

January 26th, 2017  
RITE Symposium

Panel discussion

“Innovation”

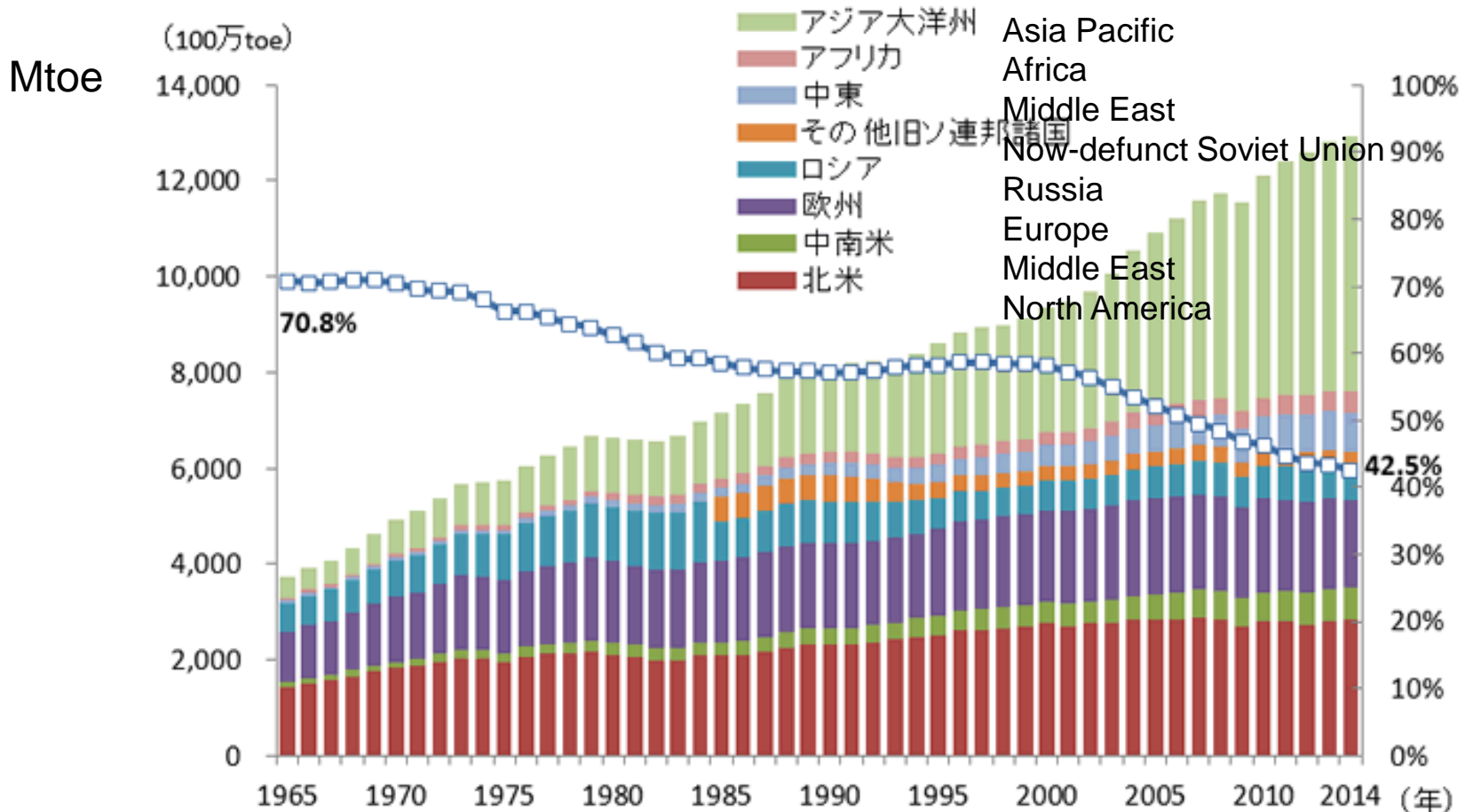
**Mayumi Matsumoto**

Visiting Professor at the University of Tokyo,  
The Environment and Energy Department, the Faculty of Arts and Sciences

# Global energy demand has been grown rapidly

Global Energy consumption (by region , primary energy)

OECD energy consumption decorated form 70.8 % in 1965 to 42.5% in 2014.



Ref: METI (BP: Statistical review of world energy 2015)

## Significant “efficiency improvement and low carbonization” are required in energy demand and supply sides

- Industrial sectors must evolve improvement in manufacturing process and updating their manufacturing facilities.

*e.g. Low-carbon steel-making, energy-saving cement production, CO2-EOR)*

- Investment to clean coal technology in energy sector  
*e.g. CCS, high efficiency coal-fired power (A-USC, IGCC, IGFC)*
- Fuel switch (low carbon energy, Hydrogen etc.)
- Promotion of next-generation vehicles, zero emission vehicles(ZEV)
- Energy management with ICT including energy storage

# “Mission Innovation”

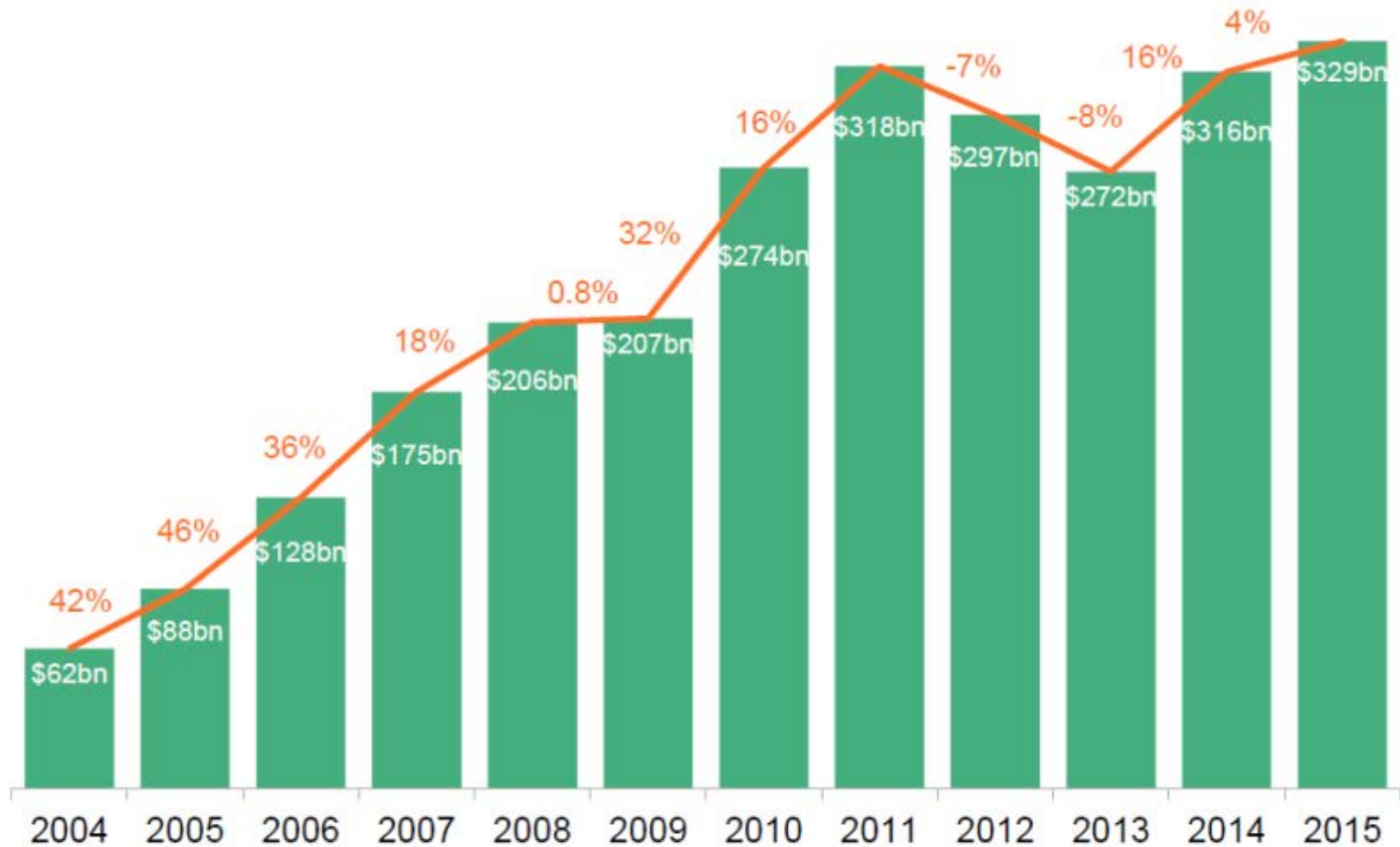
- International Initiative has been Jointly launched in the opening day of COP21, November 30<sup>th</sup> ,2015. The countries participating in the new initiative include japan, US. France, UK and Bill Gates from private sector.
- 20 countries announced to double its governmental or state-directed clean energy research and development investment over five years.



# Global investment in clean energy 2004-2015

世界におけるクリーンエネルギー市場の新規投資額推移  
2004年 - 2015年 (\$BN)

Bloomberg  
NEW ENERGY FINANCE



Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects (not reported in quarterly statistics).

Source: Bloomberg New Energy Finance

Ref: Bloomberg New Energy Finance

## D. Trump's An "America First" Energy Plan

Core of energy policy: boosting domestic energy production and ensuring energy self-sufficiency

- Ensuring energy self-sufficiency, creating 500,000 jobs/year, increasing wages by more than \$30 billion, and reducing price of energy
- Unleash America's \$50 trillion in untapped shale, oil, and natural gas reserves, plus hundreds of years in clean coal reserves.
- Become, and stay, totally independent of any need to import energy from the OPEC cartel or any nations hostile to our interests.
- Open onshore and offshore leasing on federal lands
- Encourage the use of natural gas and other American energy resources that will both reduce emissions but also reduce the price of energy and increase our economic output.

## Trump likes a ‘good deal’, so he should like my clean energy ideas, Bill Gates says

- US media reported on December 13<sup>rd</sup>, 2016 that Bill Gates called President Donald Trump about Energy sector.
- Bill Gates said , “ It is good time to take leadership for US on energy and climate change “ , “There is the opportunity for innovation and the revenue from R&D” “Low carbon energy as well as Shale gas help our economy “



# Trump meets Silicon Valley executives

Trump meets Silicon Valley executives at the Trump Tower, December 14<sup>th</sup> ,2016

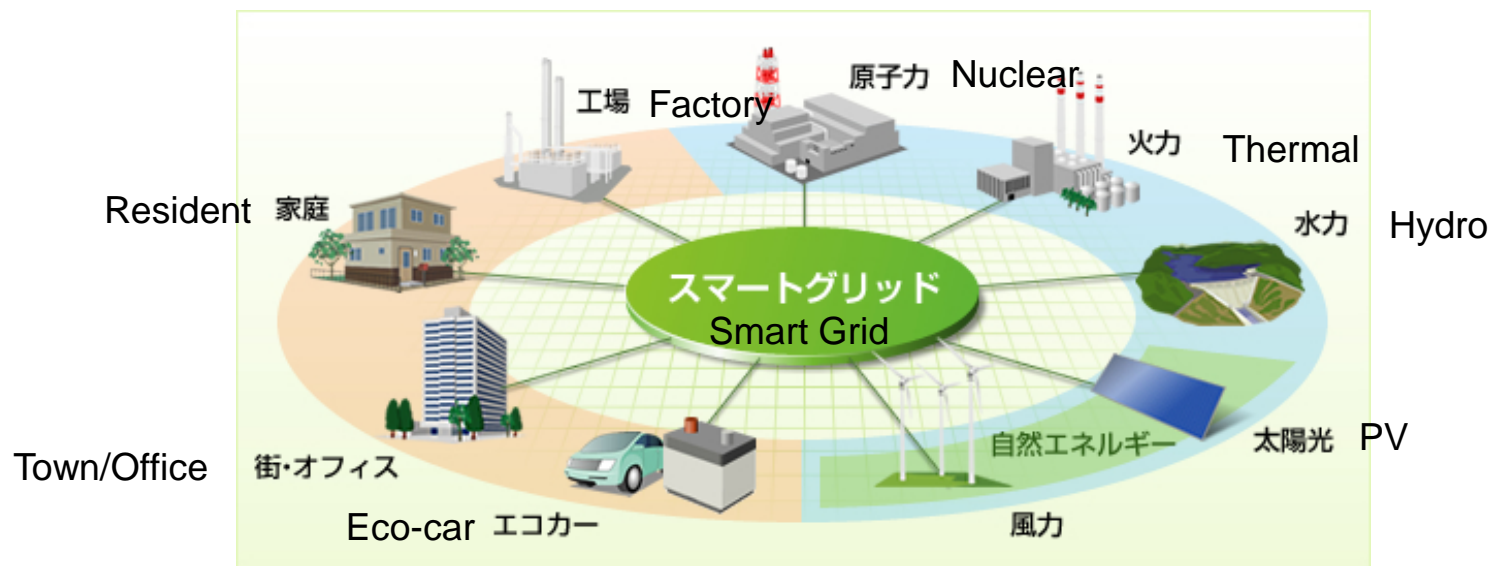
- Amazon Co-Founder and CEO Jeff Bezos said, “ very productive” and shared the view that the administration should make innovation one of the key pillars , which would create a huge number of jobs across the community, in all sectors, not just tech - agriculture , infrastructure, and manufacturing – everywhere “
- Oracle CEO Safra Catz said that lower corporate tax rate and anti-regulatory policies will boost competitiveness in Silicon valley.





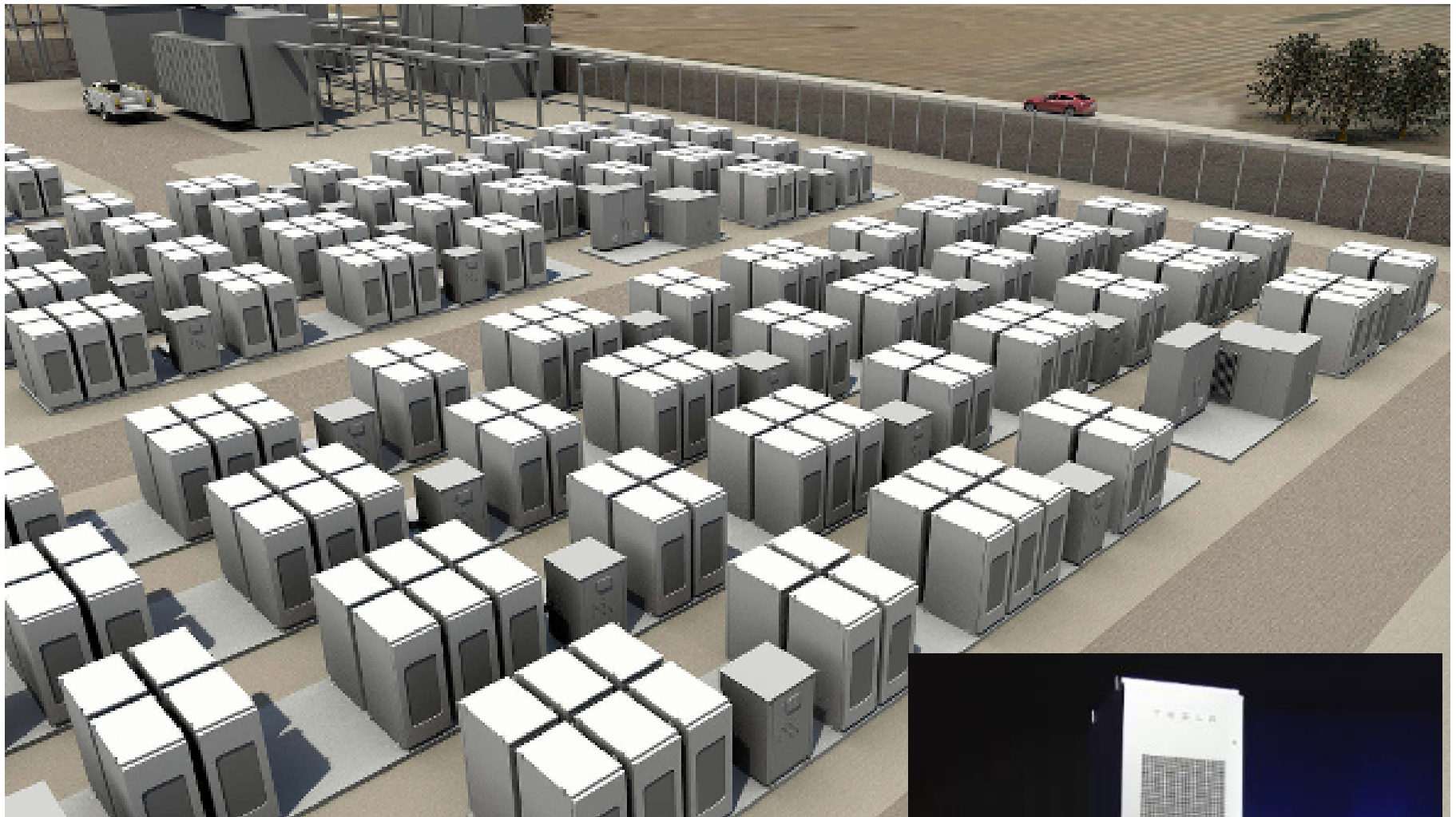
# Smart Grid

- Grid system integrates electricity , gas, heat, water, building ,home appliance , light , power wall, automobile ,and logistics. Power, IT, software, telecom, motor vehicle, and security industries enter this market.
- In US, Smart Grid is under infrastructure building , but analytical ability of data is already improved dramatically through Smart meter and Big Data.



## Tesla's 80MWh Battery stabilize power grid in CA

- Tesla released a new entry into stationary power battery market in April 2015: at-home battery “Powerwall” and larger “Powerpack” (210 kWh).
- Tesla announced that it has been selected by Southern California Edison to build Powerpack (20 MW/80 MWh) at the utility's Mira Loma substation. The battery installation would be able to provide enough power for 2,500 homes daily or 1,000 Tesla cars.
- Tesla and partner, Panasonic have launched construction of Nevada-based giant battery plant, “Tesla Gigafactory”.



**Image of Powerpack energy storage**

Ref: Tesla

# New business model under Japan power deregulation, post FIT

## ● independent introduction from FIT

- Smart community (dispersion type power source, local production for local consumption, regionally thermal use)
- Acceleration of Eco-town based on ZEH and new business for Zero energy building (ZEB)

## ● New business model under power deregulation

- Virtual power plant
- Resource aggregation business

# Energy management through ICT technology

- Technical aspect: Energy storage, advanced inverter, and energy management through AI and big data are necessary to stabilize voltage.
- Use of IoT in a variety of power facilities, analytic technology of big data, 24hrs remote monitoring, development of high added value services like sensors.
- Size of energy storage facility (battery etc.) grows. New business models related to storage of distributed energy are expected grow from now on.

# Contribution to Innovation

- Japan must contribute to global emission reductions through energy-saving technologies transfer to developing countries in the short term.
- Japan also have to make best efforts to drive innovative technology development that facilitates the accomplishment of reducing global GHG emissions by half by 2050 in the long term.

