Our Regional Café Session: Up Close and Personal Perspectives From Asia's Biggest Economies

Regional Café

SHUICHIRO KAWAMURA

Founder & President, Energy & Environment Investment

Energy & Environment Investment, Inc.
Cleantech Forum Asia 2018

November 2018
Singapore

Energy & Environment Investment, Inc.

EEI at a Glance

- **The pioneer and leading venture capital in Japan focused on the transformation of the energy industry**
- **Founded in 2006, $ 350m assets under management, 90 portfolio companies**
- **Strong track records in creating energy transition businesses through partnership with startups and large corporations**

Energy
Environment
Investment

Our Mission

Energy Environment Investment

Investment Focus

Sustainable economy, environment, society

Home	Industries	Infrastructure	Communities

Energy Transition

Connected Home	Smart Industry (building, factory, data center, agri, forestry)		Smart mobility		Smart city/ smart community
Energy auction	P2P energy	Energy uberfication	Digitized energy (smart meter, big data analytics)		Sharing energy
Customer engagement	Non-subsidized renewables	VPP, DER	Demand response, aggregator	Grid optimization	Stadtwerke model
Energy efficiency, production, storage	Advanced material	Sensor, IoT, AI	EV & storage	Fintech, blockchain	Energy crowd funding

The Japanese Market
～Unique and Transformative Growth Opportunities～

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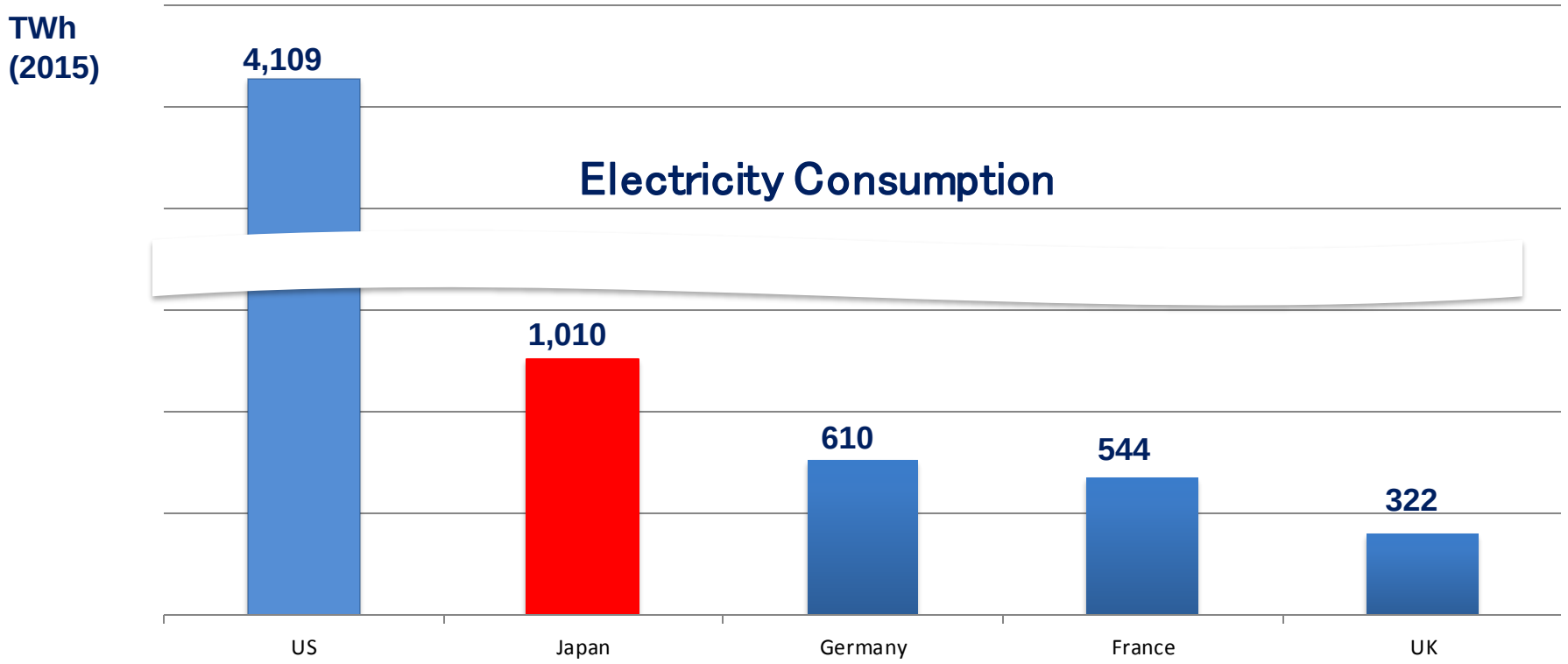
Attractive Japanese Market

Japan has one of the largest energy market in the world next to US, China. Electricity consumption of 1000 TWh, and market size of $200 billion



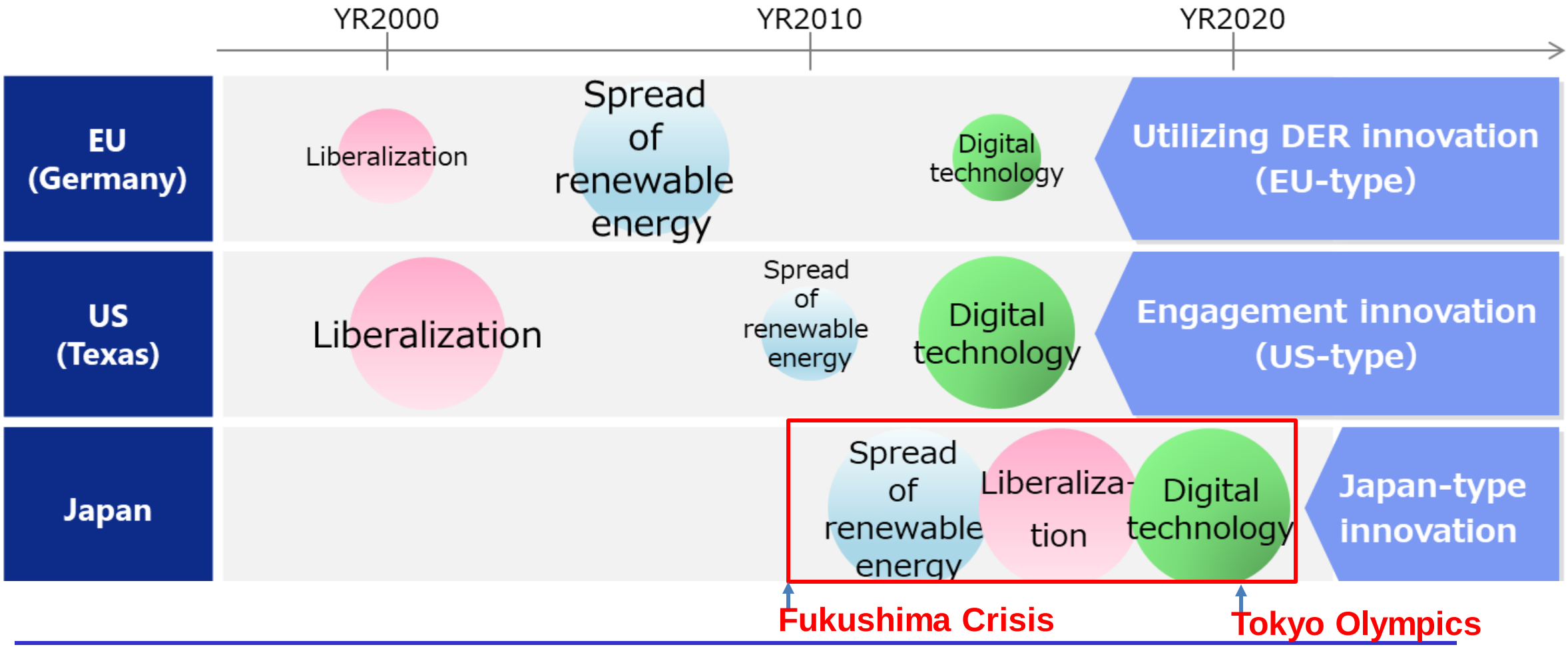
Source: https://data.oecd.org/energy/electricity-generation.htm

Unique and Transformative Growth Opportunities

Unique and Transformative Growth Opportunities

- **Simultaneous impact of Deregulation, De-carbonization, Decentralization & Digitization**

The Uniqueness of the Japanese Market



Unique and Transformative Growth Opportunities

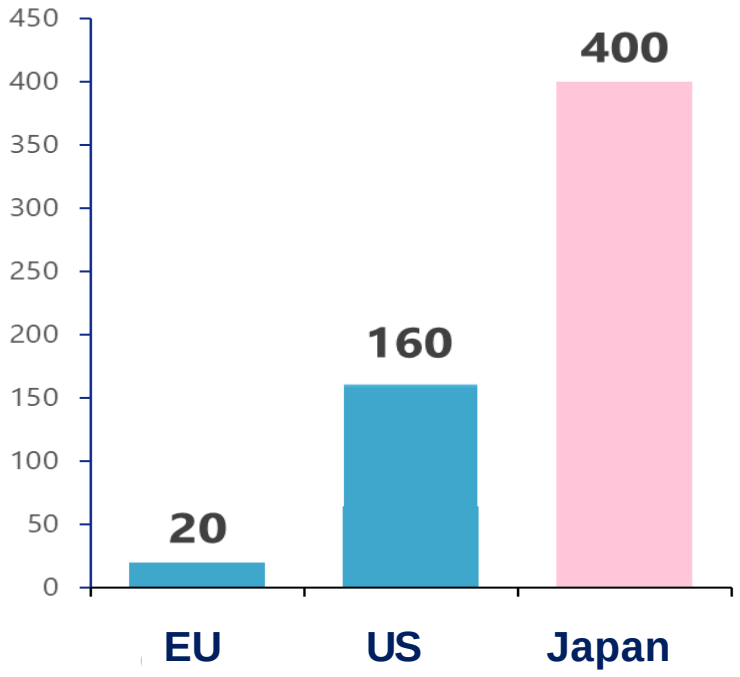
- **Intense competition among incumbents, gas, oil, telecom, steel, trading, railway companies and independent retailors**

Competition in the Japanese Market

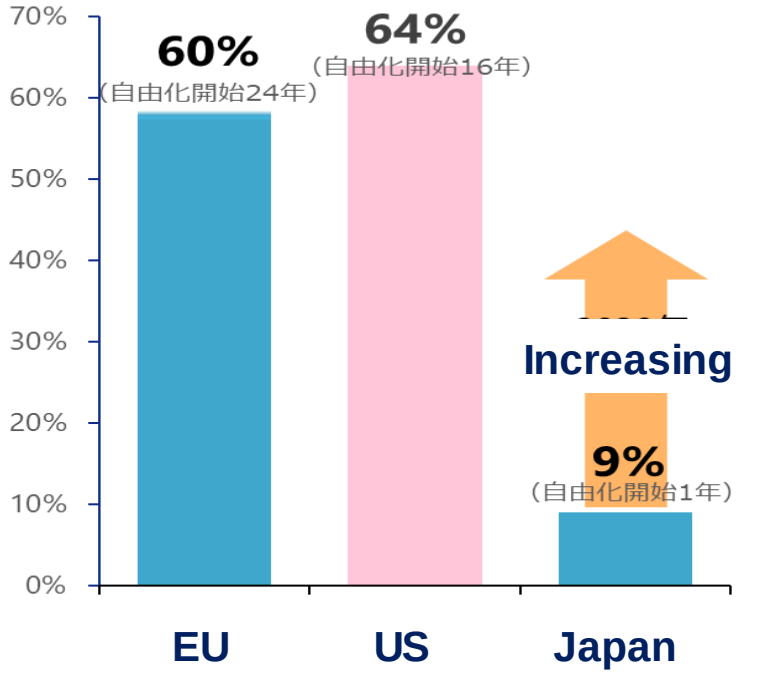
Retail electricity market has been fully opened in April 2016.

One of the most competitive market in the world.

Number of New Entrants



Switching Rate (Residential)



Unique and Transformative Growth Opportunities

- **Government policy and growing customer awareness of sustainability leading to more renewables and DER.**

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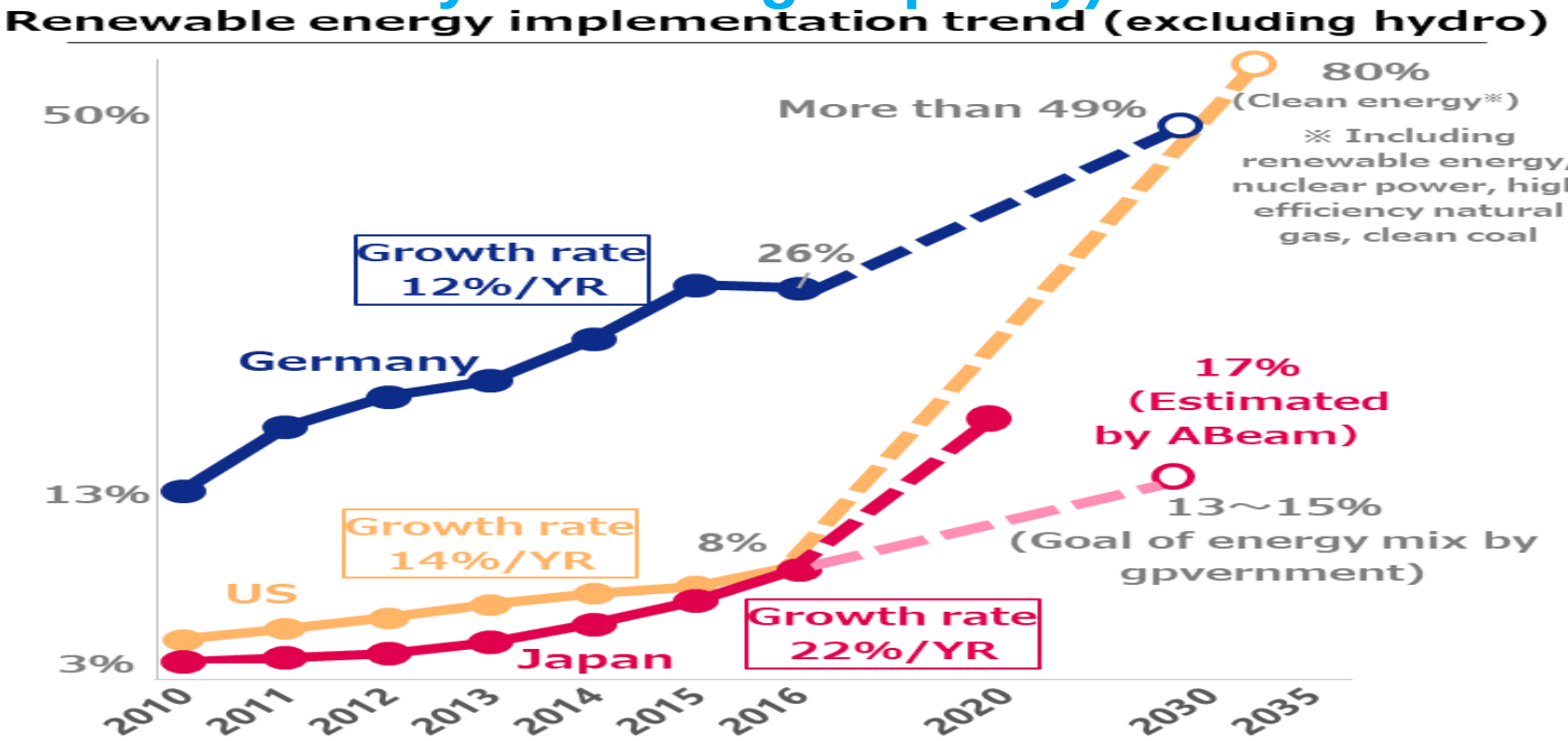
DER Proliferation

Renewables and DER are expected to increase rapidly

Costs of renewables and batteries are coming down rapidly (Japan has already reached grid parity)



※ Growth rate : Annual average growth rate from 2010 to 2016
※ Growth rate and Japanese renewable energy proportion in 2020 (17%) is estimated by ABeam consulting

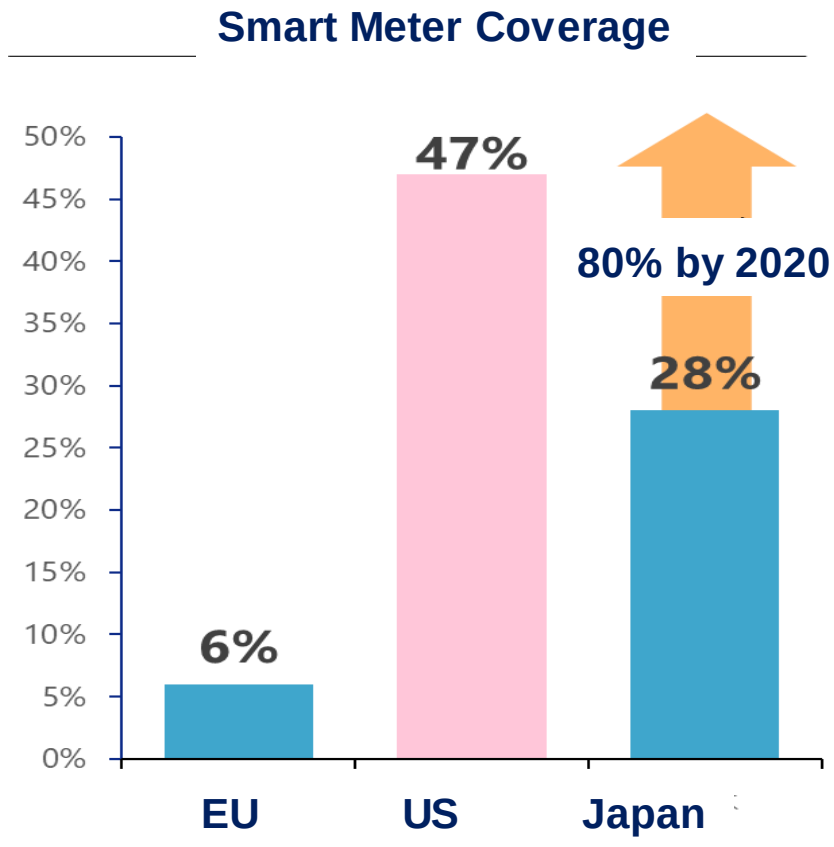
Unique and Transformative Growth Opportunities

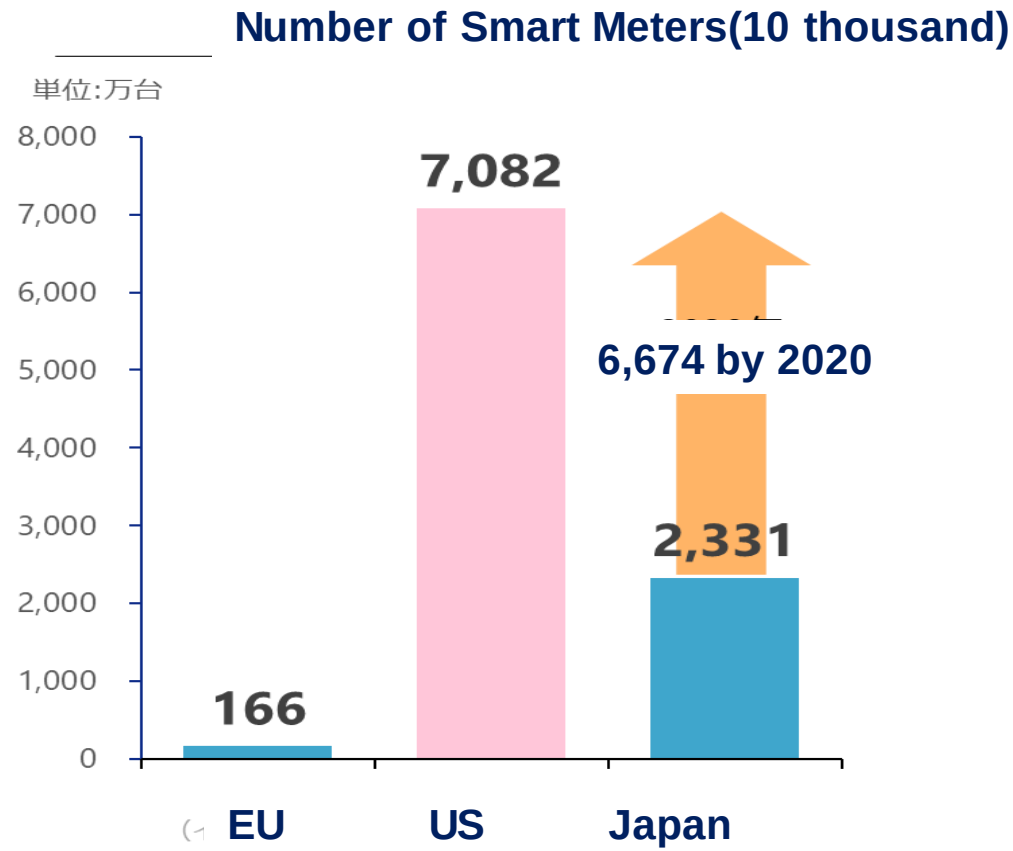
- **Aggressive deployment of smart meters and IoT devices leading to creation of new data driven businesses**

Smart Meter Deployment

Smart meter coverage in Japan is currently 28 %

Expected to reach 80 % by 2020



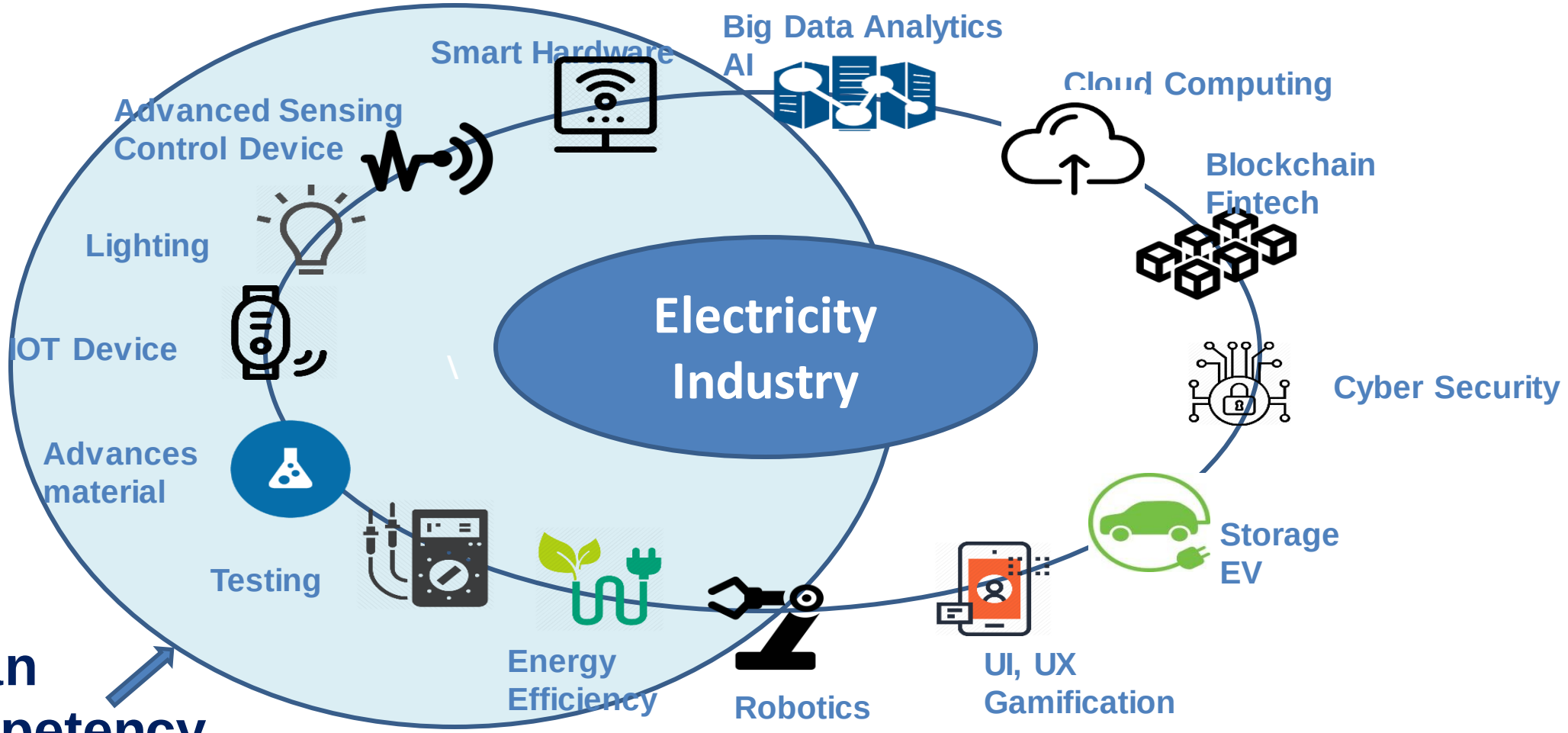


Unique and Transformative Growth Opportunities

- **Unique Japanese technology in hardware manufacturing impacting innovation in the energy sector**

Technologies Affecting the Electricity Industry

Japanese startups and SMBs have unique strengths around hardware related technologies.



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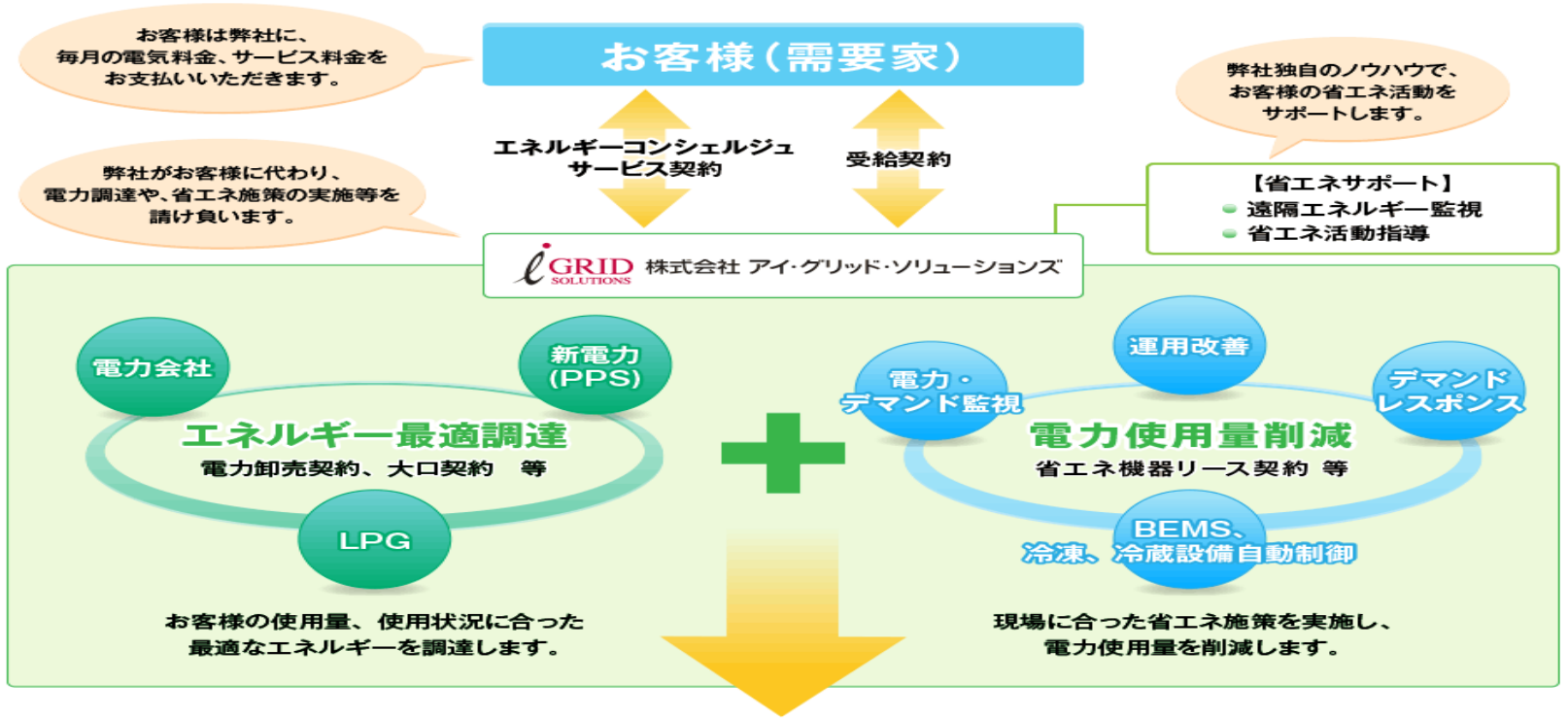
Selected EEI Portfolio Companies and Pipeline

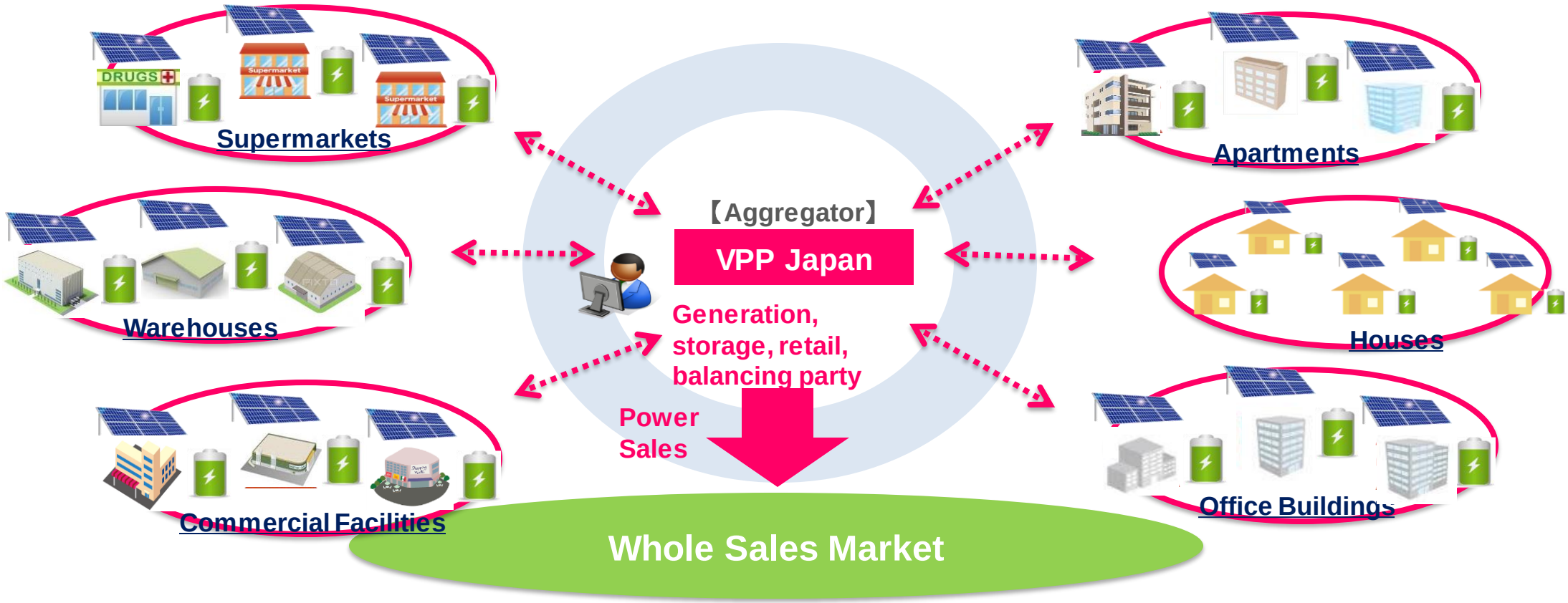
AI / Energy Efficiency: I Grid Solutions Co., Ltd.

- Boasts a vast customer base of 5,600 supermarkets and retail outlets.
- To which it provides one-stop array of energy services spanning:
  - Energy Efficiency Management, Energy Supply (cost optimization via aggregation), Demand Response, etc



Virtual Power Plant: VPP Japan Inc.

- Installs solar PV on supermarkets and other commercial facilities, providing power for self-consumption
- Next phase is to install storages, peer to peer trading, and establishment of VPP.



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Market Place: I AND C-Cruise Co. Ltd

I AND C-Cruise
株式会社アイアンドシー・クルーズ

- Operates leading PV matching platform. Also operates major home reform site.
- Established leader position of rich network and customer data of green conscious market and solution providers.
- Excellent position to expand into residential VPP market.

Leading Portal serving the residential home/energy segment

太陽光領域

「グリーンエネルギーナビ」

・国内No1の太陽光発電（住宅/産業）蓄電池のポータルサイト
・「価格.com」との独占連携
・月間見積もり依頼数 1000件
・提携会社数 200社

リフォーム領域

「リショップナビ」

・国内最大級のリフォームサイト
・「価格.com」との独占連携
・月間見積もり依頼数 2000件
・提携会社数 1000社

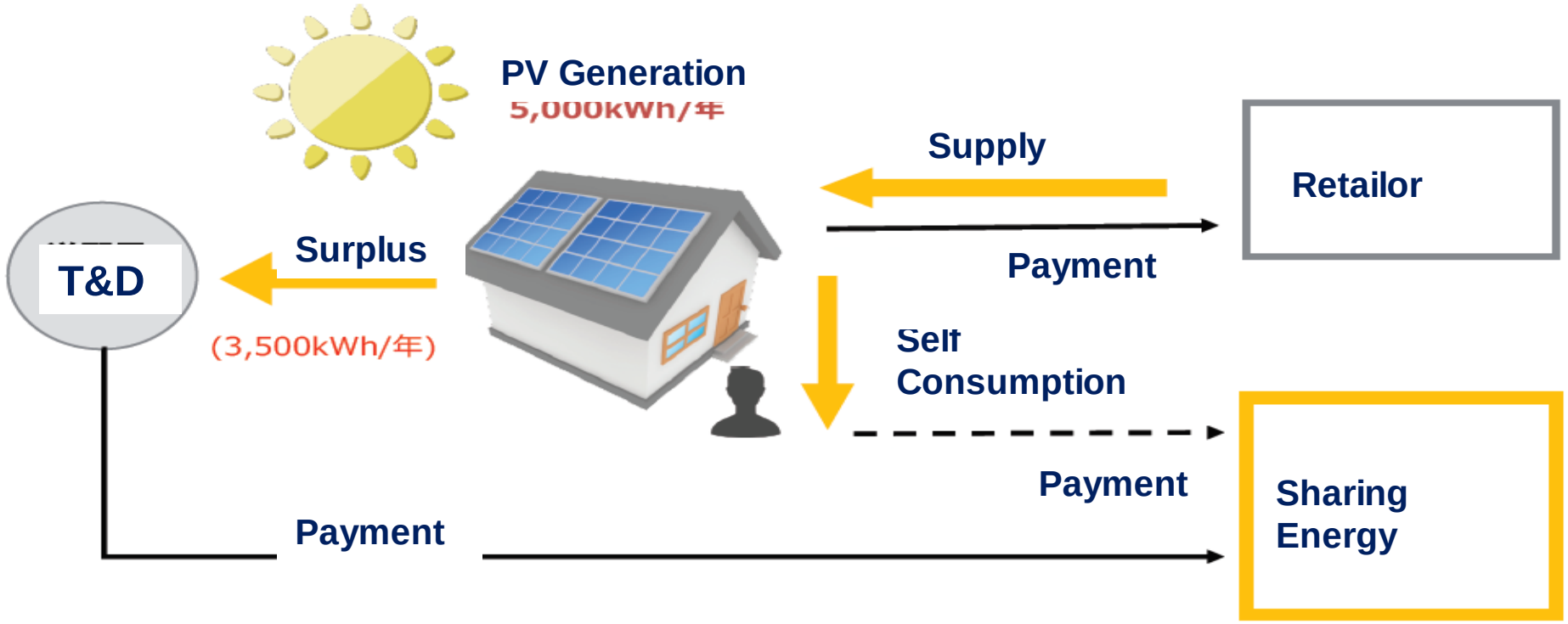
電力・ガス領域

「enepi」

・国内最大級のプロパンガスサイト
・「価格.com」との独占連携
・月間見積もり依頼数 1000件
・提携会社数 50社

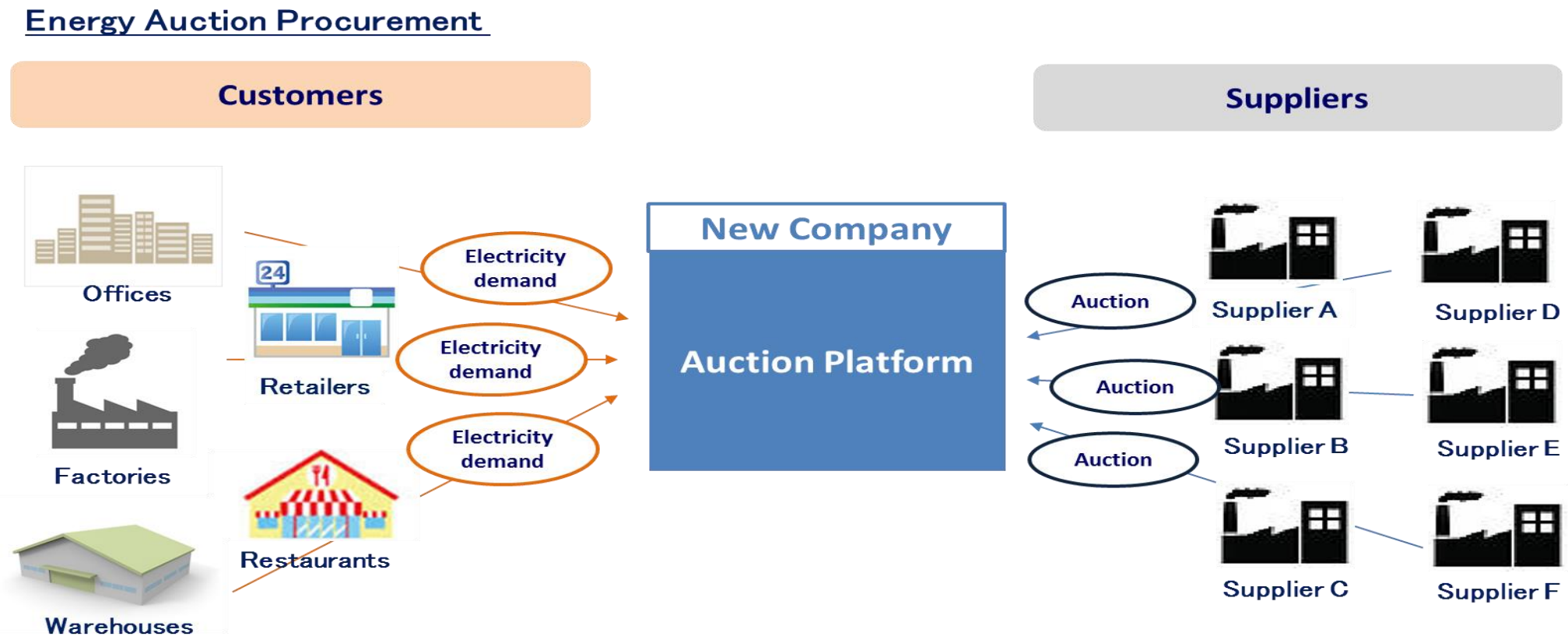
DER/VPP: Sharing Energy

- Installs solar PV on residential buildings, providing power for self-consumption. (Sells surplus electricity to local T&D company)
- Next phase is to install storages, peer to peer trading, and establishment of VPP.



Market Place: Whole Energy Co., Ltd.

- Provides auction platform that directly connects C&I customers and energy suppliers.



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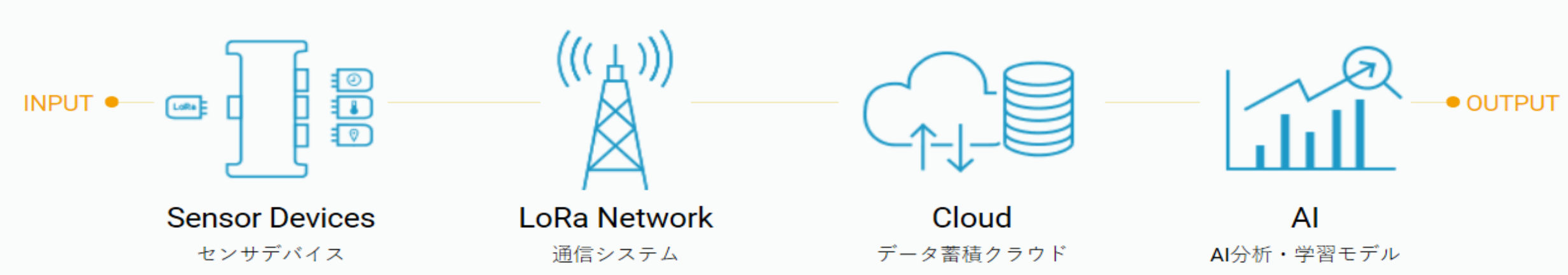
AI / IoT: Skydisc Inc.

SKYDISC

- Provides IoT/analytics solution for Industrial application
  - Factories, Energy Infrastructure (e.g. motor, pumps, hydro), Water Treatment, Environment, Construction, etc
- Strength in Big Data Analysis and Application Specific AI/Algorithm Modelling



Provides Full Solution spanning sensor devices + network, data analysis, AI algorithm modelling.
Enables easy to implement IoT + Cloud based platform for facility maintenance

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Material for Next Generation Lighting: NS Materials Inc.

NS Materials

- Technology Leader in Next Generation Quantum Dot (QD) nano material development.
- Develop/Manufactures QD based phospors for next generation displays:
  - Major Image Quality Enhancement
  - Greatly reduces energy consumption of devices
- Multiple Asian Display OEMs in Product Evaluation Phase

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QLED Not OLED Is The Future Of TV Technology, S

John Archer, CONTRIBUTOR
FULL BIO
Opinions expressed by Forbes Contributors are their own.

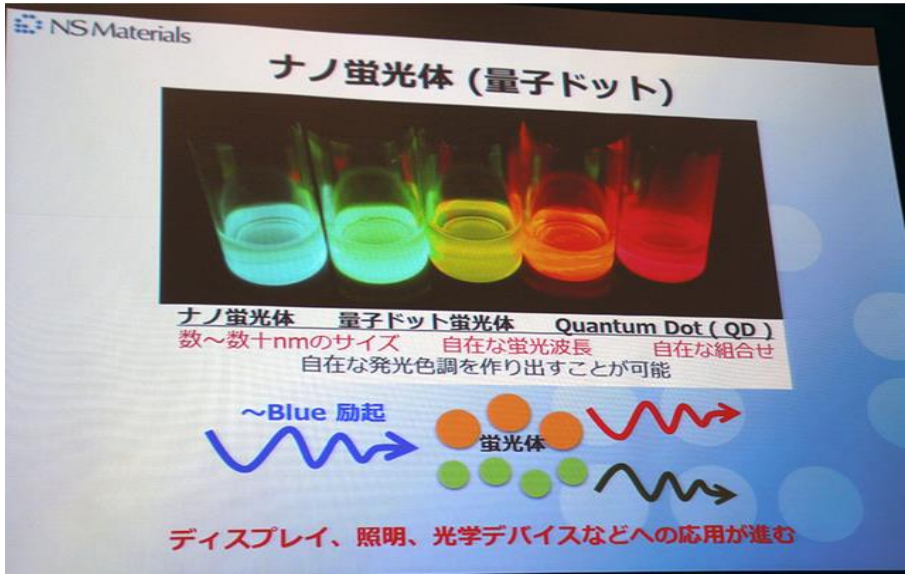
A leading international AV consultancy has reported that the future of TV is stacked heavily in favor of Quantum Dot LED (QLED) rather than OLED technology, due to LG simply not being able to make enough OLED TVs to satisfy demand and drive prices down.

The eye-catching claim was made at the recent QLED And HDR10 Summit in Los Angeles by Ross Young, Founder and CEO of Display Supply Chain Consultants (DSCC). In a presentation entitled QD vs OLED TV Capacity And Cost Outlook, Young concluded that 'OLED TV panel capacity is small and will remain small relative to LCD capacity through 2021.'

Young's analysis finds that Quantum Dot (QD) TV shipments are expect to rise at a compound annual growth rate (CAGR) of 90% from 2016 through to 2021, hitting just over 100M units and a 34% market share. What's more, the DSCC research suggests that if, as anticipated, current technical issues are overcome and manufacturing costs are reduced, QLED screens could account for the entire LCD TV panel market by 2021.

出典：Forbes

QD bases nano phosfors



Battery Technology: LE SYSTEM CO., Ltd.

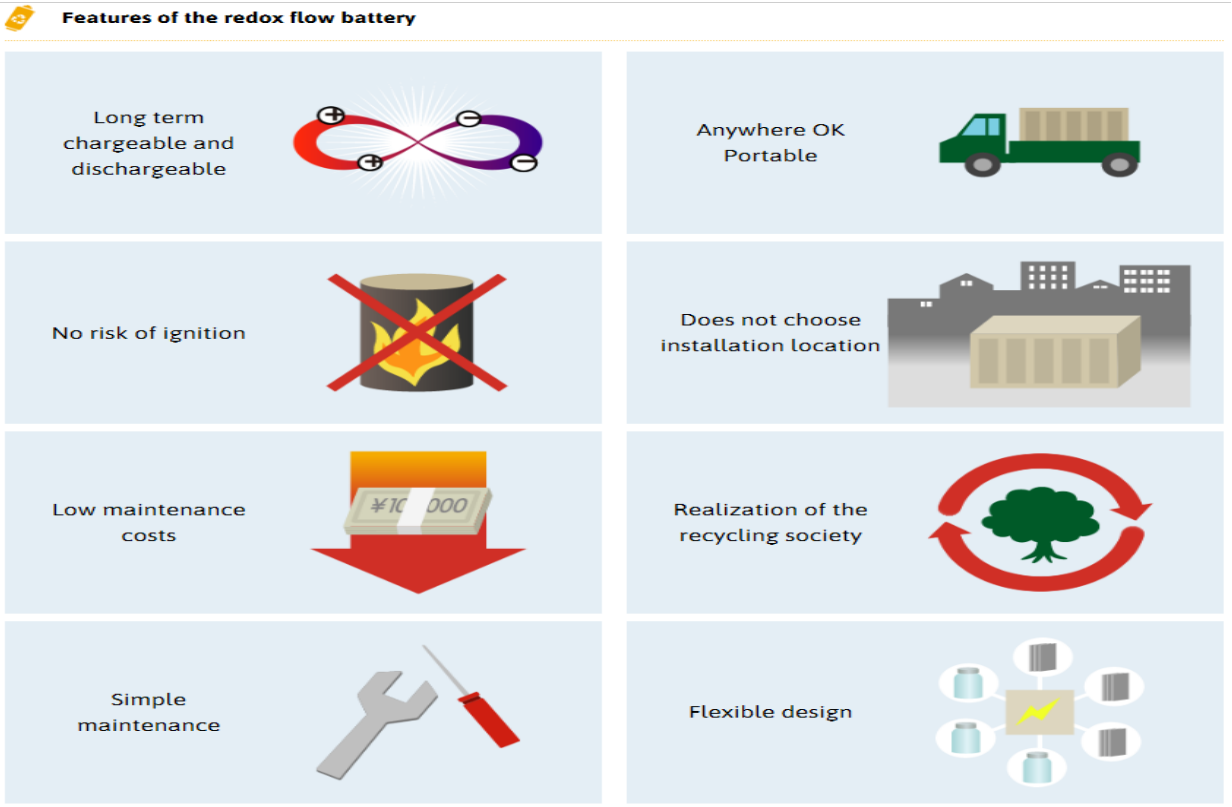
LEシステム株式会社

- Development of next generation vanadium based redux flow batteries (VRFB).
- Particular Strength in Stable/Low Cost supply of vanadium electrolyte material which has been a major bottleneck for VRFBs.
  - Technology breakthrough in recovering vanadium from industrial waste

Redox Flow Battery (RFB)

The battery occurs by the oxidation-reduction reaction during charging and discharging. Although not suitable for small scale, but it have long life and safe.

- Long lifetime. The design can stand for 20 years.
- Safe: The electrolyte is non-flammable and the battery operates in room temperature
- Scalable

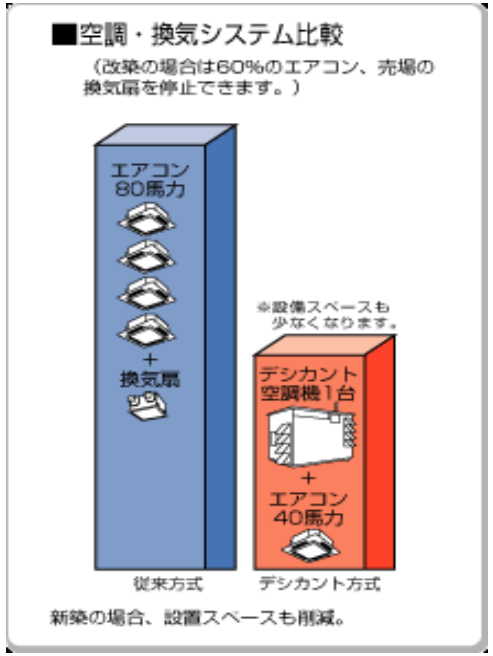


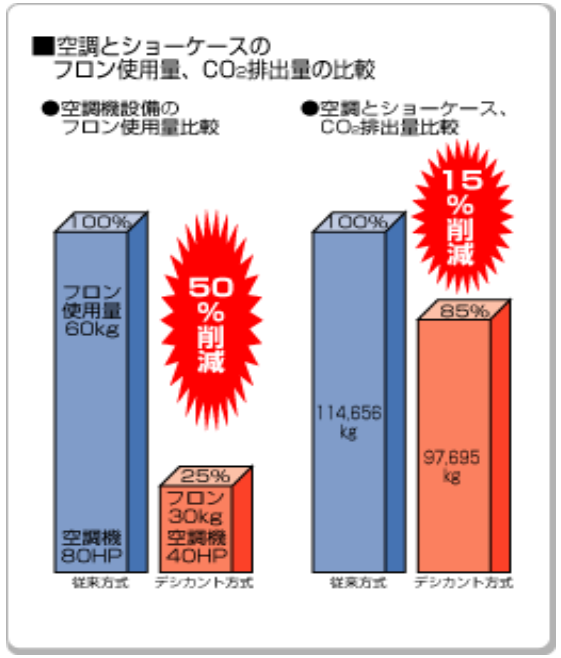
Next Generation HVAC: Earthclean-Tohoku Co., Ltd

株式会社アースクリーン東北

- Leading manufacturer of desiccant air conditioning system. Enables major CO2 and energy reduction for air conditioning.
- Patented nano wired oxidized titanium material is basis of product superiority.
- Implemented in major supermarkets, factories, data centers, etc.

Desiccant A/C

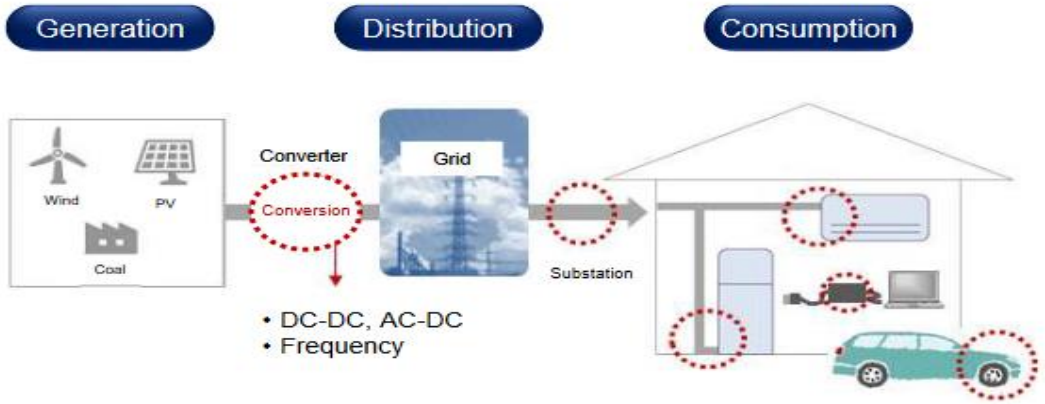




Ultra Energy Efficient Power Device: FLOSFIA Inc.

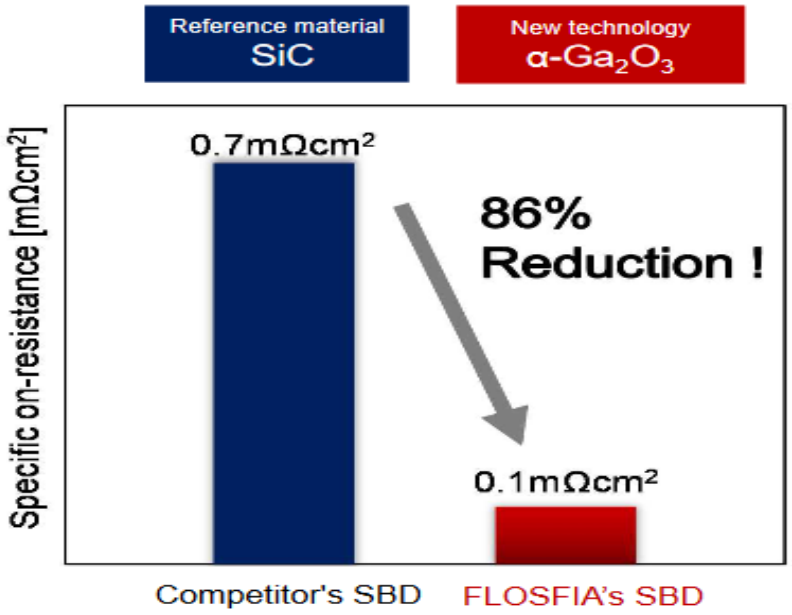
- Groundbreaking innovation in Gallium Oxide (Ga_2O_3) based power devices. Brings huge gains in energy efficiency in power electronics.
- A spin-off of Kyoto University research, its unique mist chemical vapor deposition process enables leading-edge new material development.
- Samples already demonstrating world class performance.
- Also collaborating with leading auto components supplier for EV applications.

Market pain: More than 10% of all electricity is ultimately lost due to conversion inefficiencies of silicon power devices.



- Great expectations for a low-loss and low-cost power device
- Difficult to achieve such device by extension of existing technology (SiC and GaN).

Demonstrated lowest on-resistance of any SBDs



DER: SymEnergy Inc. (former Koyo Electric)

- Major developer of renewable DERs (PV, Biomass, Thermal).
- Deep expertise in collaborating with local municipalities promoting “Local Production for Local Consumption”.
- Rapidly expanding its energy supply business to commercial & residential.
- Combines Energy Management Services

Retail: Chuo Electric Power Co., Ltd.

- Leading energy retailer focused on large apartments.
- Starting to install PVs to apartment rooftops, with an aim to establishing VPP

Before

After

Battery Material: W-Scope Corporation

- Develops and manufactures lithium-ion secondary battery separators.
- Global company headquartered in Japan, production plant in Korea, selling to China, Korea, Japan.
- Highly efficient production capabilities for its membrane film products.

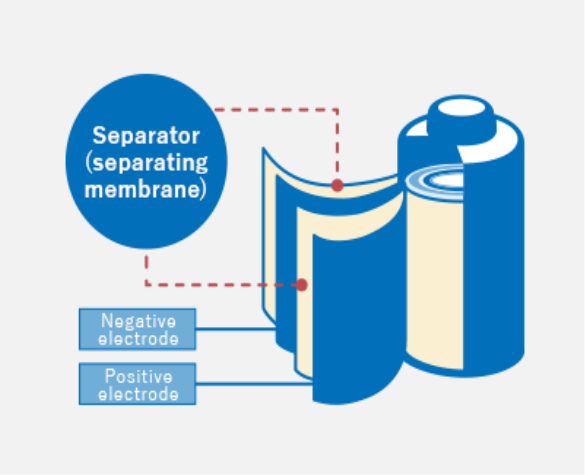
Exited

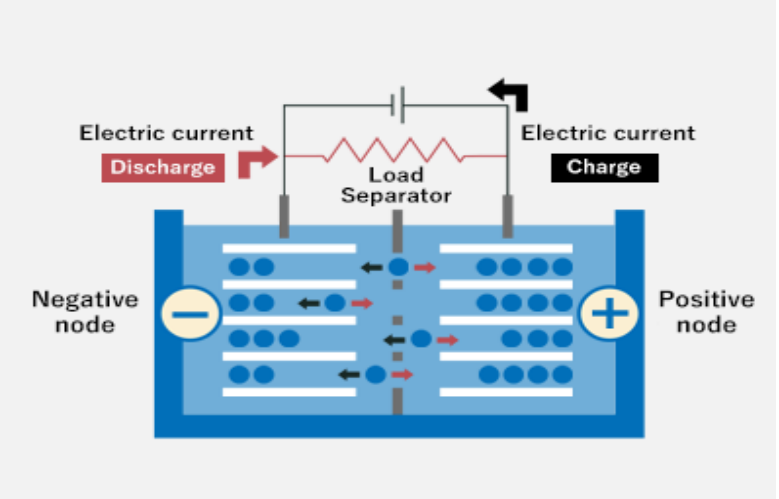
Lithium-ion secondary battery separator

What is lithium-ion secondary battery separator?

Separator is one of core components of lithium-ion secondary battery. It allows electric current to go back and forth between negative and positive nodes while preventing overheat and ignition caused by short-circuit.

Four core components of lithium-ion secondary battery are positive and negative electrodes material, electrolyte and separator. In addition, there are between 20 and 30 materials such as metal foil, binder and additive agents. Performance and material cost of lithium-ion secondary battery are mostly determined by those 4 core components.





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