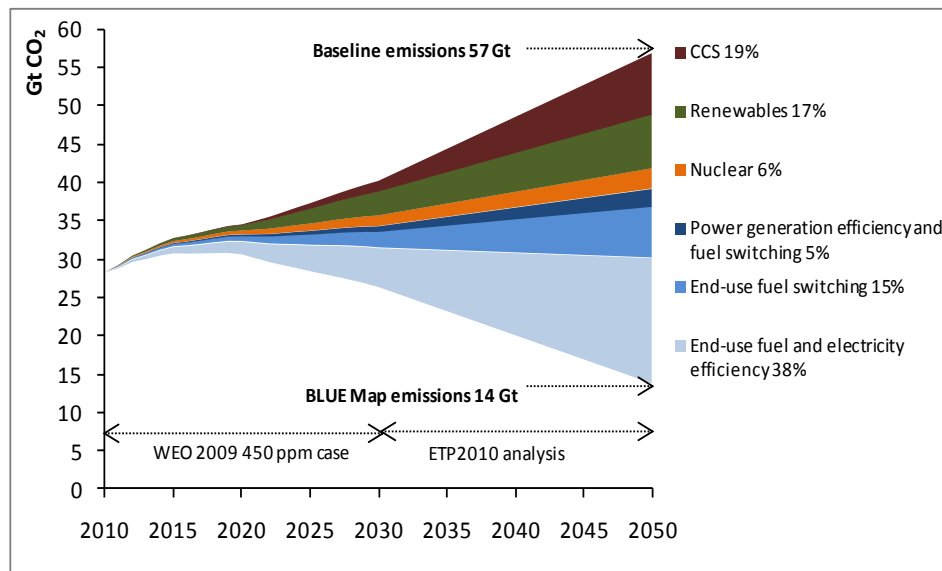


Forging Clean Energy Collaborations

Osamu ONODERA
New Energy and Industrial Technology
Development Organization (NEDO)
JAPAN
October 2011

Energy is a Global Challenge

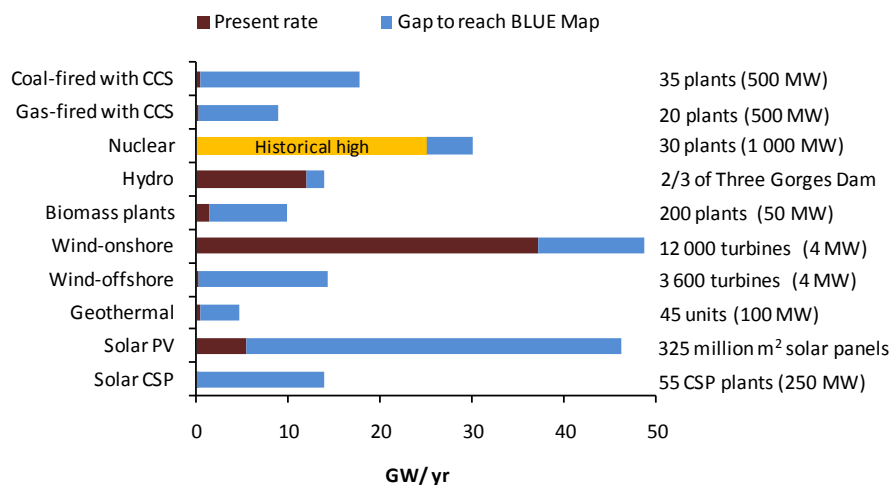


- Energy Efficiency and Renewable Energy contribute over half of CO2 reduction

(Source: IEA)

Need to accelerate investment into clean tech from current levels

Global Clean Energy Market
\$46 bn (2004) to \$243 bn(2010)
(Bloomberg New Energy Finance)



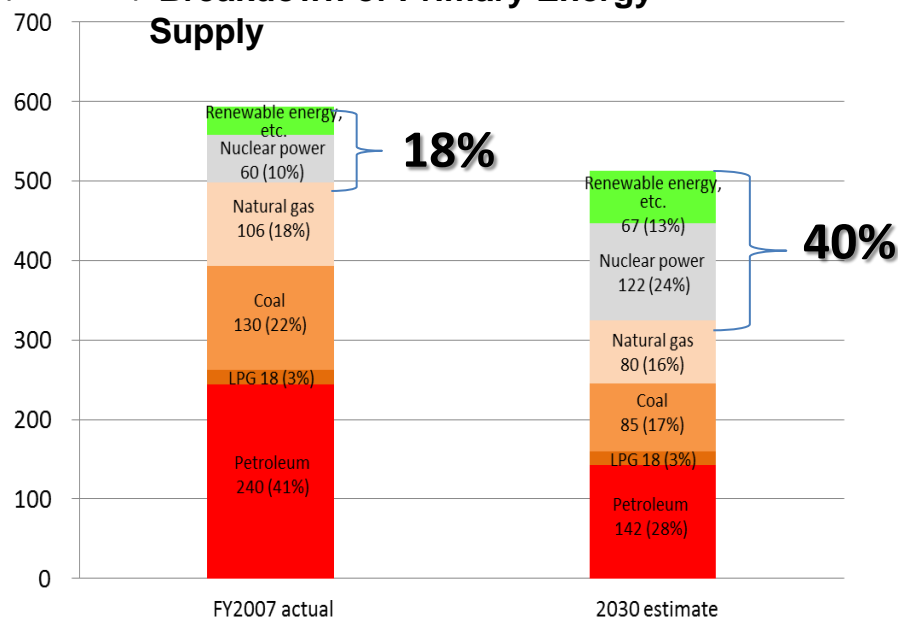
Japan has ambitious policy targets (to be reviewed)

The Japanese government has set ambitious policy targets to achieve a **30% reduction in energy-related CO₂ in 2030 compared to the 1990 level.**

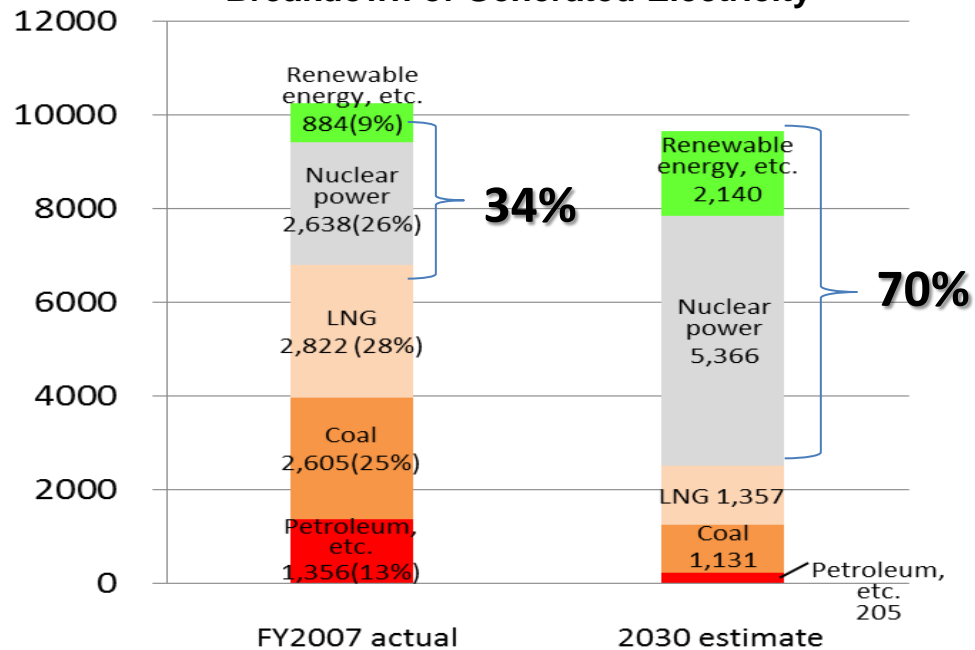
For example,

- ◆ Energy self sufficiency: 40% (18% at present)
- ◆ Zero-emission power source ratio: 70% (34% at present)

(Million kL) Breakdown of Primary Energy Supply



(0.1 billion kWh) Breakdown of Generated Electricity



The earthquake cut power supply capacity in the area by 40%.
 15% of demand reductions were requested to businesses and citizens in summer.
 The Japanese government has initiated a review process of energy policies.

Six Topics Discussed in Review Process

- ◆ Energy efficiency
- ◆ **Renewable energy**
- ◆ Natural resources (oil, gas)
- ◆ Nuclear power
- ◆ Electricity system reform
- ◆ ~~Industrial policy~~

Pre Fukushima

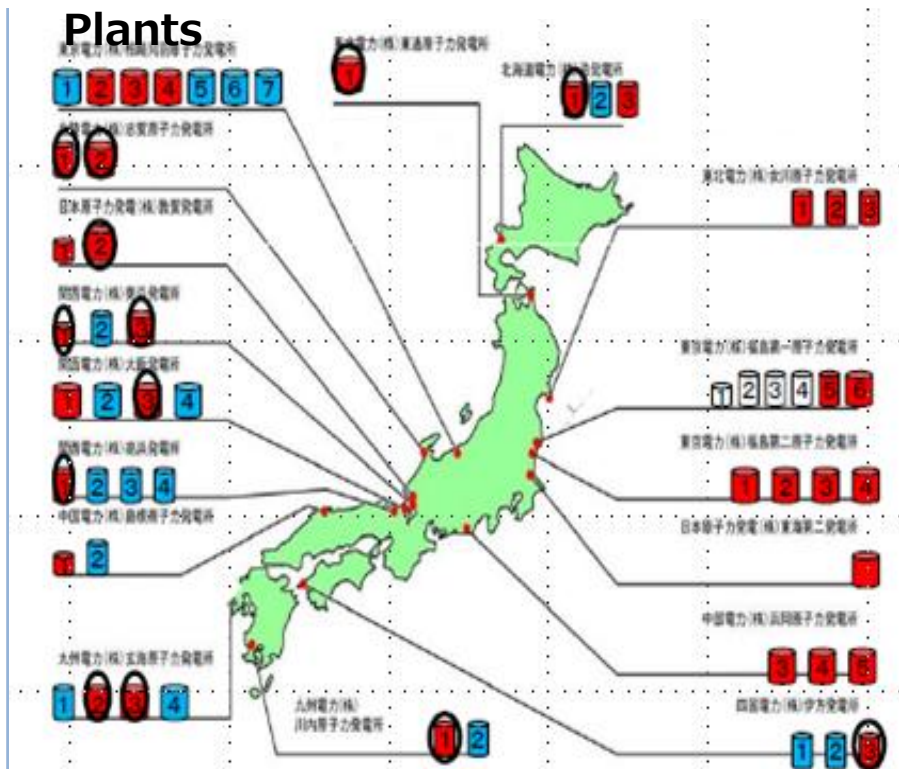
- Supply growth (RE, nuclear)
- Damp demand growth

Post Fukushima

- Lack of power supply
- Demand Response as a viable alternative
- New Renewable Energy Promotion Law (FIT)

➤ Policy Framework change leading to new markets

Current Status of Nuclear Power Plants



There are now fifty nuclear power plant units in addition to the four units at the Fukushima Daiichi Nuclear Power Station (NPS). Three units at the Hamaoka NPS have been shut down at the request of METI/NISA. Thirty other units have also been shut down for regular maintenance work.

Why Japan-U.S. Cooperation in Clean Energy ?



Strategic Partners

2 of 3 largest economies in the world

Clean Energy/ Smart Grid is system of systems

Complementary Strengths

Strength of Japan

**Applied Technology, Material/
Manufacturing Technology
Product/Process incremental
innovation**

**(Energy efficiency, Solar PV,
Fuel cells, Batteries etc.)**

**Innovation system with large
companies and existing SMEs**

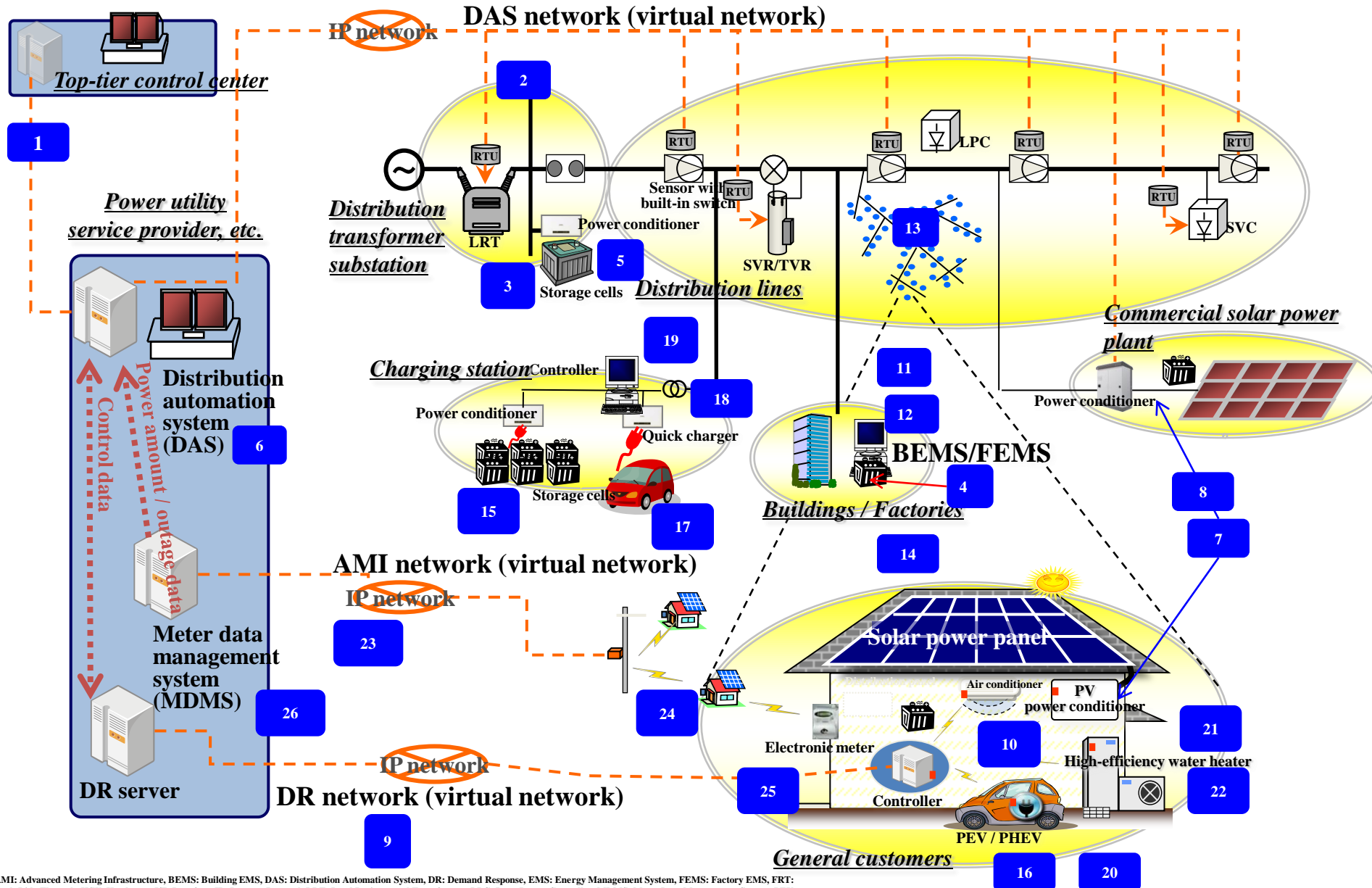
Strength of U.S.

**Basic Research,
System Engineering
Marketing/Organizational
innovation**

**(Smart Grid (Smart meter system),
Bio fuels, Solar thermal,
Computational Science etc.)**

**Innovation system with large
companies, new ventures,
university**

26 Focus Areas "System of Systems"

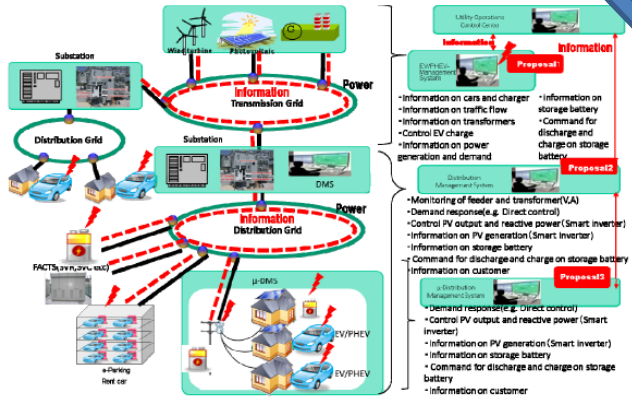


AMI: Advanced Metering Infrastructure, BEMS: Building EMS, DAS: Distribution Automation System, DR: Demand Response, EMS: Energy Management System, FEMS: Factory EMS, FRT: Fault Ride Through, H/W: Hardware, I/F: Interface, IP: Internet Protocol, LRT: Load Ratio control Transformer, LPC: Loop Power Controller, MDMS: Meter Data Management System, PEV: Plug-in Electric Vehicle, PHEV: Plug-in Hybrid EV, PV: Photovoltaic, RTU: Remote Terminal Unit, SVC: Static Var Compensator, SVR: Step Voltage Regulator, S/W: Software, SW: Switch, TVR: Thyristor Voltage Regulator, WASA: Wide Area Situational Awareness

NEDO collaboration projects in the United States



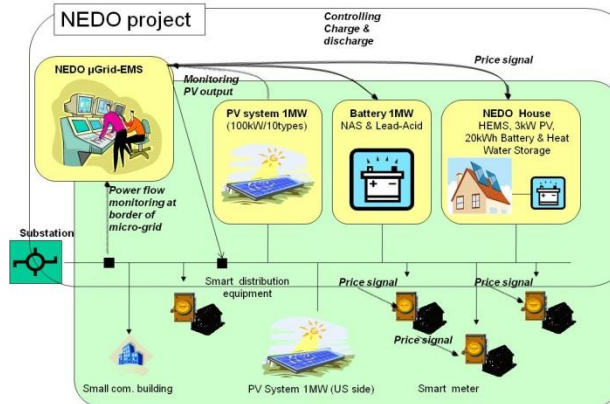
Maui Island, Hawaii



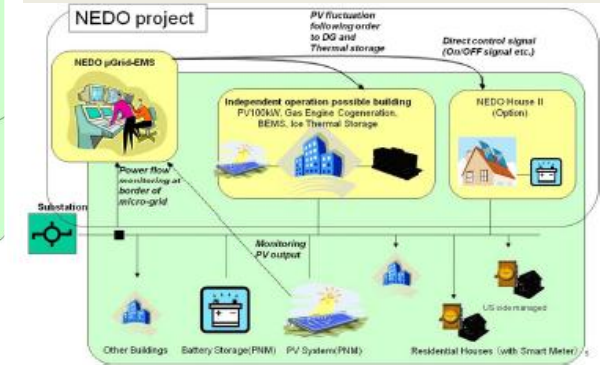
Interoperability of standards !!!



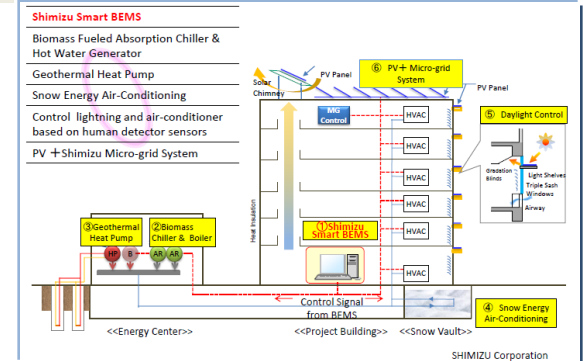
Los Alamos, New Mexico



Albuquerque, New Mexico



New York



- Large/large company – large/small company
- Strategic Collaboration, IP Collaboration, JV, Buy-out
- Technology/Finance
- Targeting US/JP/Global market

Examples

GE – Fuji Electric

Smart meters

GE – Hitachi

Nuclear

Westinghouse – Toshiba

Nuclear

Eaton – Takaoka

DC Quick Charger

Carrier – Toshiba

Air Conditioning

Tesla – Toyota

Electric Vehicles

Ford – Toyota

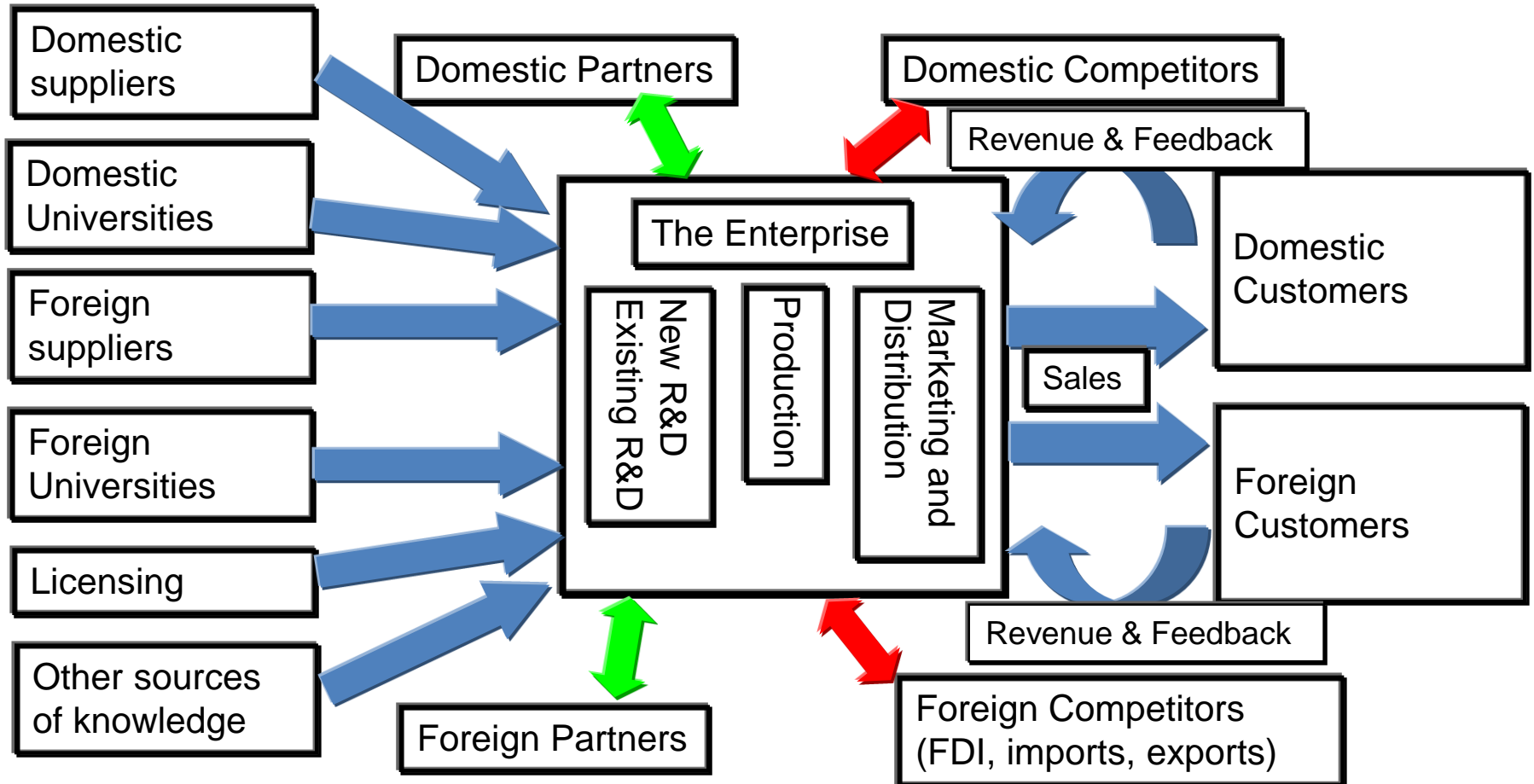
Hybrid Systems for Trucks

NRG Group – Eurus Energy

45 MW PV plant

CBI polymers (Skai Ventures) - ??

Decongel (Nuclear Cleanup)



**Thank you very much
for your attention!!**



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<http://www.nedo.go.jp>**