Energy Internet Era
Reshaping the Future Gas Value Chain

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Five Value Propositions of the Energy Internet

1. Interconnection of energy infrastructure

2. Interchange of energy forms

3. Interoperation of the energy technology and big data

4. Complementary aid of the energy distribution mode

5. Mutual benefits towards the energy production and consumption

Diagram:
- Multiple energy
- ICT-based control system
- Control & Dispatch Center
- Microgrid Integrator
- Virtual Power Plant
- Data Service Provider
- Market Maker
- Trading Market
- Distribution Network
- Distributed Photovoltaic Power
- Distributed Wind Power
- E-vehicle
- House
Driven by the Energy Internet, the Development of Natural Gas and Renewable Becomes an Irresistible Trend

2015-2040 Global Primary Energy Demand Growth Rate

2015-2040 Total Global Energy Investment

Total investment in Natural Gas and Renewable exceed Coal and Oil

Fuel supply

Power supply

Source: IEA
Nature Gas and Renewables Play Complementary Roles, Jointly Drive the Energy Transition

Under the influence of “internet+”, combining distributed renewable energy, distributed gas, grid power supply and smart technology to create a regional Energy Internet that is green and efficient.

**UCSD Energy Internet project**

**UCSD Central Plant**
- Two 13.5 MW gas turbines
- One 3 MW steam turbine
- 40,000 ton/hr thermal energy tank

**Solar Panels**
Total Power: 3 MW

**Central Plant Generated Energy**
Maximum Electrical Power: 30 MW

**Imported Energy From SDGE**
Total Imported Power: 0 MW to 10 MW

**Campus Electrical Grid**
Total Power Consumption: 25 MW to 40 MW

**Chilled and Hot Water Loop**

**CSE Building**
Total Demand: 250-400 kW
- HVAC loads: 20-150 KW
- Server loads: 120-150 KW
- Plug Loads: 120-150 KW
- Lighting: 40-80 KW

• Capital cost: $27 million
• Avoided electricity purchase costs per year: $8.04 million
• Payback: 5 years
• Gross thermal efficiency: 70%

*source: Understanding the Role of Buildings in a Smart Microgrid*
Evolution of Energy Internet is Reinventing the Value Compass

1. 有容乃大 Market-shaping Era
2. 平台论剑 Platform Booming Era
3. 无远弗届 Fully Disruptive Era
4. 乾坤易位 Brave New Era

There is a strong consumer demand for **Clean Energy** and digital & energy combined **Service**

- Connected home: 82% (59%)
- EV purchase and charging: 55% (52%)
- Energy trading market: 81% (80%)
- Rooftop solar energy: 59% (33%)
- Remote monitor: 66% (40%)

Digital consumer **Digital consumer** Non-digital consumer **Non-digital consumer**
Clean Energy Technology & Services Starting to Lead the Market

Three high value sectors led by distributed energy

Three disruptive Forces led by Internet platform

Three competition focuses led by demand side

China’s end-use energy market structure shift from product-oriented to service-oriented

market size

RMB 19.3 trillion

RMB 11.8 trillion

RMB 6.9 trillion

5% 17% 22%

24% 34% 42%

71% 48% 36%

2015 2020 2030

source: Energy Internet survey, Accenture China
With Accelerated Energy Market Innovation, Gas Companies are Under the Pressure of being “Pipelinized”

New energy businesses, and energy service enterprises perform stronger in potential of value growth.

Energy Market Pattern of China 2030

- New Energy Businesses
- Energy Service Enterprises
- Transboundary Businesses
- Traditional Power Enterprises
- Traditional Oil & Gas Businesses

Growth Capability

- High
- Mean value
- Low

Bubble size: Revenue scale

65% of the respondents believe that the distributed energy production and access can create remarkable new output value.

Source: Accenture New Energy Consumer 2016

Price and service are key factors for energy users to change suppliers:

- New provider charges less than the old one: 59%
- New provider offers discounts for product and service package: 41%
- New provider offers better service: 36%
- New provider demos in its shop: 25%
- New provider offers more knowledge and information about product and service: 24%
- New provider is more reliable: 22%
- New provider is a local enterprise: 20%
- New provider gives me better experience: 20%
- New provider provides favorable clauses for cancelling or transferring services: 17%
- I am in the Loyalty Reward Plan of the new provider: 17%

If the energy provider fails to provide the needed service and seamless experience, 79% of the “post-80s” consumers will consider changing the energy supplier.
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More than 90% of interviewed Chinese companies believe that Energy Internet will impact heavily on China’s energy industry chain in three years, among them nearly 20% think this impact will be disruptive.

1/3 interviewed Chinese energy companies plan to add new specific investment over 500 million yuan in 5 years.

Key areas of investment include energy and ICT integration, multi-energy synergism and consumer experience.

source: Energy Internet survey, Accenture China
Challenges for Chinese Energy Enterprises: Internal and External

External: Energy Market Reform Hasn’t Been Implemented at the Grassroots Level

- Major reasons for investment decision-makers to wait and see:
  - The Chinese energy users are not yet sufficiently segmented to support the new profit growth point
  - Cross-border partners still lack a mature and reliable business model and a win-win
  - In the era of "Internet+", most of the energy enterprises still lack a complete digitalization
  - The domestic energy and power market reform has not yet completely implemented at the grassroots level

Internal: Insufficient Preparation of Strategy and Technology

- Three technologies that the Chinese enterprises need to urgently upgrade:
  - Intelligentization of the centralized energy production system
  - Regional intelligent pipe networks
  - Energy service platforms

- Management incompetence hinders the application of "Internet+":
  - Information processing and data-based decision-making
  - Agilizing the market model to grasp opportunities
  - Digital technology management platform
  - Creating customer experience and interaction

source: Energy Internet survey, Accenture China
Big Trends: Re-positioning of the Energy Industry Value

Easier Said Than Done: A Wait-and-See Attitude by the Energy Decision-Makers

Five Tips: Carry out A Successful Energy Internet Strategy
Gas Enterprises Shall Reshape the Path of Value Innovation

Forging Development Strategies Around Assets, Data, Platform, Users and Workforce

**Near-Term Integrated Energy Supplier**
- Energy Management Service
- Regional Energy Internet Pilot
- Distributed Renewable Power Generation Pilot
- Promotion of Smart Meter

**Mid-Term Special Customized Supplier**
- Special Customized Energy Service
- Energy Internet Commercialization
- Customizable Clean Energy Sales
- Energy Consumption Big Data Analytics

**Long-Term Integrated Energy Product and Service Supplier**
- Consumer Service Over the Whole Value Chain; Value-Added Service through Data Analytics
- “Energy Product + Value-Added Product + Service” Bundled Sales
- Multi-energy Trading Market
- Other New Revenue Stream Service

Promotion of Smart Meter

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Tip 1: Enhance the asset portfolio management capabilities, focus both on asset transaction value and the derivative value

Asset values shift from equipment assets to digital assets, companies should enhance their portfolio management and application capabilities for physical assets and digital assets, mining the deriving value, regain the favor of investors.

BP starts a venture capital fund, investing in oil & gas exploration and production, high-tech companies in downstream refinery and sales fields as well as new energy and digital technology services company.

### Upstream investment
- Fotech
- Saltworks
- Taxon Biosciences
- XACT

### Downstream investment
- Biosynthetic
- Cool Planet
- Helix Power
- Liquidlight
- Synthentic Genomics
- Verdezyne

### Cooperation fund
- Eko
- Forest Carbon
- Infuse Ventures
- PCF
- Zouk

### New energy technology investment
- Bright Source
- Chromatin
- EOS Climate
- Mendel Biotechnology
- Skyonic
- Solidia Technology
Tip 2: Improve digital application capability, matching the new technology with the business growth point

Cultivate data management capabilities - collecting, utilizing and incubating data. Explore the business growth point and the new business model to also activate the data capability.

Direct trading of distributed renewable energy generation between supply and demand sides

The combination of blockchain and energy consumption

Provide seamless smart charging, payment and authorizing service for EV of different models
Tip 3: leverage platform economy to find partners, encourage open innovation

Company should embrace open innovation, build a new ecosystem and win-win business model through platform model, in the meantime recruit technical talents.

Established the internal crowd-sourced platform, and an open cooperation model with start-ups.

Innovation center

Enel work with start-ups to develop projects. Choose start-ups according to their business potential and required strategy match degree.

Crowd-sourced platform

Enel provide a crowd-sourced platform to employees, and received 1300 creative ideas respond to company’s challenges within a month.
Tip 4: Drive the consumer-centric transformation, innovate for the digital consumer engagement and experience

Company should reposition themselves in the Energy Internet, start from consumer engagement, improve consumer’s digital experience, gradually lead them to actively participate in interactive and innovative services.

Cooperate with the supermarket and other physical stores, and provide multi-channel services, multi types of business for consumers with flexible use of mobile phones, computers and other intelligent terminals.

Connected home controlled by mobile terminal

Provide services through APP

Maintain customer relationships through O2O
Tip 4: Drive the consumer-centric transformation, innovate for the digital consumer engagement and experience

Utility companies leverage new technologies and applications to proactively drive digital transformation. They target to improve both internal service level and operation efficiency through digitization of processes, and hence to further improve customer experience externally.

At the backend, develop Data Analytic platform to support customer insight and decision making. At the frontend, extend mobility application to field force and customer interactions.
Tip 5: build a team with high digital quotient, improve employees digital capabilities

The enterprise can build and maintain a high digital quotient team by adopting "acquisitive employment" strategy, creating "chief digital officer“ role and introducing digital training, etc.
Thank You