Evolving Utility Market Activities

Regulated and Unregulated Opportunities, Emerging Business Models

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Concentric Energy Advisors

Concentric offers a broad range of services that enable our clients to address diverse needs comprehensively without the difficulty of retaining and coordinating multiple resources.

Regulation

- Our team includes former regulators and utility executives who have served as decision-makers and expert witnesses on a broad range of policy and rate matters in state, provincial, and federal regulatory proceedings across North America.

Markets & Resource Planning

- Our analytical work in the energy industry spans all aspects of the natural gas and electric markets, including both wholesale and retail levels.

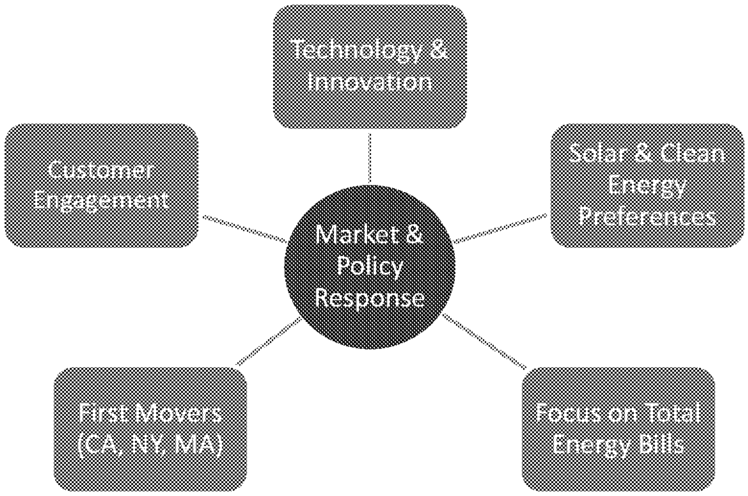
Financial Advisory

- Our team is comprised of senior financial, economic, and industry professionals who advise clients on all aspects of the structure, negotiation, and implementation of asset-based and corporate transactions.

Litigation

- We provide clients with expert-based litigation and arbitration support services on matters pertaining to the North American energy industry.

What is Driving Reform, Creating New Market Opportunities?



Changing customer demands, new technologies, and evolving public policy will drive increased deployment of new grid technologies and expanded deployment of a variety of distributed energy resources.

-- MN PUC Staff Report on Grid Modernization

Role of the Utility Is in Play

There are a variety of growth vectors for utilities in terms of the services they provide (beyond those considered traditional)

Speed of these markets (*and others*) to grow differs by state/jurisdiction

Regulated Utility Roles/Business Models

- Vertically integrated supplier (including, e.g., LSR)
- Default Supplier; counterparty on clean energy PPAs
- Platform service provider
- Integrated system planner
- Distribution market maker
- Basic or essential services (including L&MI, social obligations)
- Value-added monopoly services (dist. planning data, etc.)
- Enabler of behind-the-meter/competitive services

Competitive Services (w/ potential for utility participation)

- Retail suppliers expand into DER services
- DER providers (solar, storage, EV)
- Technology and systems providers (EPC/turnkey approaches)
- Contracted service (e.g., DER aggregation, microgrids, NWA)

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The Ultimate Question: Will Customers Benefit?

Continued reliability & enhanced network resiliency	• Changes to distribution network planning and operations must not result in a policy-induced deterioration of reliability
Lower total energy bills	• There may be a timing gap between investments (and costs) to implement REV and energy bill savings
Affordable electricity service for residential customers	• Creative solutions will likely be required to achieve broad public support for reforms, especially if services are perceived to benefit a small group of customers
Acknowledged value for an improved environment	• It is likely that "clean" will be more expensive, either through compensation for carbon or some other means
Direct or indirect benefits from new products and services	• New products and services will require that third-party providers show up and remain committed to the market – even though they lack the "obligation to serve"

While many stakeholders assert that customers must (and *will*) benefit, it is not yet clear whether the benefits will be spread broadly among them.

If it doesn't make sense for customers, it doesn't make sense

Where have companies experimented with new opportunities?

Regulated Utility Program	Utility/3rd-party Partnership	Competitive/ Unregulated
• Advance policy objectives • Often pursued in collaboration with policymakers • Often (*not always* favorable to utilities • Rate-supported investment	• Market development • Proof of concept • Moderates risk to the utility • CLOSELY watched by stakeholders • Future of market: TBD	• Regulated utilities excluded (by statute) • Utility affiliates, operating at "arms-length" from utility • Highly uncertain margins • Regulatory risk may remain

Regulated utilities: sample approach

Example 1: CA utilities, energy storage

- A "market transformation" initiative became emergency response
  - Loss of San Onofre (nuclear) capacity
  - Aliso Canyon gas storage leak: pressure on gas generation
- Exigent circumstances led to an opportunity for the big 3 CA utility companies
  - Program started with SoCal Edison, expanded to SDG&E, then PG&E
- The CA Public Utilities Commission mandated expedited procurement and deployment of energy storage
  - Just months from RFP to operation
- Policy permits utilities to own 50% of storage capacity

Unregulated utility affiliates are getting in on the storage game

AltaGas

AES Energy Storage

NEXTera ENERGY

nationalgrid

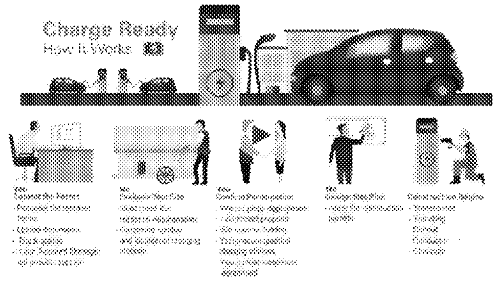
https://www.greentechmedia.com/articles/read/california-passes-huge-grid-energy-storage-mandate
http://www.utilitydive.com/news/inside-construction-of-the-worlds-largest-lithium-ion-battery-storage-faci/431765/
https://www.energy-storage.news/blogs/aliso-canyon-is-starting-gun-for-us-utility-storage-deployment-greensmith-c

Regulated utilities: sample approach

Example 2: CA EV infrastructure

- Example of state policy support for utility investment
- In 2012 Executive Order B-16-2012 set a goal of 1.5 million ZEV in CA by 2025

Company	Current program	Proposed Expansion
PG&E	• Up to 7,500 charging stations • $130 million in ratebase • Hybrid ownership model: PG&E may own up to 35% of installed systems	$253 million
SoCalEdison	• "Charge Ready" is a 1,500-site pilot • SoCalEd's cost: $22 million under a host-owned model	$570 million
San Diego Gas & Electric	• "Power Your Drive" is a 3,500-site pilot • $45 million, (utility-owned, in ratebase)	$246 million



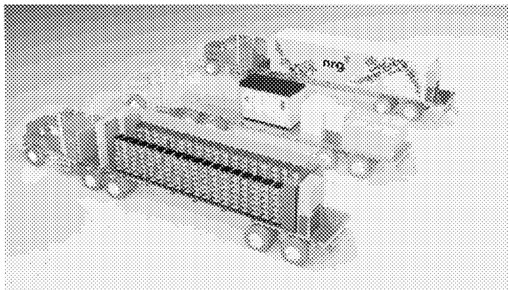
- Expanded programs would address the needs of delivery fleets; ridesharing, heavy commercial and industrial use (port terminals, etc.)

https://www.pge.com/en_US/residential/solar-and-vehicles/options/clean-vehicles/charging-stations/ev-charging-infrastructure-program.page
http://www.edison.com/home/our-perspective/charge-ready-a-plan-for-california.html
http://www.utilitydive.com/news/california-puc-approves-pge-electric-vehicle-infrastructure-plan/432710/
https://electrek.co/2017/01/23/electric-utilities-expand-electric-vehicle-infrastructure-charging-stations-california/

Utility/3rd-Party Partnership/Hybrid Approach

Example 3: New York utilities under *Reforming the Energy Vision* ("REV") proceeding

- Con Edison has filed for approval of a new REV demonstration project
- Company will partner with NRG Energy, Inc to develop and construct the Queens Energy Storage Terminal at NRG's existing Astoria Generating Station
  - A 1MW/4MWh Project: two mobile battery trailers, one mobile electrical switchgear trailer
  - Units will provide wholesale services to the NYISO



- Con Edison to pay for capital costs and retain 100 percent of the ownership in ratebase
- NY PSC's REV "Track 1" order provides a path to cost recovery for projects that test new business models, ultimately motivate new markets

The Project is unique in that it is an innovative partnership that will leverage wholesale market participation to reduce the overall effective cost. Con Edison will pay for the capital cost of the storage assets and retain 100 percent of their ownership. Additionally, Con Edison will pay a Mobility Option Premium to NRG for operating and maintaining the units when they are located at the Astoria site and ensuring that they are available for Con Edison as needed. Through the Mobility Option Premium, NRG will recover certain costs to operate and maintain the units, including the cost of labor, insurance costs, taxes, utilities and consumables.
In exchange for the Mobility Option Premium, NRG will reimburse Con Edison an annual payment, to the extent it is available, from gross margin generated by providing NYISO wholesale services

ALSO in REV: EAMs, Platform Service Revenues, charges for Data Access, etc.
Sources:
http://www3.dps.ny.gov/W/PSCWeb.nsf/All/B2D9D834B0D307C685257F3F006FF1D9?OpenDocument
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B3803CE0D-F246-4518-8F5A-2E1C12BCB1CA%7D
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B3803CE0D-F246-4518-8F5A-2E1C12BCB1CA%7D

Pursuit of Unregulated Opportunities

Example 4: National Grid

Investments in solar

- Earlier this year National Grid announced a $100 million investment in Sunrun
- Partnership will sell solar power systems to homes and businesses
- Financial Times: *"The joint venture will sell solar power systems to homes and businesses, and develop products and services for a power grid adapting to a new model of small-scale local generation."*

Innovation incubators, venture capital investment, etc.

- National Grid and other utilities have invested in innovation through partnerships with VC firms to support early-stage market developments
  - Utility companies provide support and the insights re: end-users, customers, regulatory environment
  - VCs contribute investment expertise, potential for new ideas to test

Pursuit of Unregulated Opportunities: Challenges

Diving into new markets is challenging for utilities, affiliates

- Unregulated investments in tech-driven markets are uncertain, don't often pencil out
- Companies commonly protect opportunities on the regulated side, attenuating policy advocacy re: unregulated market opportunities
  - Delicate balance to strike: preserving opportunity on the rate-regulated side, creating new opportunities for unregulated affiliates
  - E.g:
    - Exelon: Emphasis on regulated utilities, but mindful of opportunities in other states (e.g., New York ESCO/retail market
    - Exelon: Tension between aims of BG&E Home, and the three Exelon distribution OpCos in Maryland
    - Dominion
    - AES
- There were once many affiliates going after unregulated EE
  - There were some bad experiences; many of these have been sold (e.g., Ameresco)

Implications for the Utility

A regulatory model focused on sustaining the utility business can support diverse market opportunities

- Long-term rate plans
- Modernization investment plans
- Clean energy initiatives
- Benefit-cost demonstrations
- Earnings sharing mechanisms
- Platform service revenues
- New service approvals
- Constructive rate design
- Performance plans with incentives

Regulators will have to navigate several tensions as they resolve conflicting stakeholder positions

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