REV Project Demonstration Goals

- Develop and test four utility services serving a multi-customer Microgrid for a 2-week outage scenario in Village of Potsdam:
  
  A. Tiered recovery for new storm-hardened underground wires
  B. Central procurement of DER
  C. Microgrid control and operations
  D. Billing and financial transaction (settlement) services
Critical and Essential Facilities

- Hospital
- Universities (2)
- Police Dept.
- Fire Dept.
- Rescue Squad
- Pharmacy
- Gas Station
- Grocery Store
- Bank
- Hotel

- Water Treatment Plant
- Wastewater Plant
- Utility Service Garage

Potsdam Microgrid
Distributed Energy Resources

- Existing firm generation sources:
  - One 500 kW hydro generating facility
  - One 2 MW solar PV array
  - Two 1.4 MW CHP facilities
  - Numerous Diesel, Nat. Gas <500 kW engines
- Some renewables unreliable during storms
- Need additional ~3 MW firm generation
- Limited hours for economic discharge of CHP
Staged Roll Out Map

[Map of a city with various streets and landmarks labeled with numbers indicating stages of a rollout process.]
Tier 1 Customers: Hospital, Universities, Town Hall
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<tbody>
<tr>
<td>Conduct energy audits of large users - two universities and the hospital; quantify energy efficiency (EE) and demand response (DR) opportunities.</td>
<td>Determine amount of existing DER available to Microgrid; determine quantity and type of additional DER needed for Microgrid.</td>
<td>Design underground storm-hardened wire system; ID equipment types and quantity needed. Develop standard interconnection and operating protocols.</td>
<td>Develop tiered financial recovery plan and calculate bill impacts using costs developed in engineering design. Seek funding for capital project.</td>
<td>Present service options to stakeholders; obtain feedback; make refinements to contract models.</td>
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| Optimal DER Sizing Determined per Customer | Completed, Staged Roll-out Model | Phased Model, Detailed Design in Development | Tiered Recovery Modelled | Customer Value Determination, Value of “R” |
## Community Resiliency – Potsdam Microgrid

### Lessons from Stakeholders

| Microgrid Customers (Those directly connected to Microgrid) | ▪ Support Microgrid as critical to Potsdam area resiliency.  
| | ▪ Open to pay for resiliency, value-R varies by type of facility  
| | ▪ Loads will evolve over time due to numerous variables.  
| | ▪ Preference for utility ownership & control of MG assets.  
| | ▪ Need economic model to curtail load during emergency  
| | ▪ Benefits should exceed customer’s back up generators  
| Microgrid DER Owners | ▪ Low energy prices in Potsdam makes any DER operation economically challenging.  
| | ▪ Need guaranteed revenue model for capacity and energy  
<p>| | ▪ Prefer to outsource operation and maintenance of DER |</p>
<table>
<thead>
<tr>
<th>Utility</th>
<th>Residents (Rate Payer)</th>
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<tbody>
<tr>
<td>▪ Staged construction of underground distribution necessary to balance costs and benefits</td>
<td>▪ Essential services valued most during an outage</td>
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<td>▪ Ownership of Microgrid wires and controller</td>
<td>▪ Sensitive to electric rate increase of any amount</td>
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<tr>
<td>▪ Safe and stable transition and operation of Microgrid</td>
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<tr>
<td>▪ Standardize system Microgrid components and controller minimizes costs and risks</td>
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<tr>
<td>▪ Regular operational drill for MG scenario required</td>
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<tr>
<td>▪ Tariff changes will be required to address regulatory compliance provisions and pricing.</td>
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<td>▪ External funds critical to MG financial acceptance</td>
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<tr>
<td>▪ Need firm generator capacity for all essential loads</td>
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</table>
Community Resiliency – Potsdam Microgrid

Proposed Governance / Business Model

PMP

NYISO

T1a
Load Customer

T1b
Load Customer

T2
Load Customer

T3
Load Customer

T4
Load Customer

T5
Load Customer

Legend:
- Community delivery surcharges for tiered recovery
- Wire-Co
- Settlement Fee
- Settlemet Service
- T1 Aggregated Surcharge
- Delivery Charge (SC7)
- Controller Service
- Controller Fee

Abbreviations:
- NYISO = New York Independent System Operator
- WIRE Co = National Grid as Utility
- PMP = partnership between generating customers
- DER = Distributed Energy Resources
- T1a = connected customers with generation
- T1b = connected customers without generation
- T2-T5 = community tiered recovery customers