

The Grid of the Future:

**Enabling & Rewarding Utility Performance,
Service & Value in a Distributed Energy Age**

**Maryland Grid of the Future Conference
29 January 2016**

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The Company Store



Drivers of Change

- Natural gas supply & prices
- Declining economics of central station power solutions/model
- Environmental responsibility & imperatives
- Improving economics of distributed energy resources (“DER”) – emergence of short-term price elasticity
- Resiliency & the inherent benefits of community-based solutions
- New clarity about FERC role (until ...)

Potential Pathways

- “Maintain and harden”
- Incremental changes
- Comprehensive regulatory reform
- Legislative overhaul

Utility Reform: Why now?

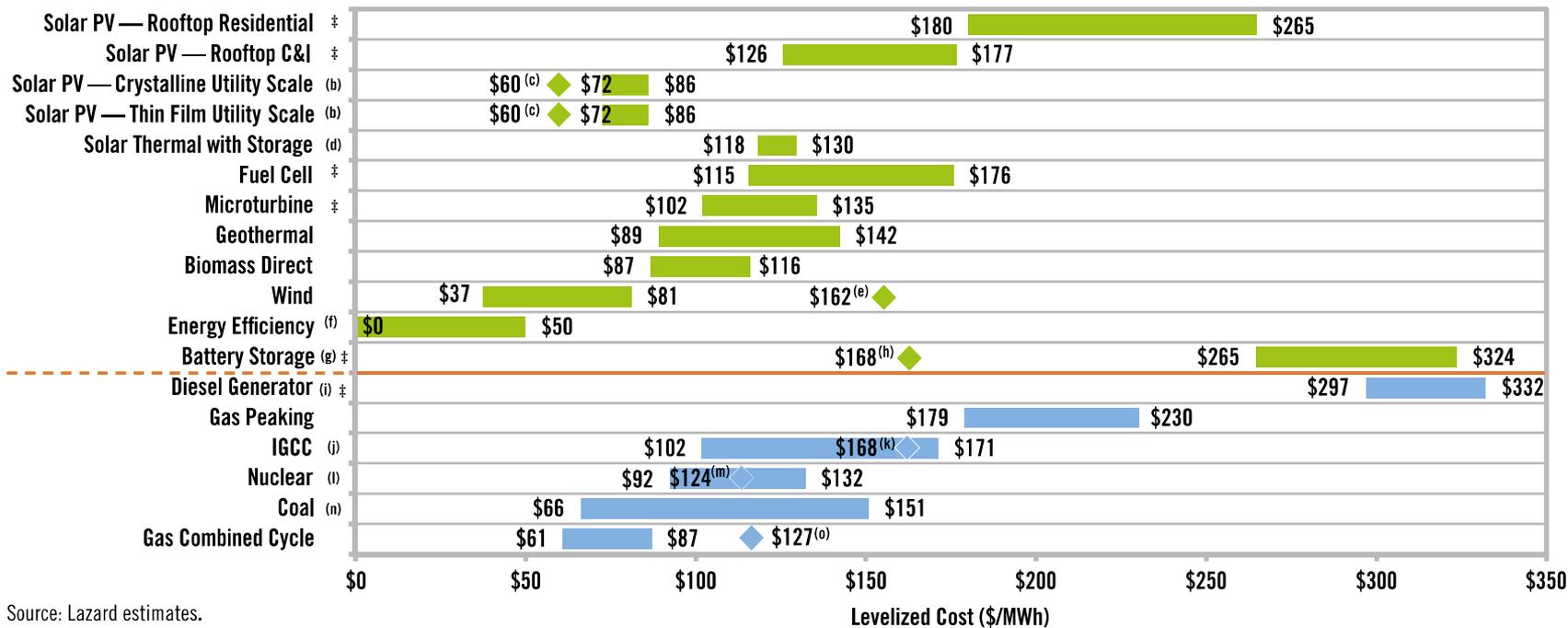
Challenges to Utility Growth

- Generation capacity prices, costs, value
- T&D investment recovery
- Decreasing relevance of incentives (in selected markets) and increase in efficiency, conservation/load mgmt.
- Controversy around efforts to buttress fixed cost recovery through monopoly rents
- Pressure on public benefit funds

A situation ripe for ~~disruption~~ transformation!

Economics are Compelling, Even When Only Wholesale Costs are Considered!

Figure 7: Unsubsidized Levelized Cost of Energy Comparison—September 2017



P. Kind, "Pathways to a 21st Century Electric Utility," CERES (Nov. 2015)

Responses to DER

- Prohibition vs. mandates
- Regulation (define as “utility,” or not)
- Extra charges vs. extra incentives
- Eliminate benefits vs. incentives
- New services from utilities vs. others
- Technical, regulatory, economic - internalization vs. bypass
- Utility transformation

Perceptions & Beliefs

- Utilities and IPPs – the forces of change are inevitable; the pace is uncertain. We are all in the same boat. (relative competitive posture)
- Non-solar/DER customers – growing bills, evaluating bypass, environmental concerns. (I'm busy and stressed)
- DER providers – utilities are shifting fixed costs, creating undesirable limits to growth at early market stages. (We are just getting going – give us a chance)

Perceptions & Beliefs (cont.)

- Regulators – seeking a more resilient, decentralized system, bypass increases pressure on non-discretionary customers, failure to deal with issues accelerates the spiral. (Hate being in the middle of 2 good things – don't force us to decide!)
- Customer groups – rate and bill increases frustrating, lack of confidence in utility planning. (Been there, don't trust that!)
- Legislators – like regulators, increasingly facing unsavory choices and conflicts. (Generates contributions, but ultimately no-win decisions)

A Sharing Utility for a Sharing Economy: The Platform Utility

“Collaborative Consumption”

- *“Collaborative consumption as a phenomenon is a class of economic arrangements in which participants share access to products or services, rather than having individual ownership.”*
- Collaborative consumption gives people the benefits of ownership with reduced personal burden and cost and also lower environmental impact—and it’s proving to be a compelling alternative to traditional forms of buying and ownership.
 - E.g. Uber, Airbnb, ZipCar, Yeloha/MySunBuddy (net metering credit sharing company)

A Well-Regulated “Sharing Utility”

- Allows customers to benefit more from utility investments
 - Systematic localized integrated resource planning
 - Transparent price and value information
- Operates against performance standards
 - Short- & long-term prices
 - Environmental responsibility
 - Customer satisfaction
 - Grid reliability & service quality
 - Minimization of revenue requirement
- Expands 3d party participation
 - Vehicle for innovation
 - Decouple revenue from throughput
 - Leverage private market assets and solutions

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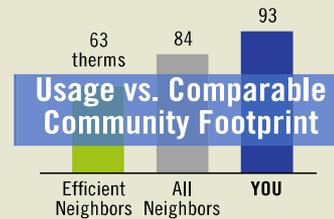
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Some Things New Markets Could Offer to Citizens and Businesses

Figure 8: Energy Management Applications Store



Orange Solutions



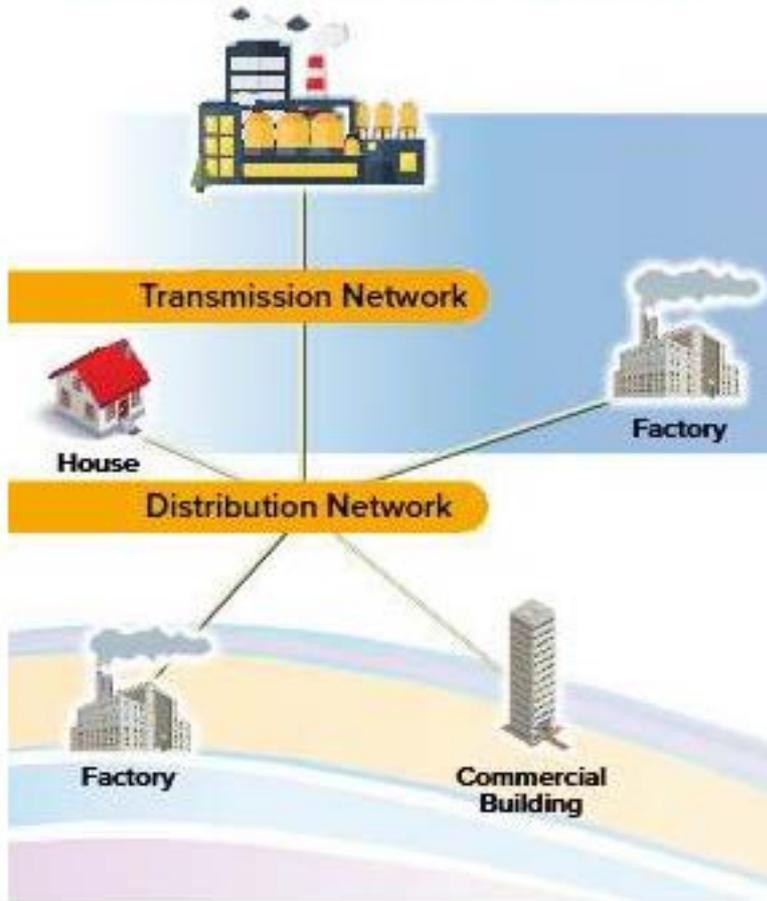
P. Kind, "Pathways to a 21st Century Electric Utility," CERES (Nov. 2015)

What Some are Already Doing

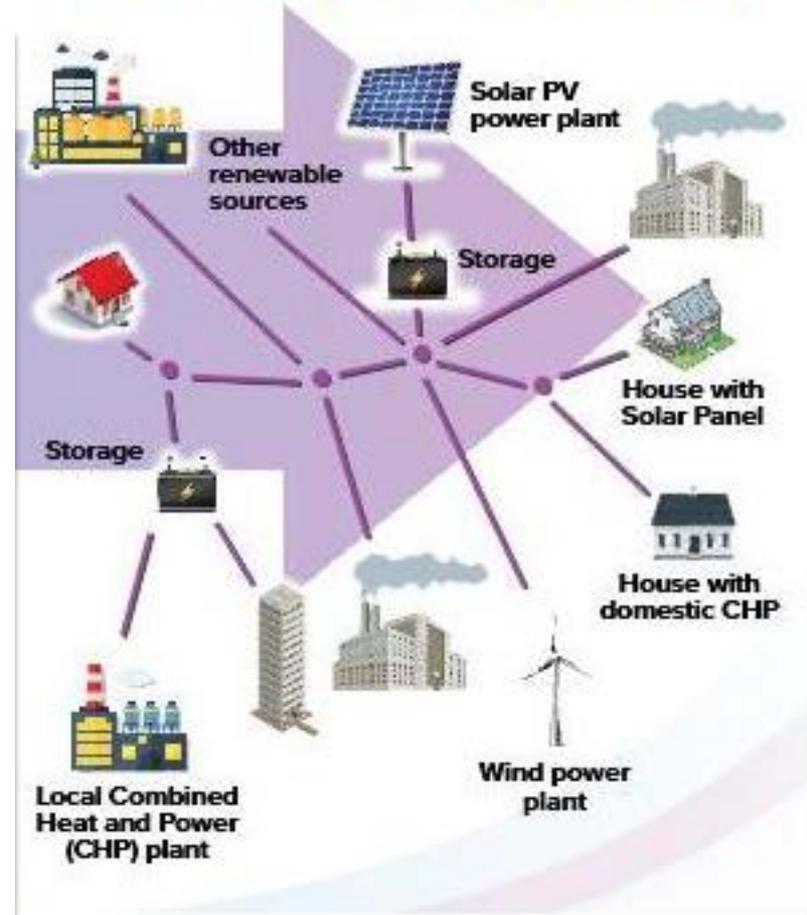
- Community and shared solar
- Combined heat and power
- District heating and cooling
- Demand response
- Community Choice Aggregation
- Solar Rooftop Leasing
- Community Storage
- V2G – Vehicle to Grid

Your Energy Infrastructure Landscape Will Change Dramatically

Yesterday's Energy Model Centralized Power



Tomorrow's Energy Model Cleaner, Local Power



<http://microgridknowledge.com/moodys-on-new-york-rev-winners-losers-and-whats-next/>

Thank you!

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Part 2: Some Details

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A Well-Regulated “Sharing Utility”

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 - Systematic localized integrated resource planning
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5 “Sharing Utility” Principles

1. The full impact of electricity generation, delivery, and use on natural systems must be accounted for.
2. Traditional cost-plus regulation should be largely replaced by value-based pricing of functionally unbundled services, remaining only for those services that continue to meet the definition of natural monopoly
3. Every new regulated system asset has to prove its economic value to society, relative to alternatives, on a full life-cycle cost accounting basis
4. Electricity pricing should offer customers a broader array of rate choices and reflect the full, location- and time-sensitive long-run marginal cost (LRMC) of utility service. *Price structure need not mimic cost structure.*
5. Utilities should provide customers with full and fairly-priced access to solar and DER technologies, and services appropriate to their individual circumstances and their consumer (or “prosumer”) preferences

Challenges & Strategies: Low/Moderate Income

- Community-based initiatives
- Education
- Demonstrations
- Residual monopoly obligations
- Granular grid cost data
- Platform technology deployment & design

Challenges & Strategies: Platform Technologies

How do we build this platform?

- Differentiate Smart Grid 1.0 (BAU grid modernization), from Smart Grid 2.0 (enhanced services)
- Metrics and performance criteria for platform development
- Bulletin board of short, mid, long-term marginal distribution capacity costs
- Accountability against the DSIP – Distribution System Implementation Plan (“SLIRP”)

Challenges & Strategies: Animating Markets for DER

Jumpstarting DER Markets:

- Stakeholder collaboratives
- Unbundling “building blocks” of rates to reveal competitive opportunities
- Marketplace portals
- Community Choice Aggregation
- Shared solar “plus”
- Demonstrations that prove something new

Challenges & Strategies: Large Scale Renewables

- Competitive procurement
- Portfolio management with mix of contract lengths
- Contracts with multiple parts, re-openers, synthetic provisions, pre-pays, etc.

Challenges & Strategies: New Revenue Models

- Minimal fixed charges
- Earnings Impact Measures
 - Revenue Loss
 - Performance
- Differential Returns on Equity to align with policy
- Market Based Earnings

What PACE/NESEMC are doing

- Leadership is convening people around a common agenda
- Pace Energy and Climate Center
 - Public interest intervenor
 - Stakeholder participant
 - Convener
- Clean Energy Organizations Coalition
- NESEMC – regional solar businesses

Demonstration Project Options

- Community and shared solar
- Combined heat and power
- District heating and cooling
- Demand response
- Community Choice Aggregation
- Solar Rooftop Leasing
- Community Storage
- V2G – Vehicle to Grid

Conclusion:

A Well-Regulated Sharing Utility

- Shifts market surplus downstream to customers
 - Local integrated resource planning
 - Transparent price and value information
- Operates against performance standards
 - Short- & long-term prices
 - Environmental responsibility
 - Customer satisfaction
 - Grid reliability & service quality
 - Minimization of revenue requirement
- Expands 3d party participation
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(Source: The Clean Coalition)

Thank you!

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1. Accounting for Impacts

Externalities are real, and markets are distorted and inefficient as a result of not accounting for them

- Pricing carbon
- Incorporating in value assigned to DER
- Flowing (some) carbon charge revenues back through bill reductions and infrastructure development

2. Move from Cost to Value

The Averch-Johnson Effect is a real and logical response to the ratemaking formula, that also applies to public power

- Cost-plus regulation only for monopoly services
- Allow deviation from dominance of averaged class rates – segmentation of customers
- Use market mechanisms to internalize externalities through value-based rates
- Open system platform for distribution services
- The “DSP” serves as conduit for crediting of value and distribution of costs

3. SLIRP, with Improvements

Translate experience into value, not just rents

- Systematic Localized IRP – the DSIP
- Extend valuation methods to all DER
- Risk-adjusted discount rates
- Markets to assess value where possible, but with regulatory oversight
- Comprehensive functional unbundling
- Utility becomes load coordinator/manager; could be 3d party (IDSO)
- DSP participation only in non-competitive market segments

4. Reflecting Cost

Increasingly, short term elasticity is possible!

- Unbundling
- Customer segmentation
- Broad access to data
- Two-part rates
- Introduce temporal and locational sensitivities in rates (with gradualism in mind)

5. Access to DER & Services

There will be a residual, natural monopoly – but it should be constantly challenged by innovation

- Utilities should develop DER programs to start, with an eye to competitive markets providing products and services wherever possible
- Utilities transition to non-competitor platform provider as competitive markets emerge