Utility of the Future

SEPA’s 51st State Initiative
What is the 51st State?

THE DESTINATION
Phase I
Hypothetical electricity marketplace

THE BLUEPRINT
Phase II
Roadmapping current state to future state over “swimlanes” to achieve future vision.

THE BUILD
Phase III
Creation of customized roadmaps & implementation of “no-regrets moves”

Crowdsourced visions for the future, starting from a blank slate

Crowdsourced roadmaps that articulate how we get from “here” to “there”
The Destination – Phase I
Sept 2014 – Sept 2015

Create equitable business models and integrated grid structures to ensure electricity is provided safely, reliably, efficiently, affordably, and cleanly.

Meet customer demand – both in the near and long term – for solar and DER options, as well as additional, comprehensive energy services.
Developing the Destination
Over a dozen participants, including:
Summary of Phase I
Ideas

**INCREMENTAL MOVEMENT**

- Reframe the regulatory construct and principles of ratemaking
- Shift towards innovative rate designs (e.g., time-of-use rates, real-time pricing, etc.)
- Clearly articulate the roles of the monopoly utility
- Focus on enabling customer adoption by enhancing interconnection standards and propagating real-time information to consumers

**PARADIGM SHIFTS**

- Create a distribution system platform for real-time, integrated exchanges between the end consumer and other assets on the grid
- Create transparent distribution planning, investment, operations, and maintenance responsibilities for utilities and/or independent 3rd parties
- Broaden cost causation principles to include societal impacts
- Enable customers to be proactive decision makers, either directly or through technologies within the home
The Roadmap – Phase II

What defines the current state?

What are the core objectives?
What defines success?

What are the major stages of transformation?

Phase II in Partnership with:
Roadmap Framework

Current State

Retail Market Design
Describe how customers participate (opt-in versus opt-out) of the future state technology enablement provisions, what assets are at their disposal, and how those assets interact with the grid.

Wholesale Market Design
Describe impacts and modifications, if any, to wholesale markets, central station generation, transmission assets and services, etc.

Utility Business Model
Describe how the utility industry needs to evolve from current to future state in order to support the new market while maintaining safe, reliable, and cost-effective service.

Asset Deployment
Address any required technologies (e.g., AMI, smart inverters, load tap changers, etc.) that utilities will need to deploy to support the future state, the timing/triggers for those deployments, and how costs would be recovered.

IT
Describe the software and communications platforms needed for all parties to enable the grid of the future, including those needed for the utility, the firmware required for devices, etc.

Rates & Regulation
Discuss how regulatory bodies, rules, and regulations must adapt from current to future state, and how retail rates must transform over time to allow for the continued economic health of the system and its participants.

Stage 1

Stage 2

Future State

STAGES
Describes a major phase of the transformation process, how different Swirllanes get affected (if at all), and how this moves the market forward.

SIGNPOSTS
Markers and indicators of whether or not the market is ready to move forward as planned or if a new direction is required.

CHECKPOINTS
Specific goals or items that should be achieved prior to moving to the next Stage.
Designing the Roadmap
Over a dozen participants, including:

- American Public Power Association
- Vermont Energy Investment Corporation
- scottmadden Management Consultants
- NRECA America’s Electric Cooperatives
- Siemens Ingenuity for Life
- Bruce Nordman
- Smart Electric Power Alliance
- Union of Concerned Scientists
- accenture strategy
- Berkeley Lab
Critical dialogue with key takeaways

• New tech = more tailored electricity offerings for customers, more efficiency, resiliency

• Customer empowerment is positive – but will require new engagement & sophistication, require consumer protection & a standard offer provider

• Regulators need to understand new issues: data ownership, privacy, & security; capabilities & limits of new tech; potential for market failures & manipulation

• Regional variations drive the need for multiple models; solutions suitable for some markets may not be even considered for others

• Increasing consumer options will mean more competition and more complexity
Example Roadmap
ScottMadden

51st State Roadmap
Leveraging the Natural Advantages of the Electric Utility

Stage 1: Develop Standards, Protocols, and Codes of Conduct
- Develop and maintain grid interconnection and integration standards and protocols
- Develop and maintain robust cybersecurity standards
- Develop third-party code of conduct for customer data
- Update utility code of conduct to ensure fair competition if utility owns DER assets

Stage 2: Define Retail and Wholesale Interaction
- Identify DER assets to be supported by retail customer rate riders
- Develop methodologies to price the value of each type of DER asset on the distribution grid
- Identify DER assets to be aggregated and provide services to RTO/ISO
- Develop measures and markets for aggregated DER assets in the wholesale electricity market
- Develop infrastructure and processes to allow robust data analytics

Stage 3: Reform Rates and Regulations
- Require DER providers to comply with standards, protocols, and codes of conduct
- Establish rates for utility ownership and returns on investment in DER
- Permit stakeholders to aggregate and leverage DER assets in the wholesale market
- Design system charges to cover fixed operating costs to accommodate DER
- Replace net metering with DER rate riders

Stage 4: Modify Utility Operations and Business Model
- Refine utility operations to reflect growth of DER assets
- Identity utility-owned DER opportunities and business models
- Market test utility-owned DER business models
- Select successful utility-owned DER business models
- Modify market and regulatory rules based on early lessons learned

Stage 5: Iterate and Improve Framework
- Develop processes and methodologies that integrate DER into long-term distribution planning
- Develop processes and methodologies that integrate DER into long-term ISO/RTO planning
- Checkpoint #2: Enact rate and regulatory reforms

Swimlanes
- RM Retail Market Design
- WM Wholesale Market Design
- UB Utility Business Model
- AD Asset Deployment
- IT Information Technology
- RR Rates and Regulation

Signposts
- Emergence of new technologies or major advances in existing technology
- Acceleration of DER penetration
- Change in public policy
Finding Common Ground

• SEPA reviewed all submissions from both Phases of the Initiative
• While the tactical and strategic actions suggested did not often align, commonalities did exist in the fundamentals behind those decision points
• SEPA condensed these themes down into four “doctrines” that represent common ground for discussing utility and market transformation
• Within each, a series of potential outcomes have been identified that could help spur conversations with key stakeholders
  • These are not meant to be required actions or a suggested series of incremental steps; rather, they represent the universe of alternatives that could be adopted
  • Each market is different, and the choices made in one are not necessarily the right choices for another
## Doctrine 1: Market Efficiency

A primary goal of the market should be to promote efficiencies in the production, consumption, and investment in energy and related technologies.

<table>
<thead>
<tr>
<th>Potential Solution</th>
<th>Example Approaches to be Considered</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Promote Energy Efficiency</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incremental Changes</td>
</tr>
<tr>
<td>• Creation of an energy efficiency standard</td>
<td>• Implementation of decoupling or similar approach to address disincentives (also see doctrine 3)</td>
</tr>
<tr>
<td>• Development of incentives for energy efficient technologies and investments</td>
<td></td>
</tr>
</tbody>
</table>

| **Investment in Distribution Automation** | | |
| | Incremental Changes | Transformative Changes |
| • Investment in flexible assets; retirement of older, poor heat rate units | • Investment in two-way communications on the distribution system, including metering solutions |
| | • Deployment of control technologies as standard equipment, such as D-SCADA, outage management, volt/VAR control, and advanced inverters | • Display of near real-time usage information (for customers) and real-time system data (for operators) |

| **Incorporation of Distribution System Resource Planning** | | |
| | Incremental Changes | Transformative Changes |
| • Modeling of DERs as part of integrated resource planning (IRP) processes | • Development of advanced interoperability standards |
| | • Incorporation of long-term distribution planning into IRP efforts | • Predictive analytics on customer deployment of DERs |
# Doctrine 2: Clear Definition of Roles

The role of the utility, as a public service entity, should be clearly defined so that all market participants can understand their roles in enabling customer options in a fair, transparent, and nondiscriminatory manner.

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<tr>
<td><strong>Broad Discussion on Utility Structure</strong></td>
<td><strong>↔ Incremental Changes</strong></td>
</tr>
<tr>
<td>• Vertically integrated utility</td>
<td>• Creation of an organized market at the transmission level (RTO/ISO) in traditionally bilateral markets</td>
</tr>
<tr>
<td>• Distribution “wires only” utility</td>
<td>• Utility becomes platform optimizer for DER integration</td>
</tr>
<tr>
<td><strong>Determination of Utility Roles and Responsibilities</strong></td>
<td>• Creation of independent system operator at the distribution level (organized DSO market at the distribution level)</td>
</tr>
<tr>
<td>• Full public service corporation</td>
<td>• Partnership concepts between utilities and solution providers</td>
</tr>
<tr>
<td>• Provider of last resort</td>
<td>• Utility as an integrator of services</td>
</tr>
<tr>
<td></td>
<td>• Utility, under codes of conduct, providing products and services directly to customers</td>
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Doctrine 3: Rate Structures

Rate structures should provide transparent cost allocation that supports a sustainable revenue model for public good utility services

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<tr>
<td>Broad Discussion on Principles of Ratemaking</td>
<td>• Continued use of cost of service ratemaking</td>
<td>• Use of value-based ratemaking for DER transactions</td>
<td>• Consideration of compensation structures that vary by time and location</td>
</tr>
<tr>
<td>Determination of Principles of Rate Design</td>
<td>• Retention of predominantly variable rate design</td>
<td>• Default time-of-use rates</td>
<td>• Implementation of pure dynamic rate design (timing, price, made available on a day-ahead or day-of basis)</td>
</tr>
<tr>
<td>Enhanced Assurance of Cost Recovery</td>
<td>• Formal approval of IRP or IRP action plan investments</td>
<td>• Prudency determination in advance of deployment</td>
<td>• Switch to performance-based ratemaking (e.g., RIIO model)</td>
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## Doctrine 4: Customer Choice

Customers should be presented with a variety of rate and program options that expand the choice of and access to energy-related products and services that are simple, transparent, and create stable value propositions.

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<td><strong>Multiple Rate Alternatives Offered to Customers</strong></td>
<td><strong>Incremental Changes</strong></td>
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<tr>
<td>• Required retention of standard volumetric rate design for customers not interested in more complex offerings</td>
<td>• Multiple time-of-use rates that leverage different peak windows</td>
</tr>
<tr>
<td><strong>Multiple Energy Programs Offered to Customers</strong></td>
<td>• Default opt-out rate for customers shifted away from standard volumetric-only rate design</td>
</tr>
<tr>
<td>• Third party-owned community solar</td>
<td>• Utility-sponsored online marketplace for third party energy-related products and services</td>
</tr>
<tr>
<td>• Utility-owned community solar</td>
<td>• Rooftop leases or power purchase agreements</td>
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<tr>
<td>• Green pricing programs</td>
<td>• Demand response</td>
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<tr>
<td><strong>Increased Transparency for Consumers</strong></td>
<td>• Bill comparisons – both online and on paper bills – that show the impacts of new rate options</td>
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<tr>
<td></td>
<td>• Bill guarantee – safe haven period offered with bill comparison where new rates are shown but do not take effect for a period of time</td>
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The Hard Part – Phase III
Sept 2016 forward
Engaging Stakeholders

1. Engage a neutral subject-matter expert for stakeholder facilitation
2. Clearly articulate the end goal and process up front
3. Focus on areas of agreement; defuse and work through disagreements
4. Document progress
Engaging Stakeholders (cont’d)

Ground the Conversation in Core Principles

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<td></td>
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<td>Affordability</td>
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Leverage Multiple Time Horizons for Deliverables

- **Roadmap**
  - Big Picture
  - Directional
  - Outlines Major Stages of Transformation

- **Action Plan**
  - Near-Term
  - Tactical
  - Outlines Specific Actions to be Taken within 1-5 Year Timeframe
Contact Information

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