Rulemaking Regarding Interconnection of Distributed Generation Facilities
(Docket No. RE-0000A-07-0609)

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Agenda

► Overview
► Process Standardization
► AC Disconnect Switch
► Process Screens
► New Technology
► Recap
Service Areas

SERVICE AREAS / CUSTOMERS
- Tucson Electric Power Service Area
- UNS Gas Service Area
- UNS Electric Service Area
- UNS Gas & Electric Service Area

- Transmission Line
- Coal-Fired Power Plant
- Natural Gas-Fired Power Plant
- Community-Scale Solar Power
- Company Offices
## Overview

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<thead>
<tr>
<th></th>
<th>TEP</th>
<th>UNS Electric</th>
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<tbody>
<tr>
<td>Service Territory Population</td>
<td>1,000,000</td>
<td>250,000</td>
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<tr>
<td>Retail Peak Demand (2015)</td>
<td>2,218 MW</td>
<td>429 MW</td>
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<tr>
<td>Customers</td>
<td>417,000</td>
<td>93,000</td>
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<tr>
<td>Residential DG Customers</td>
<td>~ 11,000</td>
<td>~ 2,000</td>
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Process Standardization

- Generally support standardized
  - Application forms, fees, & requirements
  - Study agreements
  - Pre-operational testing
  - Process and use of a modified IREC or FERC process

- Utility needs flexibility in determining technical requirements
  - Interconnection agreements
  - Technical manual
  - Technical specifications
  - Study thresholds
Strongly support requirement of an AC disconnect switch

- Ensures the Safety of our Workforce
  - Customer panel breaker is not a suitable disconnecting means per NFPA 70E
  - Safety device for both utility workers & emergency responders
  - Not redundant

Disconnect Switch Benefits

- Personnel Safety
- Visible-open, lockable in the open position
- Consistency for all DG systems
- Easier and faster maintenance
- Less disruption to customer
- TEP/UNSE supplies the disconnect for residential customers at no cost
Do not support a blanket increase of the system size thresholds presently defined by the Level screens
- The screens do not always result in additional studies
- The screens support the process for escalation if a project could pose a risk
- The screens should not be interpreted as automatic project approval if they are met

Support further exploration of the concept of supplemental reviews
**New Technology**

**Micro-Grids**
- TEP is researching the integration of micro-grids
  - Simulations
  - Volt/VAR Optimization
  - Advanced Inverters
  - Energy Storage
  - Grid Management Software
- Micro-grids must break connection from the grid before energizing local source
- Support private micro-grids with the appropriate grid service charge and operational protocols
Advanced Inverters

- Support creating an advanced inverter requirement/specification
- Standardized factory settings and testing procedures would be beneficial
New Technology

Energy Storage

- Support inclusion of energy storage in definition of “Generation Facility”
- Support requirement of advanced inverters for energy storage
- Additional study work is needed to better understand the impacts of energy storage on the grid
- Energy Storage and Rotating Machine technology should follow study track
Recap

- Utility specific technical manuals
- AC Disconnect switch is critical to safety
- Adopt process standards for new technology to support continued integration of DG