The Hon. Robert Powelson
NARUC President
The Honorable Colette Honorable
“Bless her heart”
The Hon. Brien Sheahan
Chair, Task Force on Innovation
2017 Innovation Awards

PRESIDENTIAL TASK FORCE ON INNOVATION
Category 1: Innovators in Regulatory Policy

- **Subcategory 1**: State-level Innovation in Regulatory Policy
  - Eligible nominees: a state commission or state organization

- **Subcategory 2**: Municipal-level Innovation in Regulatory Policy
  - Eligible nominees: a city, town, or village

- **Subcategory 3**: Individual Innovator in Regulatory Policy
  - Eligible nominees: An individual – commissioner, commission staffer, local government leader, or local government staff
Category 2: Utility Industry Innovators

- **Utility Industry Innovation by Functions and Values**

  - **Subcategory 1:** Utility Industry Innovation in Customer Care, Engagement, and Empowerment
  
  - **Subcategory 2:** Utility Industry Innovation in Reliability, Resiliency, or Security
  
  - **Subcategory 3:** Utility Industry Innovative Pilots or Demonstration Projects
Category 2: Utility Industry Innovators (Cont.)

- Utility Industry Innovation by Sector
  - Subcategory 1: Utility Industry Innovation in Water and Sewer
  - Subcategory 2: Utility Industry Innovation in Electricity
  - Subcategory 3: Utility Industry Innovation in Gas
  - Subcategory 4: Utility Industry Innovation in Telecommunication
Send Questions and Nominations to InnovationAwards@naruc.org
Innovation: The Catalyst for Integration
Energy in the Emergent Era

NARUC Summer Committee Meeting | Russell Stokes, CEO GE Power

July 2017
Internet Users 2020: 5B
IP Devices 2030: 3T
Electric Cars 2040: 400M
Reduction in CO₂ 2050: 50%
The power grid will become increasingly diverse

affordable, reliable, more sustainable

- 65 GW
- 45 GW
- 38 GW
- 30 GW
- 1.8 GWh
- $0.1M
- 138K
- 2016 generation global orders

High voltage transmission:
- Bigger, scale lowered cost
- Efficiency through technology

Distribution networks:
- Few economies of scale
- Simpler, solid state
- Efficiency through data

- Local control
- 2-way flow
- Solid state
- Network micro-optimization
- Scalable generation and load

14 GW
13 GW
73 GW

July 2017

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Solar PV is fastest growing gen technology... moving towards a combination of centralized + distributed multi-directional system.

Wing-to-wing, connected, digital ecosystem
Providing more efficient & sustainable solutions for cost effective solar PV power.
Battery storage becoming economical... paradigm shift on generation dispatch and decarbonization

GE Hybrid Enhanced Gas Turbine
- 10 MW/4.3 MWh battery energy storage system + 50 MW LM6000 aeroderivative gas turbine
- Battery capacity designed to provide immediate energy while gas turbine starts and reaches load
- Greenhouse gas emissions & air pollution ↓ 60%
- Demineralized water consumption ↓ 45%, saves 2 million gallons of water annually

On July 7, 2017, a consortium consisting of French energy company Neoen and Tesla won a State Government tender to build the world’s largest lithium-ion battery in South Australia. This plant adds much needed power capacity that resolves the supply shortage in the state and enables a set of wind farms to provide dispatchable power. But it is not on its own a cure for all that ails the state, which will still be dependent on the interconnector to meet peak demand without additional...
Micro-grids becoming more prevalent in and emerging and mature segments … providing affordable and resilient access to power

Nice, France Microgrid Project

- 4 year microgrid demonstrator project including islanding and demand response
- Solar generated power above 1 MW, integrated energy storage
  - ↓ generation costs by up to 20%
  - ↓ carbon footprint

Nice Microgrid: Solar, Storage, & Reliability

Way down in the south of France, an experimental microgrid is demonstrating both the technical and business sides of local power production and distribution. The Nice Grid Project combines rooftop photovoltaic resources, strategically placed battery banks, and a smart control system, all of which provide on-site generation, peak load shifting, and islanding.

N.J. utilities board develops 13 microgrids to improve storm resiliency

The New Jersey Board of Public Utilities is furthering the state Energy Master Plan’s (EMP) priorities of improving energy resiliency and increasing the use of DER microgrid technologies by funding 13 Town Center DER Microgrid feasibility studies.
Convergence of energy and transportation sectors

... creating new business models and transforming the roles of the utility & consumer.
The pace of change is accelerating… we ALL must continue to evolve to remain relevant in the energy future.

IoT  
Artificial Intelligence  
Robotics & Automation

Additive/3D Manufacturing  
Virtual/Augmented Reality  
Machine Learning

… policy and regulatory landscape must also keep pace with technology innovation.
ELECTRICITY VALUE NETWORK

GENERATION
- Thermal
- Wind
- Solar
- Hydro

TRANSMISSION

DISTRIBUTION
- Hybrid Gas Turbine
- Storage

BEHIND THE METER (BTM)
- EVs
- CHP
- Microgrid
- Community Storage and Solar

SYSTEM-OF-SYSTEMS BENEFITS
- ↓ Delivered cost of electricity
- ↑ System flexibility
- ↑ Resiliency
- ↓ Greenhouse gases
- ↓ Curtailment of renewables
- ↑ System diversity (energy independence)

DIGITAL THREAD

EMoS SW

DMS SW

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Innovation: The Catalyst for Integration
Innovation: The Catalyst for Integration
NARUC Summer Policy Summit 2017

Dennis V. McGinn, Vice Admiral (Retired), US Navy
Former Assistant Secretary of the Navy
Energy, Installations, Environment
New Business Models, Markets, and Partnerships
Emerging Technologies: Innovation in Energy Production and Management
Old Energy, New Energy
Changing Landscape of Electrical Grid Technology
Innovation: The Catalyst for Integration
Innovation: the Catalyst for Integration
The Future of Vehicle Electrification and Integrated Energy Solutions
Boris von Bormann
CEO, Mercedes-Benz Energy Americas
July 18, 2017
Mercedes-Benz
Mercedes-Benz Energy

Ecosystem of Home Energy Solutions Supporting EV's

- Home energy storage
- Rooftop solar PV system
- Electric vehicle
- EV charging station
- Energy management
- Smart home technology
- Virtual power plant
- Financing
Intelligent Energy Management

Managed Charging for Public + Private Charging Infrastructure

EV’s + Smart Home

Electric Fleet Management

Mercedes-Benz Energy
Innovation: The Catalyst for Integration
Pipeline to Platform

**Pipe Model – focus on the product**

<table>
<thead>
<tr>
<th>Value = f(qualities of the final product)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production ➔ Assembly ➔ Distribution</td>
</tr>
</tbody>
</table>

- **Companies produce, assemble, and distribute goods** and services to end customers through a process
- **Value is created through the optimization of this process**

**Platform Model – focus on the interaction**

<table>
<thead>
<tr>
<th>Value = f(number of transactions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers ➔ Platform ➔ Producers</td>
</tr>
</tbody>
</table>

- **Companies enable interactions** between both producers and consumers, with parties potentially shifting between roles
- **Value is generated** through creation, curation, and consumption of content
- **3 types of exchanges:** information, goods/services, currency
Platform for Utility of the Future

- Data services
- Home appliances
- Energy transactions
- Connected devices
- Community solar
- Pre-provisioned DR enrollment
- DER offerings
- Financing
- SMB programs
- Home services
Platform Layers

1. The physical asset base
2. System operation and planning
3. Transactive commodity exchange
4. Services & solutions marketplace
Infrastructure investments to modernize the electric system and optimize grid operations
Layer 4

- Equipment manufacturers
- 3rd party services
- Customers and prosumers
- Customer care
- Billing
- Management
- Backend processes

= Transactions
Innovation Lab Pilot: Voice Assistant

https://www.youtube.com/user/CommonwealthEdison/videos
Innovation: The Catalyst for Integration