Asia Super Grid (ASG)
And Electricity Market Reform in Japan

Oct 30th, 2017

Shigeki (Sean) Miwa
GM, CEO Project Office, SoftBank Group Corp.
Representative Director & CEO, SB Energy Corp.
March 11th, 2011

Earthquake + Tsunami

Fukushima Accident
SoftBank’s Clean Energy Projects

Great Earthquake
March 11th, 2011

RE developer in Japan
Oct, 2011

Fuel Cell business
Jul, 2013

High-altitude wind gen.
Dec, 2014

Jul & Aug, 2011
Japan Renewable Energy Council & Renewable Energy Institute

Oct, 2012

Dec, 2013

Dec, 2015

350MW Solar PV in AP state Bid Success

Established RE business base in Japan, India and Mongolia
SB Energy (Japan)

Total 546 MW
(38 sites)
As of Oct 30th, 2017

One of top RE developers in Japan

- Solar
- Wind
Gobi Green Energy (Mongolia)

(Newcom:51%, SoftBank: 49%)

Bulgan Site
83,000ha

Khurmen Site
56,000ha

Tsogt Tsetsii Site
7,000ha

Manlai Site
181,000ha

Land secured for development in the Gobi Desert

Total 326,000ha (3,260km2)
(13GW+ wind potential)
Wind Farm Development

- **50MW** completed (COD: 6\textsuperscript{th} Oct. 2017)
- **2GW** project going on
Trilateral MOU for RE Development in Mongolia
(signed on July 18th, 2016 @Ulaanbaatar)

Joint Development of RE in Mongolia
Solar PV project (India)

Our Project

1. **350 MW** (COD is 29th Mar. 2017)
   - The world’s 7th largest solar power plant
   - Tariff is 7.1 cent/kWh (INR 4.63)

2. **400 MW**
   - Under preparation to start construction
   - Tariff is 3.8 cent/kWh (300MW, INR 2.45)
   - and 4.0 cent/kWh (100MW, INR 2.63)

Solar PV cost is already lower than new coal-fired power plant in India

Exchange rate) 1 INR = 0.01536 USD (as of 2017.10.24)
Now renewable energy is an economic choice, starting to redefine all the industries

<table>
<thead>
<tr>
<th>Place</th>
<th>Abu Dhabi</th>
<th>Kingdom of Saudi Arabia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>1177 MW</td>
<td>300 MW</td>
</tr>
<tr>
<td>PPA Tarrif</td>
<td>Marubeni Corp. + Jinko Solar: 2.42 cent/kWh (~2.92 cent/kWh)</td>
<td>Masdar: 1.78 cent/kWh Acwa Power: 2.34 cent/kWh Marubeni Corp.: 2.66 cent/kWh, etc.</td>
</tr>
<tr>
<td>PPA Period</td>
<td>25 years</td>
<td>25 years</td>
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</table>
Bloom Energy Japan (Fuel Cell)
(SoftBank:50%, Bloom Energy:50%)

New System of Distributed Power Generation

Will lead to...
✓ CO2 Reduction
✓ Disaster Resilience

Provide clean, reliable and affordable energy to Japan
Our Vision

Fossil Fuels

Renewables

Promote transition to Greener World further across the globe
Asia Super Grid (ASG)
Asia Super Grid Concept
(announced in September 2011)
4-Party MOU to study feasibility of ASG (signed on March 30th, 2016)

- Shu Yinbiao
  Chairman
  SGCC

- Cho Hwan-Eik
  President & CEO
  KEPCO

- Roman Berdnikov
  First Deputy General Director
  ROSSETI

- Masayoshi Son
  Chairman & CEO
  SBG
Project Status

Pre F/S completed
(Common concept)

2GW transmission capacity & maximize RE
Government Stance toward ASG  
- China, Korea, Russia and Mongolia -

- One Belt One Road Initiative
- GEI Promotion
  *Global Energy Interconnection*  
- Request each country leaders to cooperate with ASG  
  (2017.Sep Eastern Economic Forum)
- Speech about significance of ASG  
- Energy Bridge  
- Russia-Japan Intergovernmental WG has been set up
- Let RE main export item
- Plan to construct high voltage transmission line to China

Top leaders expressed support
Government Stance toward R-J route of ASG

- Japan -

Agreed to study the feasibility of the grid interconnection project without having a preset conclusion

Mr. Hiroshige Seko
(Minister of Economy, Trade and Industry / Minister for Economic Cooperation with Russia)

Russia-Japan Intergovernmental WG has been set up

Slow but steady progress

Need intergovernmental discussions also for MCKJ Project
Why Japan takes time?
10 Conventional EPCOs
(Generation Capacity in 2017 July)

- Japan is divided into 10 areas and 10 EPCOs are almost dominant
- Only $1.2 \text{ GW}$ transmission capacity between east and west

Source: METI
Electricity Market Reform

METI defined 3 Processes:

1st step, 2015 Apr. :

Establishment of OCCTO*

*the Organization for Cross-regional Coordination of Transmission Operators

2nd step, 2016 Apr. :

Full liberalization of retail sales

(Now)

3rd step, 2020 Apr. :

Unbundle the transmission & distribution sector
1\textsuperscript{st} Step: OCCTO

Independent organization to maintain stable and efficient electricity supply with fairness and neutrality

(Main function)
• Aggregate and analyze the EPCO’s supply-demand plans and grid plans
• Order to change EPCO’s plans such as tie lines construction
• Order EPCOs to reinforce generations and power interchanges under a tight supply-demand situation

Source) METI
2nd Step: liberalization of retail sales

**UHV** (2000kW~)
Industrial Use (Large scale)
liberalized in (March 2000)

**HV** (50kW~2000kW)
Business Use (Medium scale)
liberalized in (April 2004)

**LV** (~50kW)
Household
Convenience store
liberalized in (April 2016)

Fully liberalization of retail sales completed
EPCOs have to transform to 1 or 2 by 2020 Apr.

Equal access to the grid will be realized

Source: METI, Kansai Electric Power
Why Japan takes time?

- Electric market reform is in progress to implement efficient T&D operation and it supports renewable energy expansion in Japan.
- Need independent and unified T&D company / organization to realize equal access to the grid.

We need to discuss not only multi-national grid interconnection (ASG) but also national electric market reform in parallel.
Promotion of ASG is synonymous with electricity market reform in Japan
Our Target

“Golden Ring”
Aim to gain clear progress by Tokyo Olympics (2GW, 2020)

We are ready to execute the project once G-to-G agreement / rule-making is in place
Internet of Things
(nerve system)

Grid of Things
(blood system)
Problems revealed by 3.11 Earthquake

Electricity Supply
- Lack of transmission capacity beyond regions

Electricity Price
- High price and little competition market

Electricity Choice
- Can not choose
  (Not liberalized for household and small shop)
  (Many Japanese thought no more nukes)
Electricity Market Reform Goals

METI defined 3 goals:

1. Secure the stable supply of electricity

2. Suppress electricity rates to the maximum extent possible

3. Expand electricity choices for consumers and business opportunities

Create new comprehensive energy market, by removing barriers in vertically integrated market
Profits of ASG & Electricity Market Reform

- **Electricity Supply**: Stable supply across Asia
- **Electricity Price**: Low price and int’l competition market
- **Electricity Choice**: Can choose RE energy (Maximize utilization of RE across Asia)