

Green and Smart Data Center

-- Energy Saving --

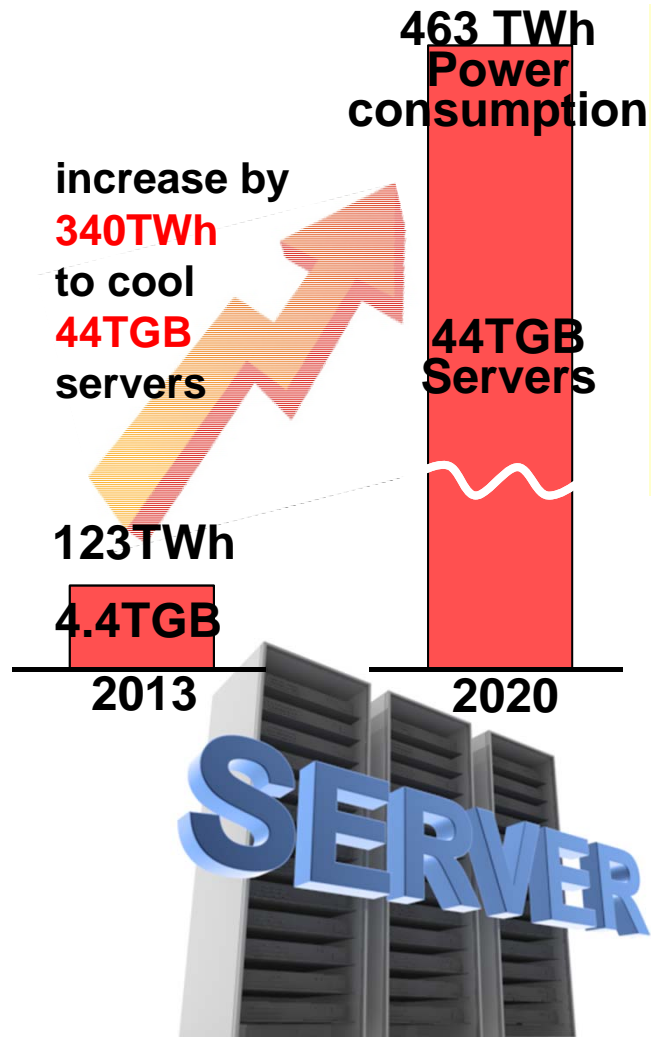
September 15, 2015

Fuji Electric Co., Ltd.

Why does Fuji Electric undertake IDC business?

Annual power consumption
to cool servers

Internet of Things(IoT)



will dramatically raise the number of servers.

- Total necessary power to cool servers will dramatically increase.
- Annual power consumption from 2013 to 2020 will increase by **340T(Trillion) Wh.**
- This number is equivalent to

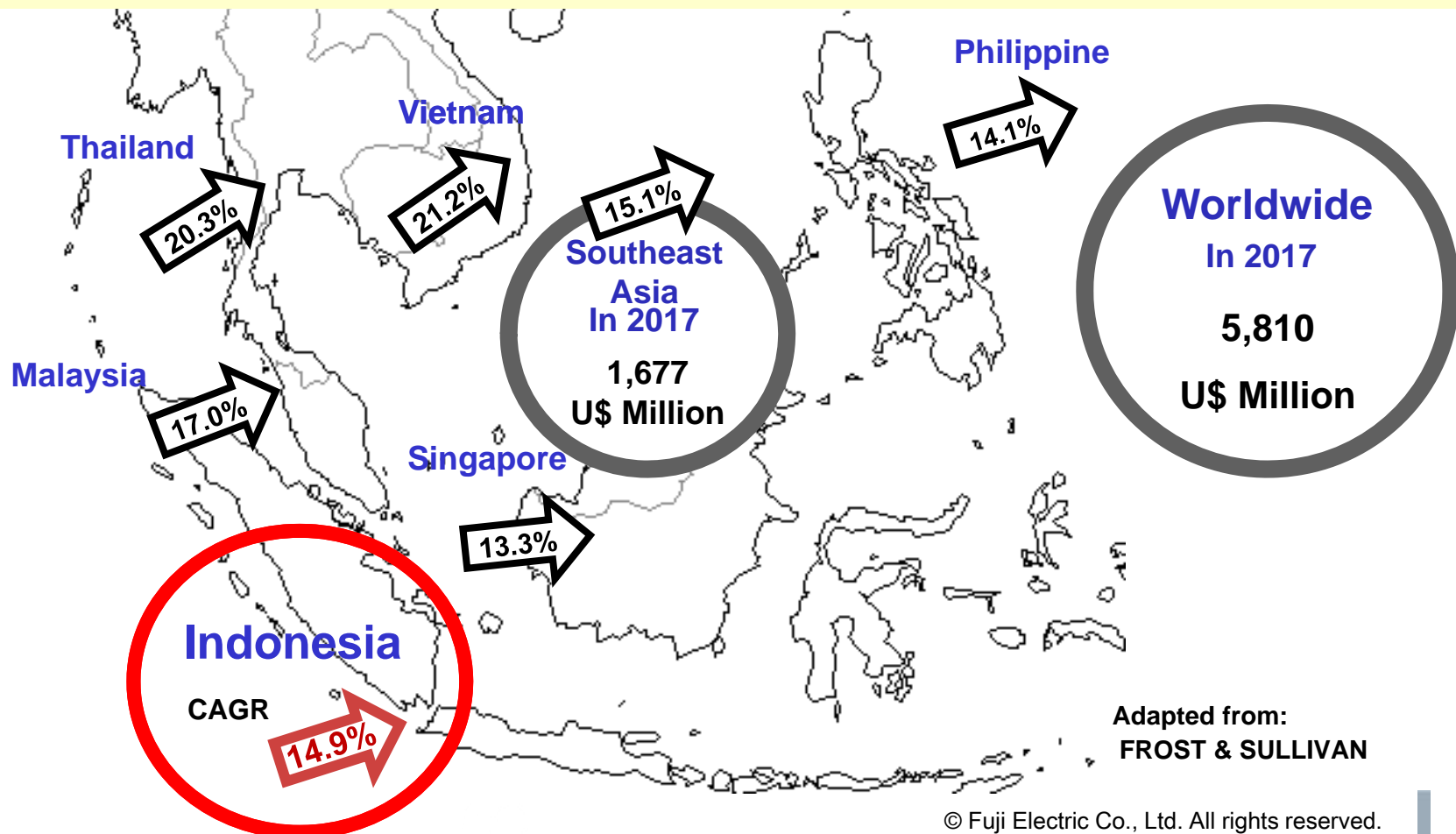
330 nuclear power plants

Fuji will contribute to energy saving by

- 1. Minimizing power consumption to cool servers**
- 2. Increasing UPS efficiency**

Data Center Market View in 2017

- North America is the largest market (2,151 U\$ Million).
- Southeast Asia is the fastest growth market (CAGR 15.1%)
- **Indonesia** is the most **possible and attractive** market in Southeast Asia because of
 1. Social stability in urban areas
 2. Opening to external investment
 3. The greatest unfulfilled potential



IDC Demands Trend in Indonesia



Indonesia is blessed with

- **Various natural resources** over a vast geographical area.
- Making the fullest possible use of their own natural resources to **develop industrial and manufacturing sectors.**

Indonesia is presently at a stage of

- Firming up of basic infrastructures such as telecommunication and energy system where **demand for IDC is staying small.**
- IDC demand for **industrial and manufacturing is increasing dramatically from 2014.**

lead to growth of IT Infrastructure

The development of IT infrastructure is

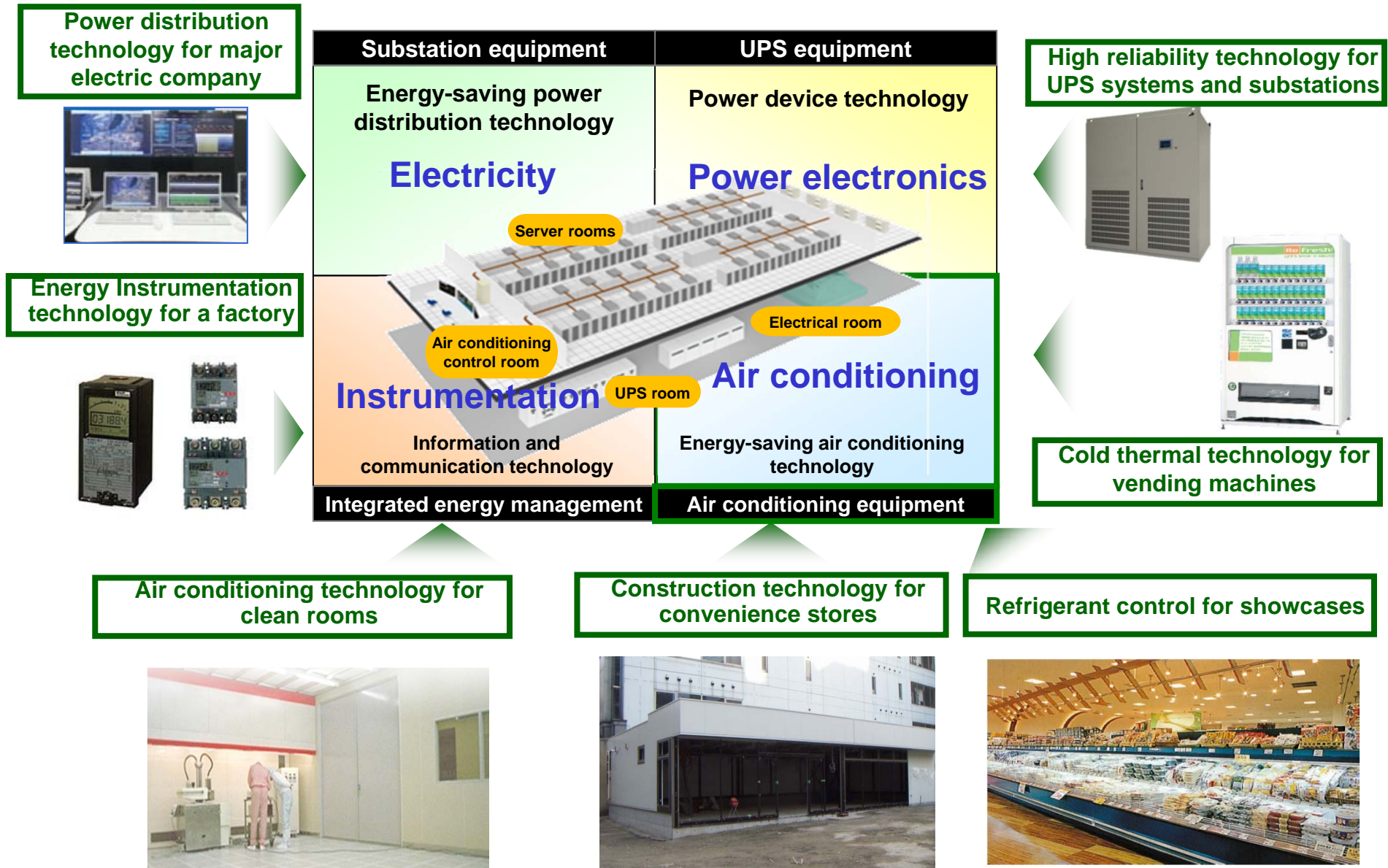
- Inconsistent across **different islands.**
- **How to provide the best solution** under such circumstances is IDC supplier's major issue.

Fuji Electric can provide

The most suitable solutions for such a specific demand in Indonesia by supplying scalable and transportable IDC systems.

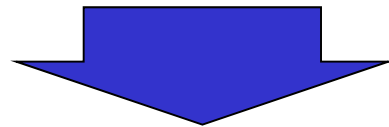


Fuji Electric's IDC Elemental Technologies

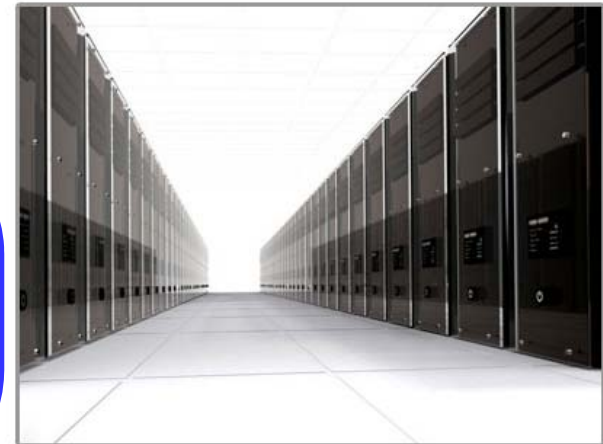


- ◆ **Expensive Facilities**
- ◆ **High Energy Usage for Operation**
- ◆ **High Cost for Operation**
- ◆ **Large Footprint**

World-wide Problem !!



Create Green Data Center
- Saving Energy -



Features of Fuji's Data Center Business

Data Center??



- ❓ High initial cost is required for traditional design to install electric and air conditioning facilities upfront. Can not install step by step.
- ❓ High running cost of cooling equipment for servers.
- ❓ High cost for labor to operate system before it is at full capacity.

Fuji's "Internet Data Center" design **reduces these costs** and provides service as a **Total Solution**.

Three benefits:

One-stop Service

Integrated Solution

Our EPC skill must be provided engineering, procurement and construction work for green IDC.

Optimize CAPEX

Improve ROI

Highly scalable design. Start small, add IT equipment by functional block in accordance with demand.

PUE1.2X

Save Energy

Effort to use energy more efficiently at the facility. Actively utilize natural energy, adopting energy saving equipment.

Low Cooling Cost : F-COOL NEO

Low cooling cost

PUE 1.2 energy-saving design!



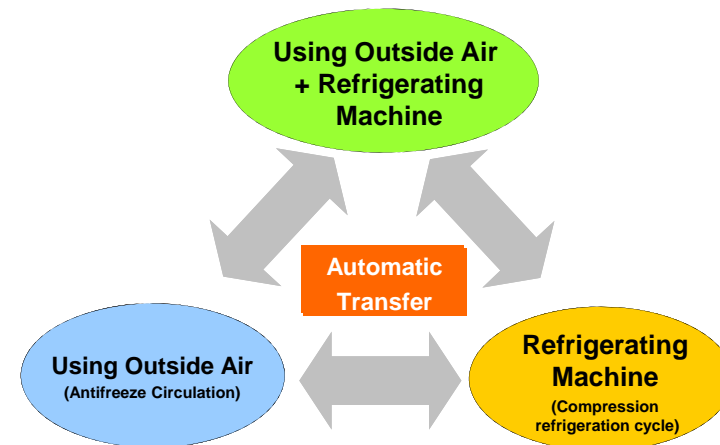
F-COOL NEO® is an energy-saving air conditioner ("indirect outside air-conditioning unit") developed by Fuji Electric with technologies and experience acquired from our long air-conditioning business. This unit saves much more energy than general air conditioners because it uses outside air energy year-round.

F-COOL NEO® aims at PUE 1.2 while simultaneously achieving the "elimination of waste" and "visualization."

F-COOL NEO

COP=10

(Measured annual efficiency, in Fuji Electric's laboratory demonstrations at Tokyo, Japan)



High Efficiency: UPS7000HX-T4

UPS 7000HX-T4 is “high efficiency” & “high reliability”.

High efficiency

Adopting RB-IGBT, achieve high efficiency, **96.5%**

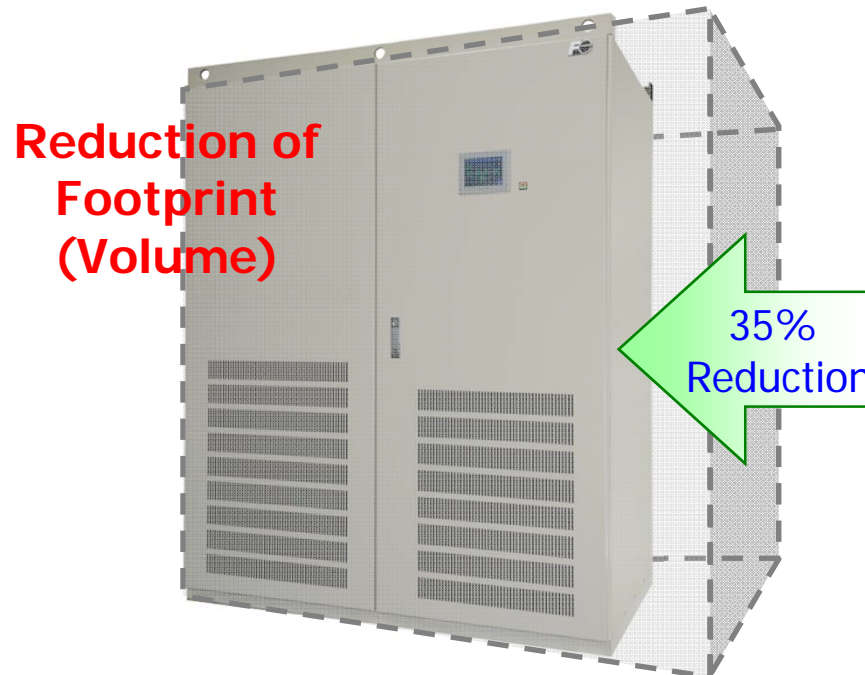
Space-saving

Footprint is 35% reduced by reducing number of parts and minimizing the parts.

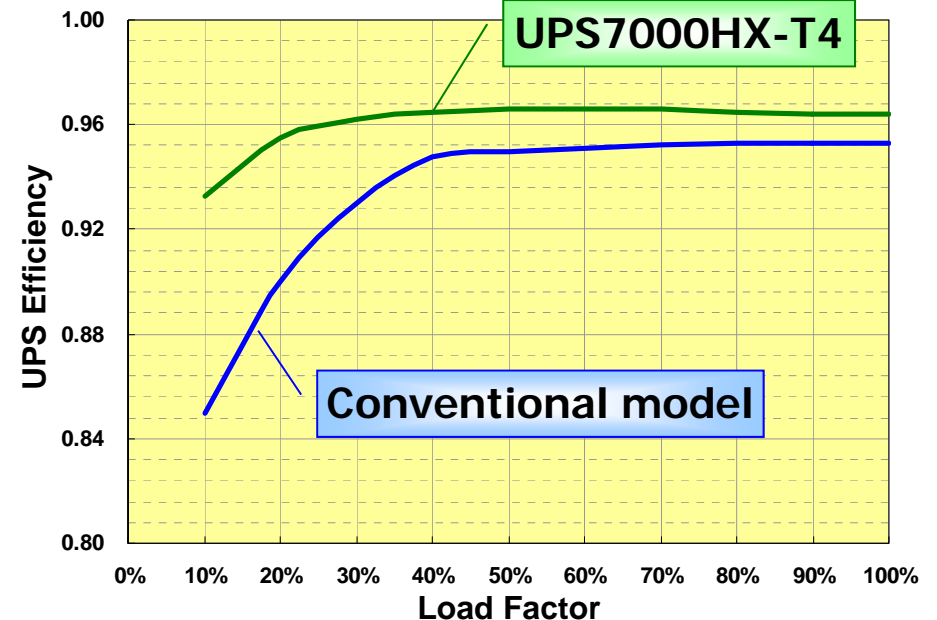
Scalability

Unit Capacity is 500kVA. 8 units can be placed in parallel at the maximum and maximum capacity will be 4000kVA.

"2014 Best Practices Award - Southeast Asia UPS"



Higher Efficiency at lower load factor



Container and Modular Data Center

Container Type



F-eCoMo



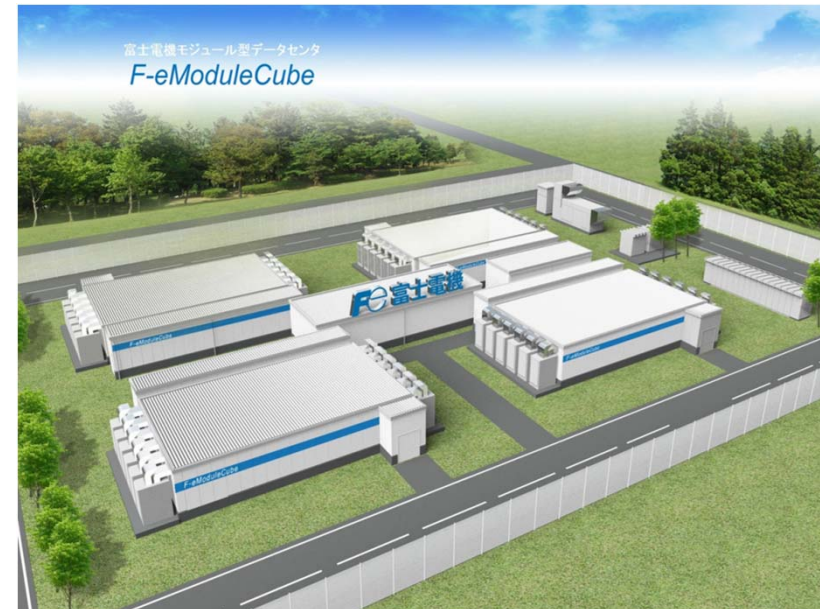
**Recipient of 2013 Green IT Award, Special Jury Award*
Award jointly to Fuji Electric, Fujitsu, and Fujitsu Laboratories**

*Prize at JEITA (Japan Electronics and Information Technology Industries Association),
GIPC (Green IT Promotion Council)

Hardware required for the data centers, such as servers, power supplies, air conditioners, disaster prevention, security and monitoring systems are offered as one package.

Modular Type

F-eModuleCube



You can build a data center step-by-step, starting with a server of 80 minimum racks and save money! You can also individually customize a server having less than 80 racks. You can install any number of server racks according to your installation space. Thus, you can increase the efficiency of constructing a data center.

Products for Data Center

Air conditioning

F-COOL NEO



F-COOL SPOT



Outside air intake unit



Electric power

Fuel cell



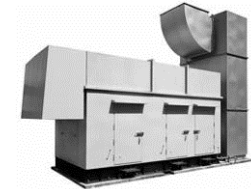
Incoming and transforming



UPS



Private power generator

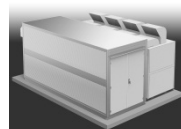


Housing

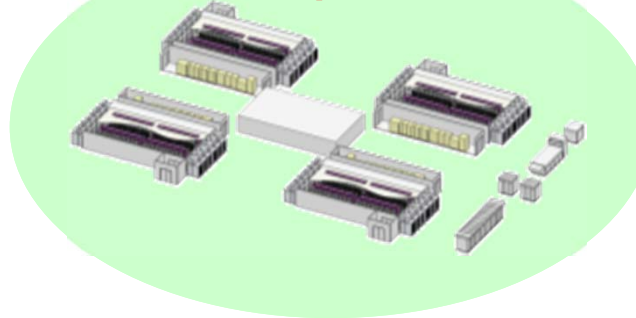
Module DC



Container



One-Stop Solution



Power distribution

Server intelligent distribution board



Step-down transformer



Rack-mounted UPS



Management (Energy saving)

F-DMS system



Electricity measuring unit



Peripheral facilities

Monitoring camera



Server rack



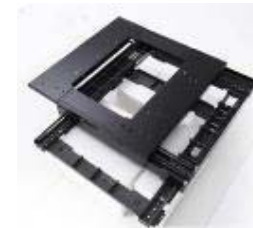
Entrance and exit management



N2 firefighting







Seismic isolator

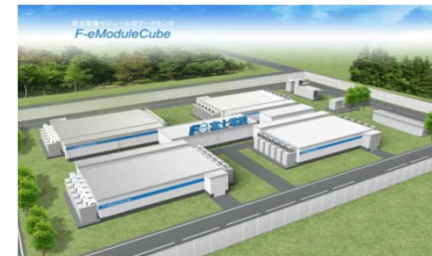


Fuji's Engineering to provide One-stop solution

Fuji will integrate its extensive experience and expertise of IDC into one-stop solution

Incoming HV/ MV Switchgear	Power Distribution LV Panel	UPS	Air Cooling Equipment	IT Rack	Fire Fighting Equipment
				Outsourcing	
	Supplying original products				
					
Delivery, construction ,start-up commissioning and maintenance					
Total Engineering + Supplying buildings					

The most suitable solutions for such a specific demand in Indonesia by supplying Container and Modular Data Center.

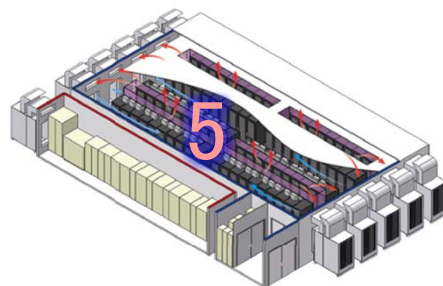


Recent Delivery Reference in JAPAN 2013 and 2014 Fuji Electric Innovating Energy Technology

References	Business Type	Year	Features
Modular Datacenter A	Turn Key	2014	Indirect outside air cooling unit
Modular Datacenter B	Turn Key	2014	Indirect outside air cooling unit
Modular Datacenter C	Unit	2014	Indirect outside air cooling unit
Datacenter D(Floor renovation)	Turn Key	2013	Indirect outside air cooling unit
Modular Datacenter E	Turn Key	2013	Indirect outside air cooling unit
Modular Datacenter F	Unit	2013	Indirect outside air cooling unit



Datacenter



Modular Datacenter



Indirect outside air cooling unit
2013 : 18
2014 : 20



UPS7000HX 61 units
UPS7000D3 110 units
(2006-2013)

FE Fuji Electric
Innovating Energy Technology

