NYSERDA Smart Grid R&D Program Update

Presenter: Sumit Bose

Central Hudson Gas & Electric Solar Summit
Locust Grove, Poughkeepsie NY
March 3, 2020
Clean Energy Fund (CEF)

The Clean Energy Fund is central to Reforming the Energy Vision (REV)

- Accelerate the use of clean energy and energy innovation
- Drive economic development
- Reduce ratepayer collections

Individual investment chapters including:

- Grid Modernization
- Energy Storage
- Smart Buildings
- Renewable Energy Optimization
- Clean Transportation
Grid Modernization Program Guiding Principles

Accelerating adoption of an advanced, digitally enhanced and dynamically managed electric grid

Clean
Integrate clean sources, deliver renewable energy, reduce losses

Reliable
Avoid outages, restore faster, reduce impacts of severe weather

Affordable
Apply innovation to get better results at lower costs
Smart Distribution & Transmission Systems – Strategy

Invest in research that accelerates realization of an advanced, digitally enhanced and dynamically managed electric grid that results in more efficient asset utilization (e.g., reduced operating margins, reduced power demands, reduced energy losses) and improved reliability, and resiliency to climate change induced weather-events.

✓ sensing, communications, diagnostics and controls
✓ advanced/improved products and materials (physical asset protection and improved functionality
✓ grid visualization, communication and control systems associated with the interoperability of DER
✓ modify regulatory paradigm to align incentives with goals
Grid Modernization Program (PON 4074)

Electric Power Transmission and Distribution (EPTD) High Performing Grid Program
Program Opportunity Notice (PON) 4074 Up to $30 Million Available

Rolling submissions: until October 7th, 2020 for Concept Papers and November 18th, 2020 for Full Proposals

Examples of eligible technologies:
Advanced Monitoring / Measurement / Controls
Transmission and Distribution Automation / Management
Distributed Energy Resources Integration / Interconnections
Advanced Power Electronics / Smart Inverters
Advanced Materials / Cabling / Conductors
Advanced System Modeling / Applications / Algorithms
Advanced Planning / Operations / Design / Forecasting Tools
Advanced Sensors / Devices / Systems
Innovative Cybersecurity / Data Analytics Advanced / Adaptive Protection Systems / Controls

<table>
<thead>
<tr>
<th>Category</th>
<th>Maximum NYSERDA Funding Per Award</th>
<th>Total Project Cost Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A: Technology Feasibility Studies</td>
<td>$100,000</td>
<td>25%</td>
</tr>
<tr>
<td>Category B: Product Development</td>
<td>No limit</td>
<td>50%</td>
</tr>
<tr>
<td>Category C: Research Studies</td>
<td>$400,000</td>
<td>25%</td>
</tr>
<tr>
<td>Category D: Engineering Studies</td>
<td>$400,000</td>
<td>25%</td>
</tr>
<tr>
<td>Category E: Demonstration Projects</td>
<td>No limit</td>
<td>50%</td>
</tr>
</tbody>
</table>
Future Grid Challenge (PON 4128)

Up to $15 Million Available - $3 Million per NYS IOU

Round 1: Closed 9Oct19
- **Consolidated Edison** – DER Monitoring & Control, Data Analytics and Advanced Forecasting
- **Orange & Rockland** – SI Functionality and Integration into Distribution System Planning and Operations

Round 2: Closed 11Dec19
- **National Grid** – SI Functionality and Integration into Distribution System Planning and Operations
- **Central Hudson Gas & Electric** – DERMS Logic for Coordinating DER Operating in a Transmission Load Pocket

Round 3: TBD

**Program Requirements:**
Product Development and Demonstration Projects
Cost share 25%
Up to $3 million of NYSERDA funding
Grid Modernization Program (PON 4094)

PON 4094 – DER Integration

• Awards focused on overcoming specific interconnection issues
  • Low Cost communication
  • Low Cost Monitoring & Control
  • Activating Smart Inverter Functions
  • DER Gateways
  • Reactive Power Dispatch
## Sample Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Category</th>
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</thead>
<tbody>
<tr>
<td>Optimal Forecasting Solution for Overhead Line Operations</td>
<td>Demonstration Project</td>
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<tr>
<td>Advanced Solar and Load Forecasting (Phase 3)</td>
<td>Demonstration Project</td>
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<tr>
<td>Sub-Synchronous Oscillation Screening &amp; Mitigation</td>
<td>Engineering Study</td>
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<tr>
<td>69 kV Optical Voltage/Current Sensor Platform for Sectionalizing Applications</td>
<td>Product Development</td>
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<tr>
<td>Low Cost Alternating to Direct Transfer Trip (Phase 2&amp;3)</td>
<td>Product Development</td>
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<tr>
<td>Machine Learning Platform for Ratio Transformer Failure Predictions</td>
<td>Product Development</td>
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<tr>
<td>Negative Sequence Voltage Protection Method</td>
<td>Product Development</td>
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<tr>
<td>Underground Cable Advanced Monitoring and Diagnostic System</td>
<td>Product Development</td>
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<tr>
<td>On-board Power Line Detection, Avoidance, and Tracking for Aerial Drones</td>
<td>Product Development</td>
</tr>
<tr>
<td>Detection of Arbitrarily Located Single Phase Opens</td>
<td>Research Study</td>
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<tr>
<td>Acceptance Criteria and Screening tools for DER Driven Ground fault Overvoltage and Asynchronous Reclosure on Transmission System</td>
<td>Research Study</td>
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<tr>
<td>Advanced Modeling of Power System Dynamics Using Machine Learning</td>
<td>Research Study</td>
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<tr>
<td>Smart Inverter Setting Guidance</td>
<td>Research Study</td>
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<tr>
<td>Model Translation Tool</td>
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<tr>
<td>Control System Forensic Capability Study</td>
<td>Research Study</td>
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<tr>
<td>Effective Grounding Methods for Inverter Based DER</td>
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<tr>
<td>Learning Smart Inverter Study</td>
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<tr>
<td>Mitigation and Modeling for Ground Fault Over Voltages of Inverter Based Systems</td>
<td>Research Study</td>
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<tr>
<td>Quantifying the Value of DERMS for New York State</td>
<td>Research Study</td>
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<tr>
<td>Control Testing for Behind-the-Meter Energy Storage Systems Grid Back-Feed Prevention</td>
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<tr>
<td>Deep Learning Computing System for Grid Operations</td>
<td>Research Study</td>
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<tr>
<td>Control of Grid Interface Inverters for Distributed Power system Stabilization</td>
<td>Technology Feasibility Study</td>
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<tr>
<td>Real Time Analysis of Transformer Oil</td>
<td>Technology Feasibility Study</td>
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<tr>
<td>Low Frequency AC Transmission Study</td>
<td>Technology Feasibility Study</td>
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<tr>
<td>Integrating Smart Meters with Smart Inverters</td>
<td>Technology Feasibility Study</td>
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Interconnection Working Groups

**Technical**
- Technical barriers & new technologies
- Consultants
- SIR screening
- Islanding Protection
- Monitoring and Control
- Voltage Flicker
- Energy Storage
- Metering Configurations
- Smart Inverter Functionality

**Policy**
- Queue management
- Communication
- Federal/State queue coordination
- Material modifications
- Cost sharing

**ITWG**
- Technical

**IPWG**
- Policy

**Costs**
- Timeliness
- Burden

[Diagram showing Interconnection Working Groups (ITWG) and Policy Working Groups (IPWG) with overlapping areas for technical and policy topics.]
Technical Working Group (ITWG)

- Goal: identify, discuss, and resolve technical barriers and challenges affecting the interconnection of distributed generation.
- Includes representatives from State agencies, utilities, and DG developers
- Technical consultants to assist evaluation process and technical document development
- Initial Topics: Ground Fault Over Voltage (3Vo) / Anti-Islanding Protections (DTT) / Monitoring & Control
- Current Topics: Energy Storage Systems / Smart Inverter Functionality / Transient Over Voltage / Updated Screening
- More information on ITWG at http://www.dps.ny.gov
Questions?

David.Crudele@nyserda.ny.gov
Michael.Razanousky@nyserda.ny.gov
Christopher.Cheng@nyserda.ny.gov
Sumit.Bose@nyserda.ny.gov