Japan Electric Market Update

May 2019
Ross Malme
Topics

I. Japan Retail Energy Market Overview
II. Japan Retail Market 2016 vs Today
III. Why Japan Is Compelling
IV. How are the U.S. Retailers Doing
V. Appendix: The Market Entry Path
Japan Retail Energy Market Overview
Retail Electricity Market

- Retail Market Opened April 2016
- 9 Viable Electric Utilities
- 80+ Million Customers Eligible to Switch (all of them)
- As of December 2018 – 16 Million Switched

<table>
<thead>
<tr>
<th>Electric Utilities</th>
<th>City, Prefecture</th>
<th>Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tokyo</td>
<td>Tokyo</td>
<td>29,031,000</td>
</tr>
<tr>
<td>Kansai</td>
<td>Osaka</td>
<td>13,607,000</td>
</tr>
<tr>
<td>Chubu</td>
<td>Toyohashi, Aichi</td>
<td>10,580,000</td>
</tr>
<tr>
<td>Kyushu</td>
<td>Fukuoka</td>
<td>8,634,000</td>
</tr>
<tr>
<td>Tohoku</td>
<td>Nagoya, Aichi</td>
<td>7,715,000</td>
</tr>
<tr>
<td>Chugoku</td>
<td>Hiroshima</td>
<td>5,243,000</td>
</tr>
<tr>
<td>Hokkaido</td>
<td>Sapporo</td>
<td>4,023,000</td>
</tr>
<tr>
<td>Shikoku</td>
<td>Takamatsu, Kagawa</td>
<td>2,849,000</td>
</tr>
<tr>
<td>Hokuriku</td>
<td>Niigata</td>
<td>2,106,000</td>
</tr>
<tr>
<td>Okinawa</td>
<td>Urasoe, Okinawa</td>
<td>875,000</td>
</tr>
</tbody>
</table>
Power Supply System in Japan

• In April 2016, along with opening the market, Japan introduced licensing unbundling.
  (i) Generator: Only Notification to METI, Under Competition
  (ii) Transmission & Distribution: License, Regional Monopoly
  (iii) Retail: Registration, Under Competition

• At present, only TEPCO has established TEPCO Power Grid, Inc.

• By April 2020, all GEUs (utilities) must be separated into TDSO and others under legal unbundling.
Japan Energy Market Structure

Regulators
- METI
- ANRE (like DOE)
- Surveillance Commission
- Diet (Congress)

Wholesale
- JPEX (exchange)
- OCCTO (like ISO)
- TOCOM (futures)
- Trading Companies

Pool Operators
- Astmax Energy Services
- Marubini
- Sumitomo
- About 17 others

Utilities
- 10 Electric
- 206 Gas

Retailers
- 400+
- 8 From U.S.

Generators
- 10 Utility Genco’s
- 20+ IPP’s
- 35+ Renewable
Recent History of System Reform

METI has been advancing the system reforms on Electricity Market in Japan, such as the introduction of competition to the wholesale market and the expansion of retail customer choice, since 1995.

1st System Reform: 1995
- IPPs and bidding system to General Electric Utilities (GEUs)
- Customer choice menu in GEUs

2nd System Reform: 1999
- Retail choice for special high voltage customer (Over 2000 kW)
- Expansion of flexibility for GEUs’ retail menu at reduction

3rd System Reform: 2003
- Expansion of retail choice to high voltage customer (Over 50kW)
- Establishment of the wholesale market (JEPX) and ESCJ

4th System Reform: 2008
- Establishment of hourly ahead wholesale market
- Introduction of stock taking method to Transmission-tariff

5th System Reform: 2015
- Establishment of OCCTO and EGC/METI
- Full retail choice (From April 2016)
- Legal Unbundling (From April 2020)
Demand-Side Management

• December 2016 - METI publishes Handbook for Demand Response
  • Rules for transactions between businesses and communication standards for remotely controlling energy devices were enacted within fiscal 2016.

• April 2017 – METI opens NegaWatt Market to buy and sell electricity saved by using residential solar power generation systems and IoT.
  • Negawatt aggregators play core role serving as mediator between consumers who control electricity demand and electricity utilities, and in tallying electricity savings from consumers
  • METI has drawn up guidelines for negawatt trading, including power-saving calculation.

• Getting started:
  • NTT Facilities, a unit of Nippon Telegraph and Telephone, will remotely reduce customers' power consumption when utilities request usage cuts.
  • Osaka Gas will ask companies and factories in greater Osaka to cut thousands of kW of power usage at electricity supplier’s direction, urging customers to boost on-site power generation by using their gas fueled co-gen systems.
  • Utilities pay annual 3-5k yen ($26-$43) per kW of power-saving to negawatt brokers
    • Brokers will use a portion of the money to pay rewards to customers
    • Utilities foresee being able thereby to forgo capital investment to maintain surplus power-generating capacities
Demand-Side Management

• Lowering Power Demands
  • Tokyo Electric Power Co. Holdings, Kansai Electric Power, Chubu Electric Power and Kyushu Electric Power aim to lower power demand by a combined 960,000 kW, (output of one typical nuclear reactor) in fiscal 2017 through negawatt trading
  • The government aims to reduce peak demand by 6% through negawatt trading by fiscal 2030
    • Eliminates need for 10 million kilowatts in power generation capacity, or 10 nuclear reactors.
    • Allows power companies to slash up to 90 billion yen per year in facility renovation, construction, and operations costs.

Source: Nikkei Asian Review, February 16, 2017
Demand Response

• Six demand response trials sponsored by TEPCO concluded at the end of FY2014.
• An additional two programs started in FY2015, running in the Osaka area.
• April 2015, Next-Generation Energy and Social Systems Demonstration Project was led by the METI for negawatt trading
  • Sumitomo Electric Industries, successfully delivered appointed negawatt power within 15 minutes of DR request issuance by using their energy management system sEMSA™ under OpenADR2.0b protocol standard

<table>
<thead>
<tr>
<th>Utility Demand Response Pilot Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Initiative</strong></td>
</tr>
<tr>
<td><strong>Lead Company</strong></td>
</tr>
<tr>
<td>Incentive-type DR</td>
</tr>
<tr>
<td>EnerNOC</td>
</tr>
<tr>
<td>Fast DR</td>
</tr>
<tr>
<td>Global Engineering</td>
</tr>
<tr>
<td>Fast DR</td>
</tr>
<tr>
<td>Eneris</td>
</tr>
<tr>
<td>Capacity program by aggregator</td>
</tr>
<tr>
<td>Sojitz/Energy Pool</td>
</tr>
<tr>
<td>Fast DR by aggregator</td>
</tr>
<tr>
<td>Sojitz/Energy Pool</td>
</tr>
<tr>
<td>Incentive-based Auto DR</td>
</tr>
<tr>
<td>Toshiba</td>
</tr>
<tr>
<td>Incentive-based Direct Load Control</td>
</tr>
<tr>
<td>Toshiba</td>
</tr>
<tr>
<td>Incentive-based DR</td>
</tr>
<tr>
<td>TEPCO, Hitachi</td>
</tr>
</tbody>
</table>

Source: Waseda University, Advanced Collaborative Research Organization
## Smart Community Pilots

<table>
<thead>
<tr>
<th>Host City</th>
<th>Program Initiative</th>
<th>Lead Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yokohama (YSCP)</td>
<td>Capacity Commitment Program</td>
<td>Toshiba</td>
</tr>
<tr>
<td></td>
<td>Critical Peak Pricing</td>
<td>Toshiba</td>
</tr>
<tr>
<td></td>
<td>Peak Time Rebate</td>
<td>Toshiba</td>
</tr>
<tr>
<td>Toyota City</td>
<td>Critical Peak Pricing</td>
<td>Fujitsu</td>
</tr>
<tr>
<td>Keihanna Kyoto</td>
<td>Capacity Program</td>
<td>Mitsubishi Electric</td>
</tr>
<tr>
<td>Kita-Kyushu City</td>
<td>Dynamic Pricing with Smart Meter</td>
<td>Fuji Electric</td>
</tr>
<tr>
<td></td>
<td>Incentive Pricing with Smart Meter</td>
<td>Fuji Electric</td>
</tr>
</tbody>
</table>
Smart Community Pilot Results

• **Yokohama City**
  - DR efforts found varying degrees of success, depending on implementation
  - Reductions ranged from 4.2-7.2% with highest seen among those given incentives
  - The large amount of data collected by HEMS provides the opportunity to learn a family’s lifestyle and to balance the desire to conserve power with comfort
    - “The entry point here was our aim to realize smart lives and smart cities through energy, but I feel that health care will be a focus at the exit of the project.” Review panelist Professor Takanori Ida of Kyoto University

• **Toyota City**
  - “Smart Mobility & Energy Life in Toyota City” demonstrated that energy savings could be achieved with
    - DC control system that utilized as much of the rooftop PV power as possible and
    - Combining battery storage with DR-type strategies utilizing equipment at optimal times.
  - Results were sufficiently encouraging, that according to DENSO, rooftop PV should achieve grid parity before 2020.

Smart Community Pilot Results

• Keihanna
  • Study involved some 700 households divided into four groups, each receiving a different level of information regarding their electricity consumption
  • Included were basic consumption, time-of-use pricing (TOU), critical-peak-pricing (CPP), and energy consultation
  • These were combined with demand reduction opportunities which included financial incentives
    • Energy savings for the TOU group were 7 percent in summer and 14 percent in winter.
    • The CPP group, on the other hand, saw 7 percent in winter and 33 percent in summer.
  • Analysis shows that much of the variation correlated with times when people were at home and were able to take advantage of DR opportunities

• Kitakyushu,
  • Building energy managements systems (BEMS) that included solar hot water were tested.
  • Results there showed that when automated response systems were supplemented by human interaction (building occupants were notified by email when rates were about to go up,) energy savings of up to 45.9 percent were achieved.

The Japan Retail Market 2016 vs Today
### Generation

#### 2016
- Nuclear mostly offline, only 4% of generation mix
- Utilities required to move generation into separate business unit and compete – by April 2018
- Utility generators not required to offer supply into wholesale market – JEPX
- Utility generators are not offering bilateral supply contracts to retailers
- Feed in Tariff (FIT) doesn’t exist for biomass, however does for wind and solar – however, utilities making transmission access for wind very difficult

#### Today
- Nuclear steadily coming back online, now 12% of generation mix
- Utilities completed move of generation into separate business unit
- Utility generators are required to offer supply into wholesale market – JEPX
  - Rules now in place whereby if utility generator offers supply into JEPX at a high price and receives no buy bids, utility retail company is required to purchase the power at the high offer price
- Utility generators now offering bilateral supply contracts to retailers
- Feed in Tariff (FiT) does exist for biomass, wind and solar – now OCCTO decides who gets transmission access
  - Regulatory initiative to eliminate FiT within a couple years
- Growth in IPP generation is now outpacing utility projects
## Retail Competition

### 2016

- In the first year about 100 companies received their METI retail license
  - Predominantly existing companies with some sort of customer base for other products/services – not energy
- Most retailers only offered simple savings vs tariff product on a month-to-month basis
- Many retailers entered balancing pool agreements with wholesale service providers
  - Sumitomo, Marubini, etc. --- 3 or 5 year contracts
  - Pool operator controlled supply price, provided scheduling and balancing services, “jail” for retailers
  - Pool operators did not offer credit sleeve type agreements
- New market entrants receive their METI license in about 4 months

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## Wholesale – ISO – Market

**2016**

- OCCTO recently formed and assigned how to create (with METI) a capacity, transmission and ancillary market
- OCCTO assigned all enrollment and switching activities between retailers and utilities
  - Utilize XML standards
- OCCTO mandated to manage transmission market, including siting of new generation and access
- OCCTO has a staff of about 70 people

**Today**

- OCCTO launching capacity market in April 2019 with full market implementation by 2021
  - Market rules published. Starting with small volumes on 3 year bids, by 2021 full market
- OCCTO launching ancillary market (called balancing market) in April 2019
  - Bid style market --- will replace utility back up supply by 2020
- OCCTO now has a Negawatt market (Demand Response)
  - Utilities mandated to bid and buy 20 MW each to start
- OCCTO in full control of transmission siting and access
- OCCTO still in planning stages for a transmission rights market – due in 2020
- OCCTO staff of over 400
Wholesale Supply Market

2016

- JEPX has same day/next day market for each of the 9 utilities
- Volumes pre-2016 about 2.5% of the overall market – in 2016 volume increases to 5%
- Little or no utility generation participation
- Forward “bulletin board” style market with no activity at all
- No trading – bilateral or hedging market exists

Today

- JEPX consolidates 9 markets into 2 – east & west
  - Improves deliverability and liquidity enabling previous utilities with no head room to become viable
- JEPX volumes steadily increase to about 20% of the overall market
- METI mandates utility generators must offer initially 10% of their generation with steady growth by year-end 2018 to 18%
- JEPX experiences high heat and cold price spikes in 2018, so METI mandates utility generators must double their offered volumes for 2019
- METI forces JEPX to modify its forward market rules – however, volumes haven’t grown much
- Now several trading companies, ability to hedge, and emerging bilateral market
  - It’s still early, trading expected to jump dramatically with rollout of capacity and ancillary market launches
## Natural Gas Market

<table>
<thead>
<tr>
<th>2016</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didn’t exist</td>
<td>Full retail deregulation implemented</td>
</tr>
<tr>
<td></td>
<td>Separate METI license required</td>
</tr>
<tr>
<td></td>
<td>Competition limited to big 4 utilities (Tokyo &amp; Osaka mostly)</td>
</tr>
<tr>
<td></td>
<td>Retailers can sign with wholesalers who provide guarantee of supply below tariff and supply, scheduling, switching and “full service”</td>
</tr>
<tr>
<td></td>
<td>Wholesale market rules passed, however no wholesale market activity</td>
</tr>
<tr>
<td></td>
<td>No exchange, price discovery or ability to access terminals</td>
</tr>
<tr>
<td></td>
<td>Improves deliverability and liquidity enabling previous utilities with no head room to become viable</td>
</tr>
<tr>
<td></td>
<td>Switching process primarily manual, no EDI or XML</td>
</tr>
</tbody>
</table>

Summer of 2018 Japan Diet very upset about gas market reform, instructs METI to overhaul the market rules to make it work this time. New METI committee formed for “Reform II” with mandate to publish new rules in spring 2019.

- Note, Skipping Stone is engaged by the committee chair to assist
In accordance with the full retail market liberalization, a massive number of smart meters are scheduled to be deployed.

As of 2018, deployment began to be accelerated and as many as 80 million will be deployed by the early 2020s.
Efforts are being made in steady installation of smart meters towards achieving the goal of completing the installation in mid-2020s (35.3 % on average).

Installation status varies depending on the companies.

<table>
<thead>
<tr>
<th>Electric Power Companies</th>
<th>Smart Meters to be Installed (in million)</th>
<th>Cumulative Installation Results as of 31 March 2017 (in million)</th>
<th>Percentage of Installation Results</th>
<th>Completion of Installation (Scheduled)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hokkaido</td>
<td>3.7</td>
<td>0.767</td>
<td>20.7%</td>
<td>End of FY2023</td>
</tr>
<tr>
<td>Tohoku</td>
<td>6.66</td>
<td>1.48</td>
<td>22.2%</td>
<td>End of FY2023</td>
</tr>
<tr>
<td>Tokyo</td>
<td>27.0</td>
<td>10.604</td>
<td>39.3%</td>
<td>End of FY2020</td>
</tr>
<tr>
<td>Chubu</td>
<td>9.5</td>
<td>2.898</td>
<td>30.5%</td>
<td>End of FY2022</td>
</tr>
<tr>
<td>Hokuriku</td>
<td>1.82</td>
<td>0.373</td>
<td>20.5%</td>
<td>End of FY2023</td>
</tr>
<tr>
<td>Kansai</td>
<td>13.0</td>
<td>7.50</td>
<td>57.5%</td>
<td>End of FY2022</td>
</tr>
<tr>
<td>Chugoku</td>
<td>4.95</td>
<td>0.909</td>
<td>18.3%</td>
<td>End of FY2023</td>
</tr>
<tr>
<td>Shikoku</td>
<td>2.65</td>
<td>0.435</td>
<td>16.4%</td>
<td>End of FY2023</td>
</tr>
<tr>
<td>Kyushu</td>
<td>8.1</td>
<td>2.571</td>
<td>31.7%</td>
<td>End of FY2023</td>
</tr>
<tr>
<td>Okinawa</td>
<td>0.85</td>
<td>0.11</td>
<td>12.9%</td>
<td>End of FY2024</td>
</tr>
<tr>
<td><strong>Nationwide</strong></td>
<td><strong>78.23</strong></td>
<td><strong>27.6</strong></td>
<td><strong>35.3%</strong></td>
<td>-</td>
</tr>
</tbody>
</table>
Why Japan Is a Compelling Retail Market
Top 10 Reasons for Japan

1. 80 million electricity customers available – 60 million have not yet switched
   • 400,000 switches per month average
2. Utility tariff goes away (price to beat)
3. 25 million gas customers available – 22.5 million have yet to switch
4. Credit sleeves now available
5. Hedging and wholesale supply market now growing and viable
6. Billing, customer care, and XML systems fully functional and retailer tested
7. American retailers have years of experience – Japanese retailers don’t
8. ISO style capacity, transmission, and ancillary markets Americans know – new for Japanese
9. Enterprise market value can easily exceed U.S. retailer sale price
10. The path has been paved, many lessons learned, and succeeding in Japan is now proven

Skipping Stone has assisted 11 U.S. companies enter Japan, including 7 of the 8 retailers.
How are the U.S. Retailers Doing in Japan?
How are the U.S. Retailers Doing?

**XOOM energy**
- First U.S. retailer in Japan
- Now in Top 25 retailers in Japan
- Launch from scratch method

**AMBIT ENERGY**
- Second U.S. retailer in Japan
- Now in Top 25 retailers in Japan
- Launch from scratch method

**COLUMBIA UTILITIES**
- Name in Japan is Family Energy
- Steady growth meeting plan
- Launch from scratch method

**Genie Energy**
- Acquired a shell summer 2018
- Launch activities completed
- Just started acquiring customers

**just energy**
- Now fully operational
- Successfully acquiring customers
- Acquired a shell company method

**Nordic Energy**
- Acquired a shell Jan. 2019
- Named Progress Energy in Japan
- Launch activities underway

**VISTA ENERGY**
- Name in Japan is Eletos Energy
- Fully operational and acquiring customers
- Launch from scratch method
Skipping Stone is a global energy markets consulting and technology services firm. We work with a diverse set of energy clients to navigate market changes and assist in capturing new market opportunities.
It Starts With Building a Relationship

We would like to explore how we might collaborate to seize market opportunities for you.

Knowledge Sharing
Opportunity Discussion
Steps & Definition
Draft Proposal
Fit to Client Needs
Project Kickoff

Peter Weigand, Chairman & CEO
+1 714-965-0885 Office
+1 248-635-5405 Mobile
peterw@skippingstone.com

Ross Malme, Partner
+1 678-837-1630 Office
+1 404-307-5999 Mobile
rmalme@skippingstone.com

“Hiring Skipping Stone is like renting entrepreneurs, they really understood how to get our ideas off the drawing board and into the market.”
— CEO - Energy Management Systems Company

“Like many others, I have been burned spending money on consultants with little to show for it. Skipping Stone has truly been a unique experience. I started as a skeptic, and now I am a believer.”
— SVP - Utility Company

“One of the things I really like about Skipping Stone is they make introductions to their other clients when they sense there is a mutually beneficial opportunity and strategic fit. They call it client knitting, I call it an unexpected benefit.”
— CEO – Retail & Trading Co.
Appendix: The Market Entry Path
The Path

Take a Step by Step Approach

1. Study the Market
   • Research on your own
   • Acquire third party research
2. Determine Internal Interest Level
   • Assign an internal “owner”
3. Develop a Strategy & Business Case
   • Buy or Build
   • Economics & Headroom Scenarios
4. Visit Japan
5. Assess Investment Required & Risks
   • Make a Go – No Go Decision
6. Create an Implementation Plan
7. Implement the Plan
These steps and typical timelines are based on experience with 7 U.S. retailers. FYI: The business pace is slower in Japan than the U.S.!

Assessment & Business Case

Japan Visit & Decide on Path

- 2/3 Months
- 1 Month

- Incorporate
- Hire President & 2-3 staff
- Secure supply/credit agreement
- Secure system agreement
- Apply for METI License
- Steps above required to apply
- Proceed to Implementation

Implement

- 8 to 12 Months
- 8 to 12 Months

- Acquire a shell
- Includes all the above
  - Except President & staff

- See slide on Orange Energy

Go Live

- 4/5 Months
- 4/5 Months

- 2 to 4 Months
- 2 to 4 Months
The Business Case

Business Case Elements

- Go to Market Strategy
- Launch Costs
- Margin (Headroom) Analysis
- Supply Strategy & Costs
- Systems & Operations Costs
- Organizational Design & Costs
- Customer Acquisition Ramp & Costs
- Proforma Models
- Investment & ROI Scenarios

YES

- There is positive headroom in Japan
- Supply & Credit are available
- Proven systems are available
- You can hire a bilingual leader
Implementation Plan Elements

First Steps
- A Detailed Project Plan
- Market Rules Documentation
- Incorporation (GK or KK)
- Payroll & Benefits Set Up
- Hire Leadership
- Banking
- Retail Licensing - METI
- OCCTO Membership
- Compliance Laws
- Agreements (in Japanese)

Supply & Sales
- Supply Agreement
- Wheeling Agreements
- Load Profiles
- Forecasting
- Product Development
- Risk Management
- Sales/Marketing Plan
- Website
- Sales Channels Developed

Operations
- Staffing/Recruiting
- Training
- Office Space
- Office Systems
- Call Center
- Payment Processing
- Settlement
- Accounting
- HR

Systems
- Vendor Agreement
- System Implementation
- Integration
- XML
- Testing
- Utility Set Up
- OCCTO Set Up
- Supply Set Up
- Reporting
- User Training

Launch Prep
Launch Activities

The implementation plan elements listed are based on a Build strategy. Several elements will be eliminated with a Buy strategy.
Orange Energy

Orange Energy is an available Japanese retail energy shell company.

This shell is owned in partnership with ESG & Capital Sixty.

The shell includes the following:

- Corporate entity in Japan
- Bank Account
- METI retail electric license
- OCCTO membership
- ESG – REES systems agreement
- ESG fixed price systems implementation agreement
- AES supply, scheduling, balancing and credit sleeve
- Skipping Stone (Japan) fixed price implementation services agreement
- Skipping Stone (Japan) recruiting agreement

Ask your ESG representative for more information
# Our Japan Operations

Opened in June 2014

## The Team

### Japan
- Shuichi Kishida, President, Japan (B)
- Tomio Okachi, Business Development (B)
- Takeshi Goto, Sr. Consultant
- Mo Jaffari, Sr. Consultant (B)
- Steve Thomas, Sr. Consultant (B)
- Matthew Croft, Sr. Consultant (B)
- Yayoi Horaguchi, Project Manager
- Rod Cramblit, Recruiting Director (B)
- Akiyoshi Yoshizawa, Consultant
- Plus Independent Contractors

### U.S.
- Peter Weigand, CEO
- Atsuyo Miller, Project Manager (B)
- Risa Nakayama, Consultant
- Translation Coordinators (2)

## Focus Areas

- Retail Electric & Gas
- Renewables
- Wholesale Electric & Gas
- Innovation
- Japan to U.S. & U.S. to Japan
- Energy Technology

## Services

- Retail Launches
- Systems Conversions
- Wholesale Market Design
- Strategy Development
- Business Planning
- Innovation Program Design
- Market Research & Reports
- Business Matching Services
- Market Entry Services
- M&A Services
- International Expansion

## Japan Alliance Partners