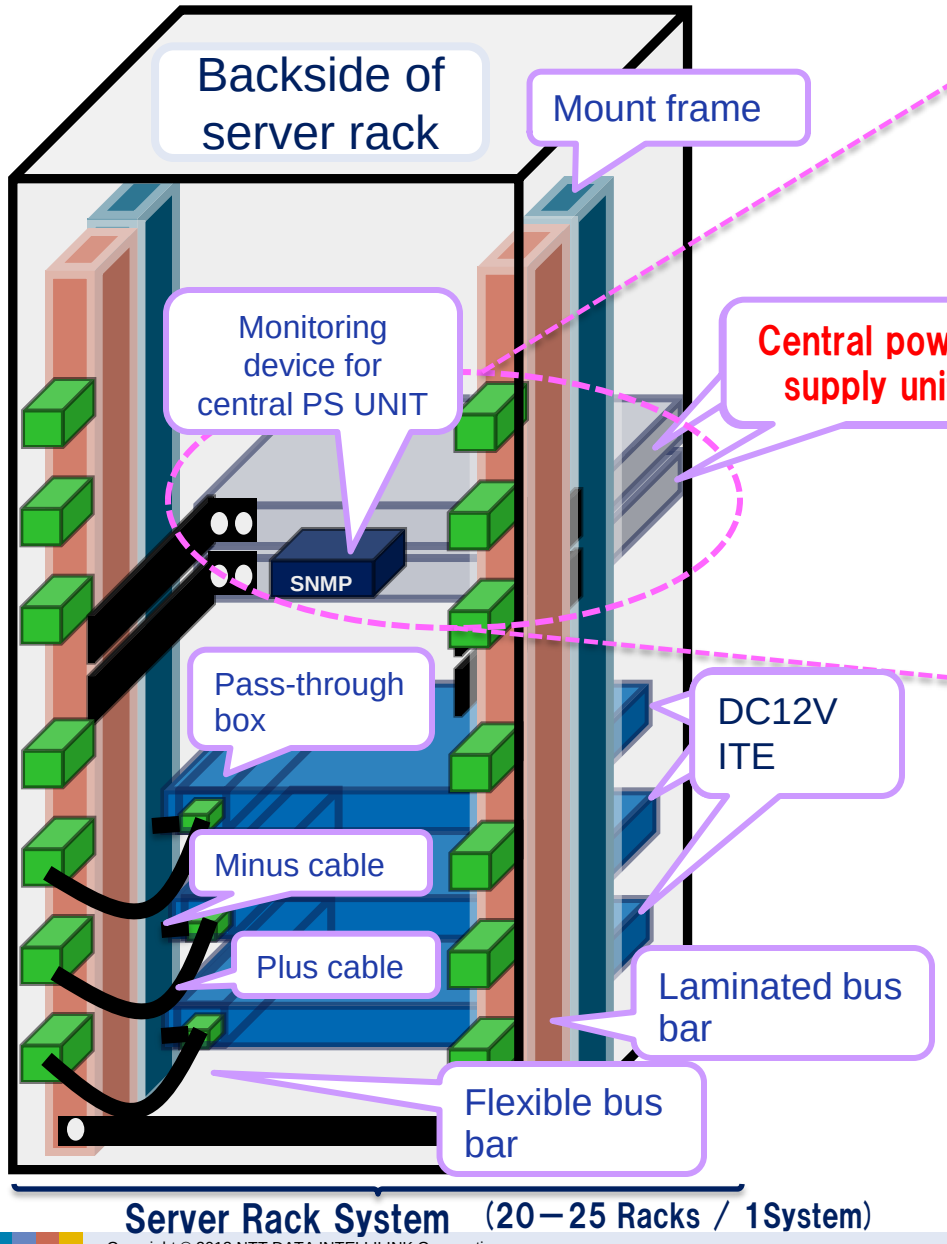
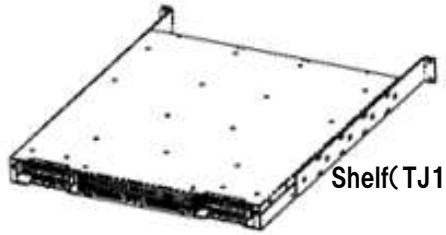


Central power supply unit



Shelf(TJ1727)

PS Unit (TJ1715)
Parallel running
with N+1 redundant
6 Unit Max **hot-pluggable**

PS Unit TJ1715
(HVDC DC/DC Converter)

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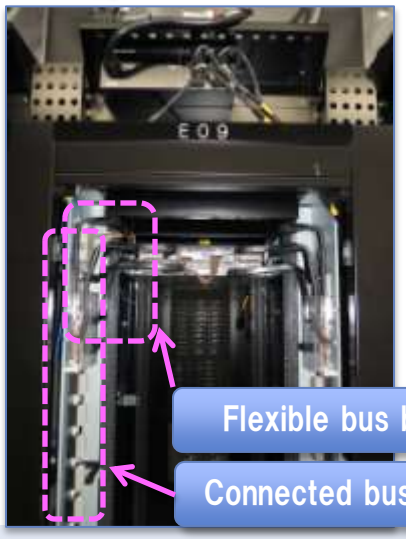


DC12V Central PS
(DC/DC Converter)

XECHNO® Power

What HVDC DC12V type can do for You

HVDC DC12V can help you succeed in the future with greater productivity and lower costs.

Benefit1 Energy-saving effect

- Total Efficiency – higher than 90% with reducing the number of conversion!
- High efficiency with real loading factor, unlike UPS
- Intensive PS system with central power supply unit in server rack
- Reduction of electricity charge

Benefit2 High reliability

- Non-stop maintenance and expansion through n+1 redundancy!
- Seamless connection to battery during power outage!
- Less AC conversion!
- Eliminating PS form ITE, long-lasting, highly-reliable!
- Fanless, liquid-capacitor less!

Benefit3 Safety

- Solving high voltage-current problems !
  - Arc suppression circuit
  - Middle point ground
  - DC12V

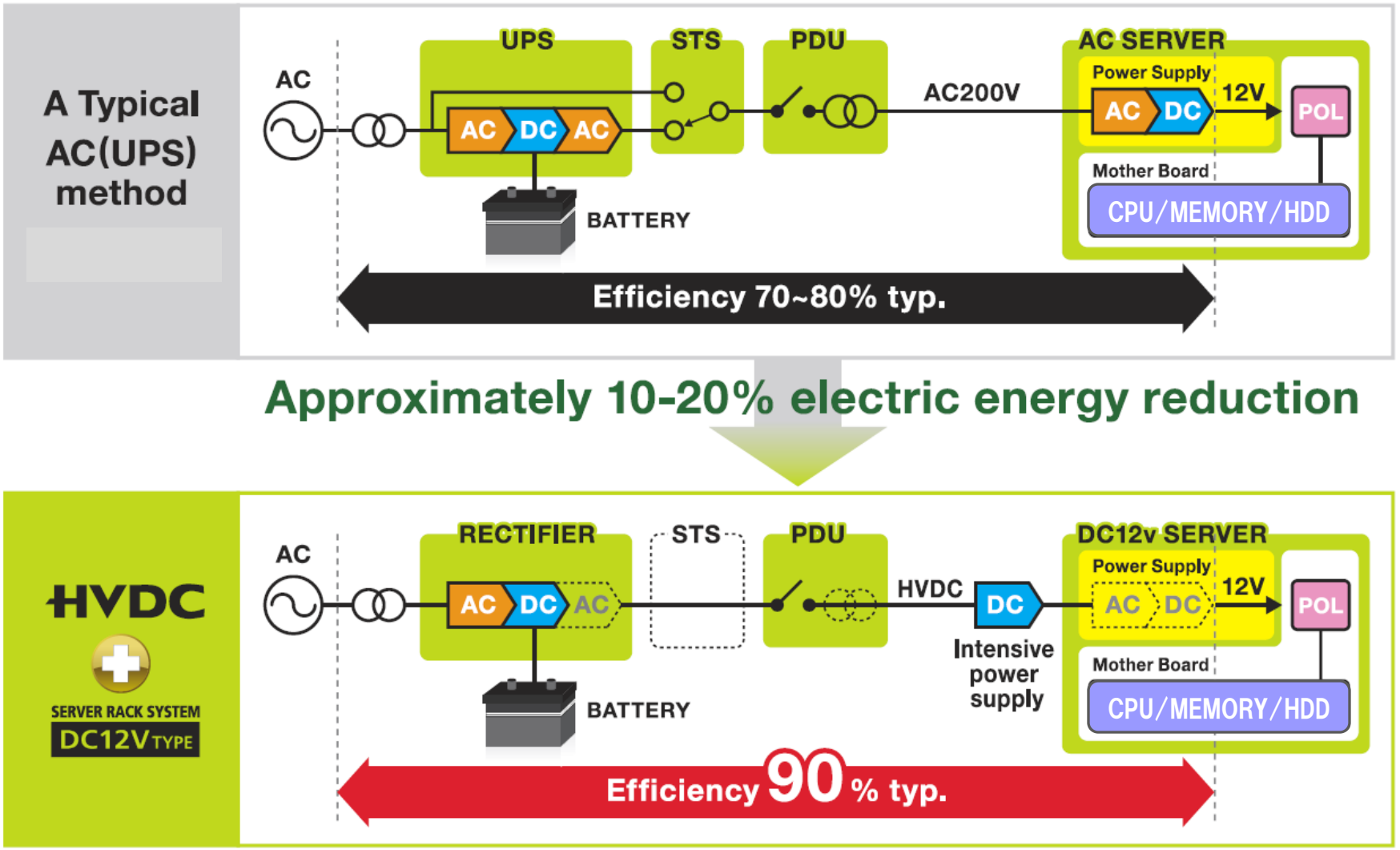
Benefit4 The future technology

- Solar power
- LED Illumination
- Fuel cell
- Cooling system with outside air
- Superconductors

etc…

Energy-saving effect: Energy reduction

HVDC DC12V Power Supply System reduces AC/DC conversions between commercial power and ITE. Power loss is reduced by approximately 10-20%.



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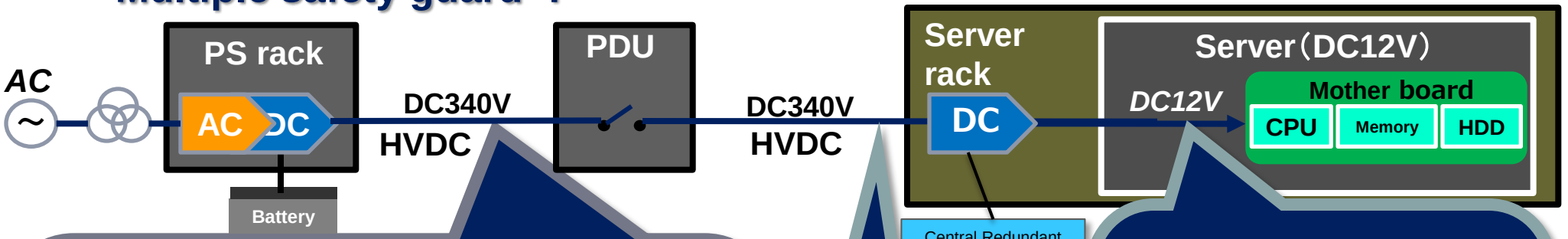
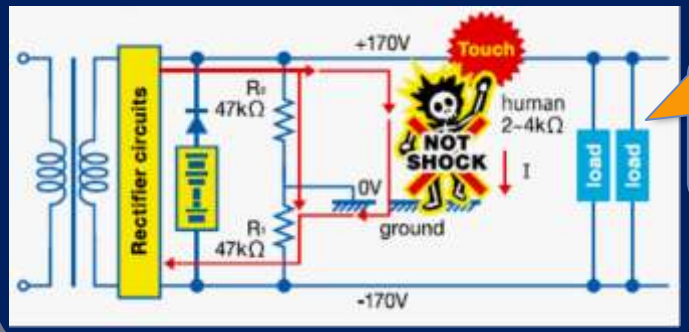
Multiple safety guard !



Key technology : Middle point ground

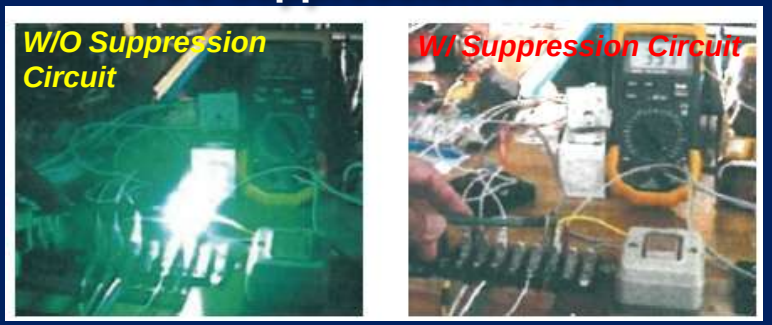
The current is limited within safety current for human through high resistors of 47KΩ.



Dangerousness by the high voltage had been pointed out. **But ,,,**

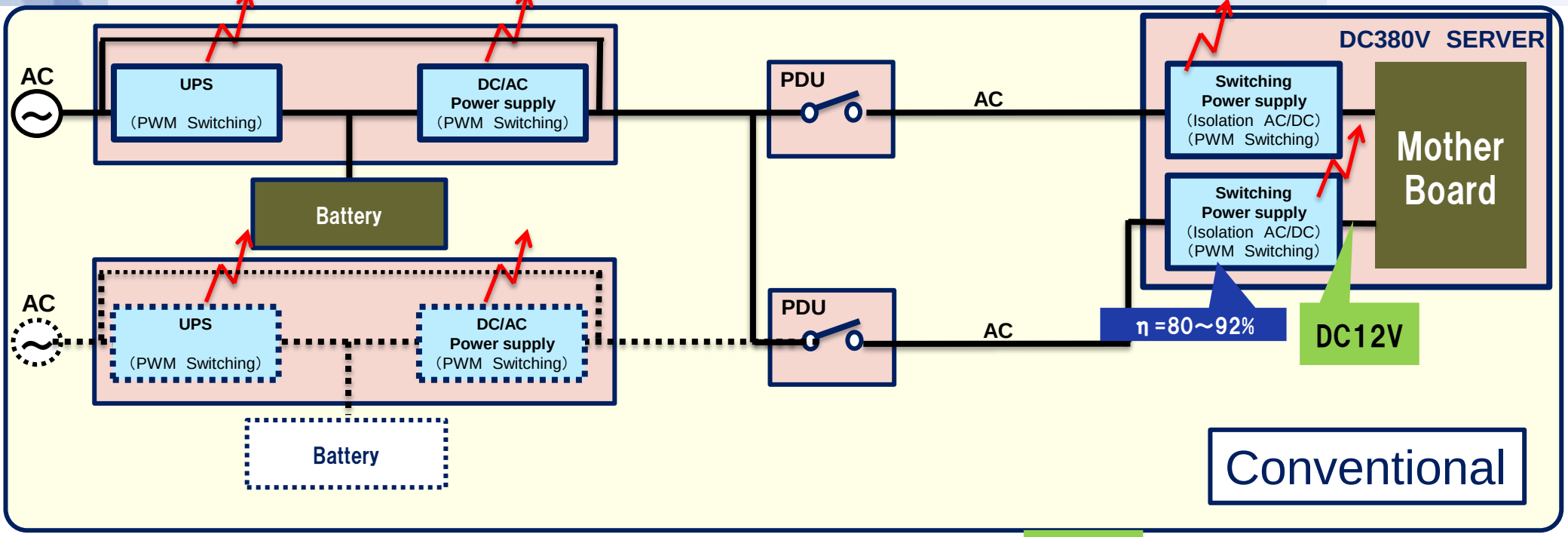
Key technology : Bus bar

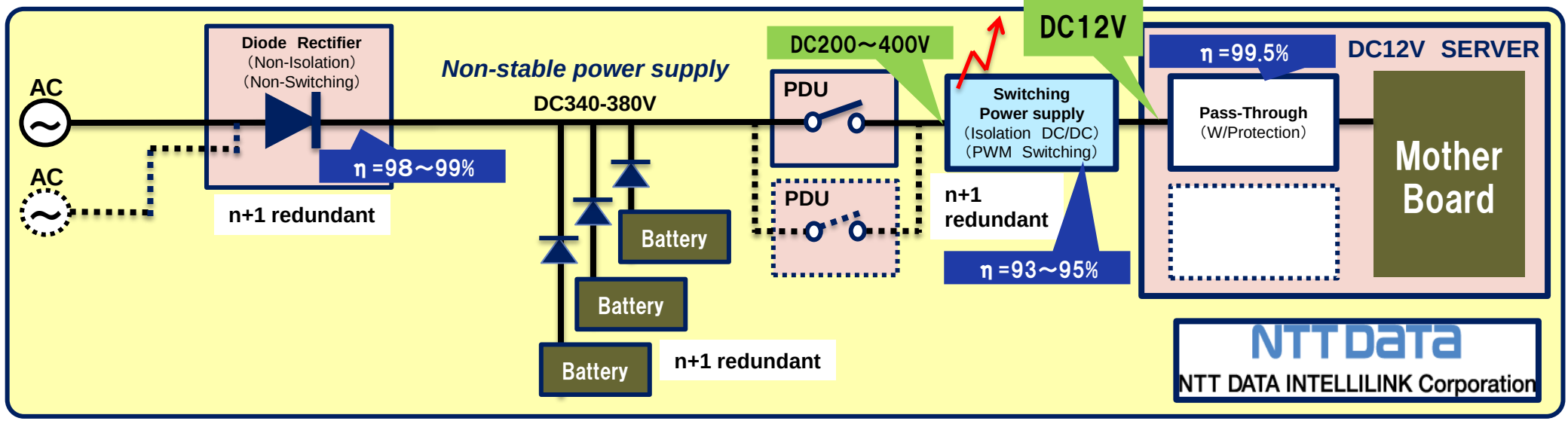
Key technology : Arc suppression circuit



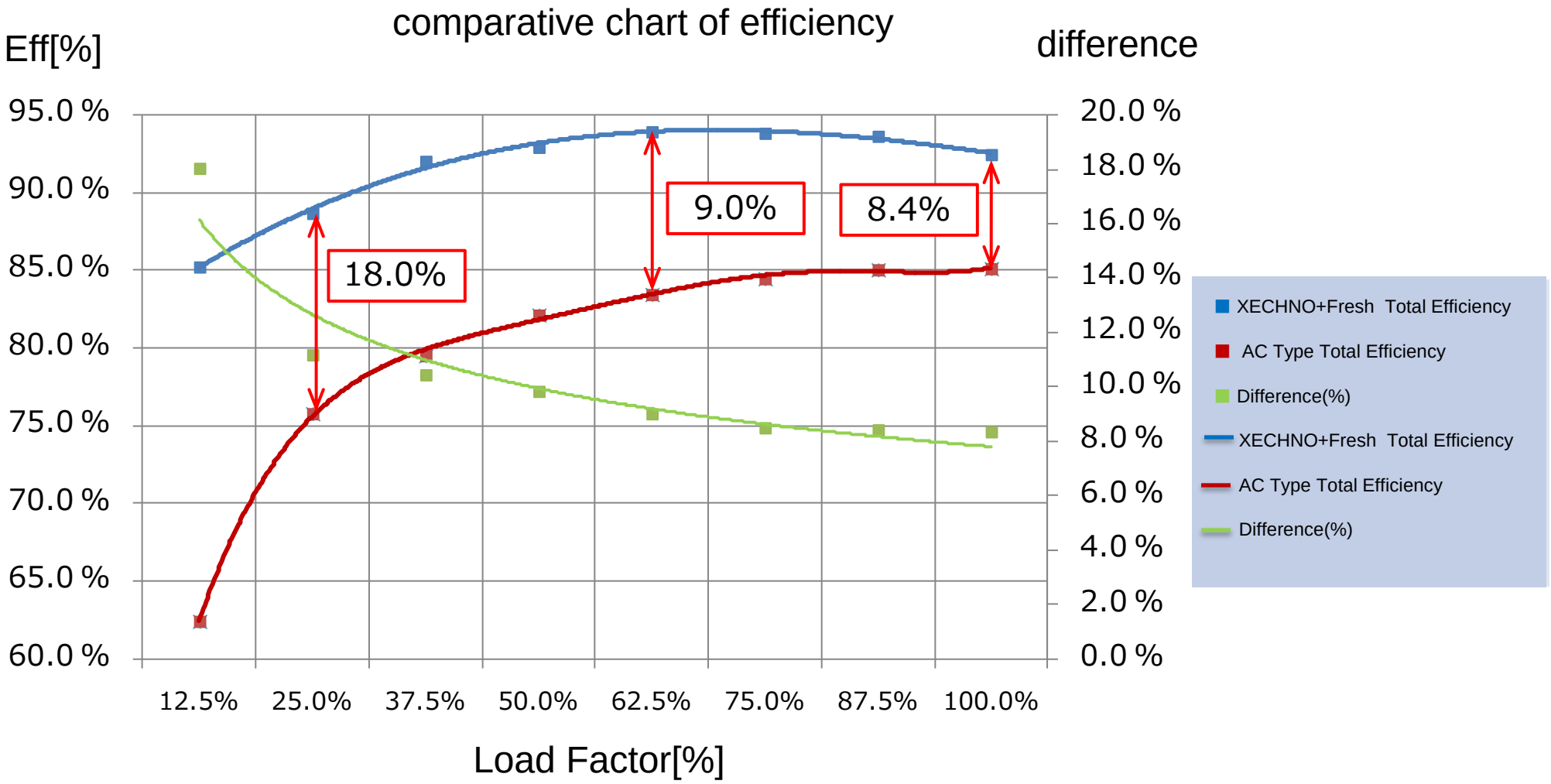
Resolved the arc discharge issue at the time of switch-on/off and disconnection.

The difference UPS to HVDC-DC12V





Energy-saving effect: Total efficiency of HVDC



Solar Power + HVDC

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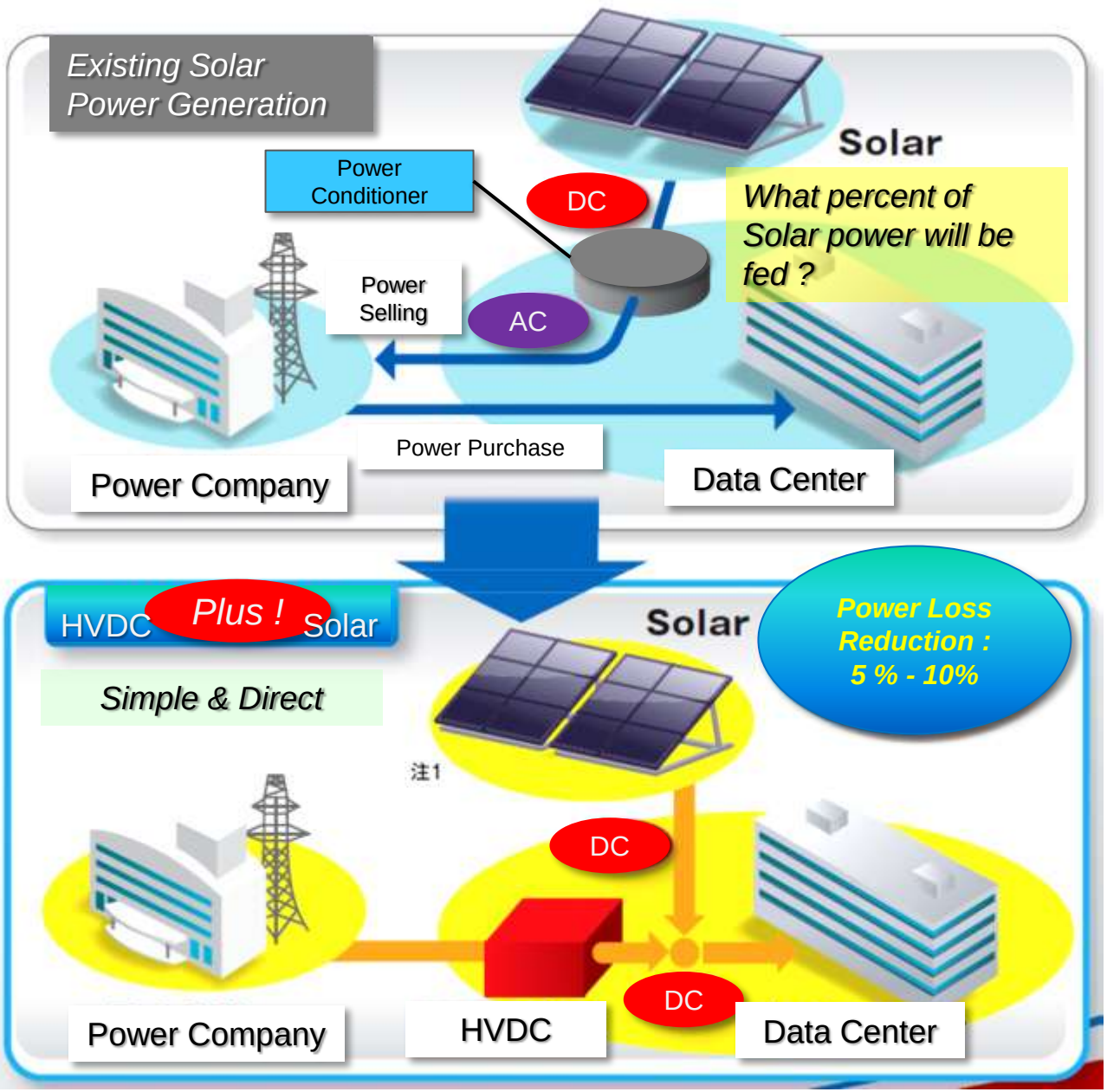
Drive The Future Communication with Sunlight !

Solar battery generates DC that's the same as HVDC !

- *Doesn't need Power Conditioner*
- *Local Generation for Local Consumption*
- *Reasonable Investment*

...Say goodbye to Power Conditioners.



International standardization activity for DC12V

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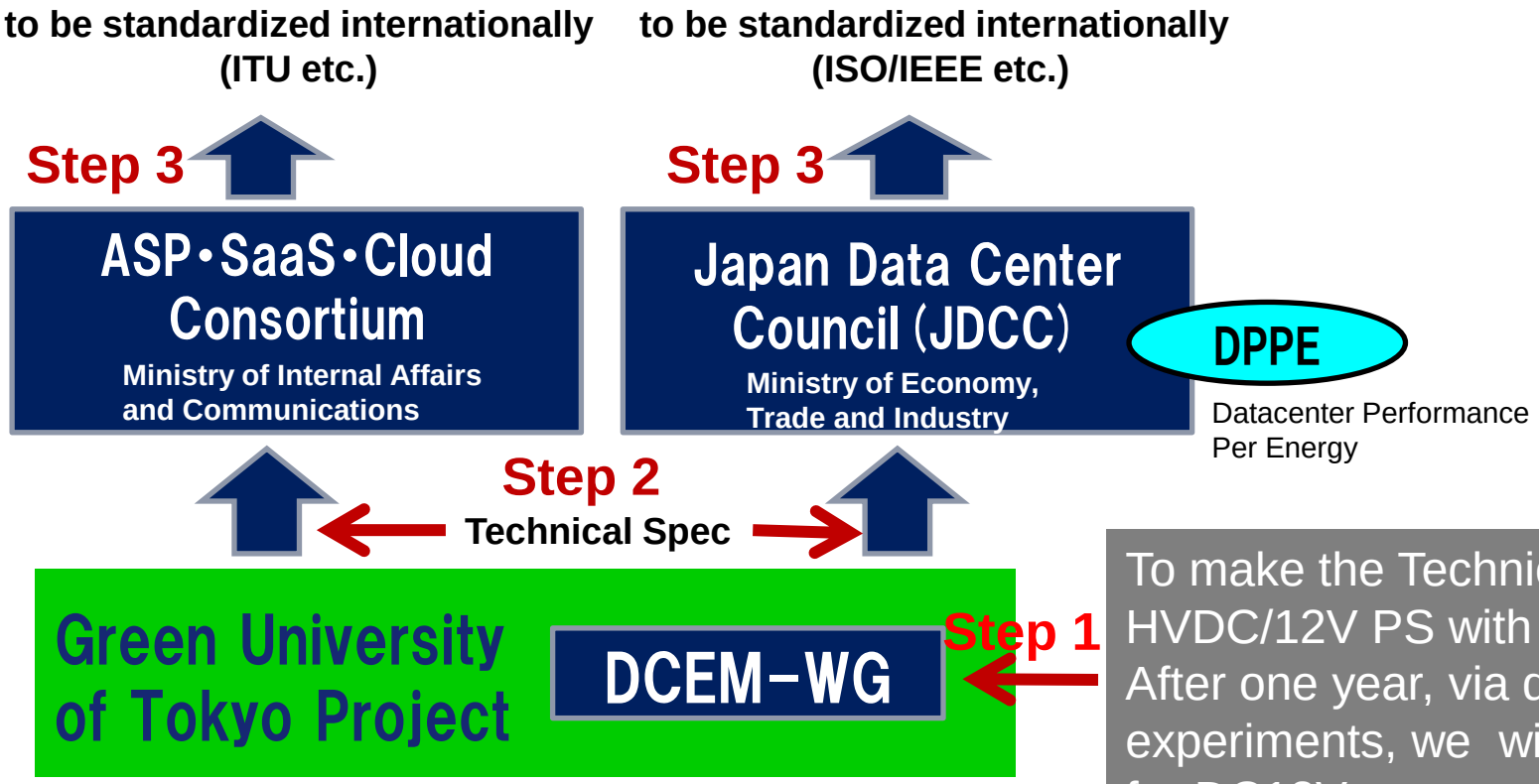
DCEM-WG has officially started as a member of Green University of Tokyo Project

DCEM-WG（Data Center Energy Management Working Group）

■SWG1・・・・DCIM（Data Center Infrastructure Management）

■SWG2・・・・HVDC system(High Voltage Direct Current System）



To make the Technical SPEC for HVDC/12V PS with DCIM,
After one year, via demonstration experiments, we will set the standard for DC12V

High Voltage Direct Current – Open Compute Project