A Collaborative Approach to Mutual Aid & Critical Spares Management

2016 NWPPA Engineering & Operations Conference
April 13th, 2016
Veracity Background

Veracity is a unique company focused on providing value added services to Utilities and Utility Associations across North America

- Surplus Asset Management/Investment Recovery
- Mutual Aid Management
- Critical Spares Management
- Emergency Sourcing

“Provide services to our Utility and Association Partners that allow them to reduce costs, operate efficiently and maintain reliability.”
Veracity Connect is the category-defining, cloud based, collaborative Community for Utilities, providing a platform for more than 1,000 Utility members to manage mutual aid, critical spares and surplus assets.
Market Adoption

State Associations/Joint Action Agencies

TVPPA – Tennessee – 154 Member Utilities
MMEA – Michigan – 40
IMEA – Indiana – 72
IAMU – Iowa – 136
KMU – Kansas – 174
MMUA – Minnesota – 125
Electric Cities of Alabama – 34
FMEA – Florida – 39
MPUA – Missouri - 42
MECA – Michigan – 42
OREC – Ohio – 24
IAEC – Iowa - 42
MREA – Minnesota – 25
CHEC - 15
Public Power Utilities Face Significant Challenges

- Aging Infrastructure
- Extreme Weather & Climate Change
- Changing Workforce
- Increasing Costs & Decreasing Revenues
- Physical & Cyber Security Threats
“56% of respondents to a recent Black & Veatch survey classified their systems as being "near the end, at the end, past or well past the end" of their service lives”

Figure 2: Demographics of the Distribution Transformers
Public Power Challenges

Extreme Weather & Climate Change

“For a record eighth straight year, tornadoes and other severe thunderstorms likely caused at least $10 billion in property damage in the United States”
Public Power Challenges – Extreme Weather

Cimarron Electric Cooperative

Destroyed Poles: 1,059

Peak Outages: 11,168

Damage Estimate: $5.2 million

Longest Residential Outages: 12 days
Public Power Challenges – Extreme Weather

Western Farmers Electric Co-op
1.75” average ice

Sustained Winds:
Avg. 40.46 mph

Peak Wind Gusts:
Avg. 57.47 mph

55 Substations Offline @ 1 Time

Structures Destroyed:
467+ (99% E – W)

Damage Estimate:
$9.03 Million

Longest Residential Outages due to WFEC Substations and High Voltage Transmission Lines being out of service:

Caddo Electric Co-op: 13 days
Cimarron Electric Co-op: 12 days
Southwest Rural Electric: 14 days
Public Power Challenges

Changing Workforce – “The Silver Tsunami”

“Approximately 50 percent of the engineering workforce eligible for retirement in 2015”

Figure 2: Retirement rates

![Bar chart showing retirement rates for employees and executives from 2010 to 2012.](image)

Source: PwC's Power and Utilities Changing Workforce.
Public Power Challenges

“Electrical utilities are losing not only “explicit knowledge” from retiring workers — knowledge from books and manuals, but also “tacit knowledge” — tricks of the trade (experience).

Fig. 4. Age Demographics at TVA (Source: TVA).
Overcoming Challenges
– A Collaborative Approach?

- **Ensure Reliability**
  - Avoid outages caused by out of stock or hard to replace equipment
  - Find replacements to obsolete items that are no longer manufactured

- **Mitigate Risk**
  - Locate spares by identifying multiple potential sources for swift fulfillment of requirements

- **Control Capital Expenditures**
  - Reduce inventory levels and carrying costs
  - Liquidate surplus with maximum returns
Defining Collaboration

“Two or more people working together towards shared goals”

This simple definition includes three parts:
1. Two or more people (team)
2. Working together (processes)
3. Towards shared goals (purpose)

Cooperation is usually much more lightweight than collaboration and often has less focused goals.
Collaborative Initiatives

MMEA Mutual Aid Workgroup
TVPPA Emergency Response Group
IMEA Mutual Aid Working Group
CHEC Mutual Assistance Committee
MECA Emergency Response Group
APPA National Mutual Aid Working Group
Canadian Electricity Association Mutual Assistance Committee
Quad States Instructors
FMEA Hurricane Preparedness
North Atlantic Mutual Assistance Group
Collaboration

Collaboration most likely to be effective during “moments of high intent”

Most common examples of these moments;

- **Storm Response**
  - Requesting/Providing Assistance

- **Equipment Failure**
  - No suitable replacement on hand

- **Mutual Aid**

- **Critical Spares Management**
Mutual Aid

“Mutual aid is a term used to signify a voluntary reciprocal exchange of resources and services for mutual benefit”

Long history of “neighbor helping neighbor”

August 2015
Western Oregon and Washington were lashed by the strongest summer windstorm on record

With a stunning 7 million acres burned, the U.S. wildfire situation is looking dire

November 2015
Four Dead, 1 Million Lose Power in Destructive Northwest Windstorm
Call to “Strengthen the Network”

From the Nation’s Capital

- Buzz word in DC: Resiliency
- Be at the table, instead of on the table
  - Department of Energy is developing a command structure; APPA and the MAWG can help shape that structure
- FEMA Funding
- Investor-owned utilities have Regional Mutual Aid Groups (R-MAGS)
- Educate Federal Government
Mutual Aid

Wide array of Mutual Aid Agreements among various jurisdictions
- NWPPA Members are also members of
  - APPA
  - NRECA
  - Western Energy Institute
  - WPUDA
  - ORECA
  - CEA
Mutual Aid

Definition
“Mutual aid is a term used to signify a voluntary reciprocal exchange of **resources** and **services** for mutual benefit”

Traditional Mutual Aid
- Information Sharing
  - Paper Based - “Binder” of Information
  - Challenge to Maintain Current Information
  - Sporadic Updates

- Communication
  - Phone
  - Email Distribution List
Technology Enablers
Collaboration and Mutual Aid can be enhanced through an effective use of available technologies

- Cloud Based Access to Information (IoT)
- Mobile Capability – now a necessary requirement
- Automated Alerts & Notifications
  - Email and Text Notifications
    - Weather Alerts
  - Outage Management Systems
  - Mutual Aid Requests
- Reporting
  FEMA
  Mutual Aid Reimbursement
Mutual Aid in Action - 2010 Russian Wildfires

July – September 2010

7,000 Fires - 500,000 Hectares

State of Emergency in 7 Regions

$15 Billion in Damages

56,000 Deaths Attributed
Mutual Aid in Action - 2010 Russian Wildfires

- Lack of government information
- Individual bloggers “crowdsourced” information on fires
- Led ad-hoc emergency response
- Overwhelmed with offers to help – Information Overload

- Help Map was developed to optimize resources – “Virtual Rynda”

- Rynda – “Russian word for a “village bell” which was used by local communities to self-organize during emergencies”
Mutual Aid in Action - 2010 Russian Wildfires

Virtual Rynda Help Map
- Mapped location of fires
- Tracked Help Requests & Help Offers
- Aggregated by region
- Optimized resources
- Mobile Enabled
- Shared with emergency agencies and public

- Rynda.org – Collaborative Platform for Crowdsourcing Mutual Aid
Mutual Aid – Collaborative Approach

- Expand the Definition of Mutual Aid – Beyond Neighbor Helping Neighbor

- Think Beyond Storm Response
  - Transformation from ad-hoc reactionary Mutual Aid to a full time network of collaboration
  - Outside Jurisdictional Boundaries
  - Collaboration between Utility Types
  - Collaboration with Third Party Resource Providers
    - Lodging
    - Meals
    - Damage Assessment
    - Clean Up
Collaboration in Action
- Mutual Aid in Michigan

Shared Coordination of Mutual Aid Response between Municipal and Cooperative Utilities
- Mutual Aid Agreement Signed
- Mutual Aid Working Group Formed
- Statewide Coordinators Identified
- Utility Information Shared
- Communication With Neighboring States
Collaboration in Action
- Mutual Aid in Michigan

Shared Coordination of Mutual Aid Response between Municipal and Cooperative Utilities
- Overarching goal
  - *Optimize assignment of resources*
A Collaboration Analogy – Critical Spares

Imagine that your phone battery is dying while you are sitting in the airport, in a café, etc, but you have no charger with you.

1. The owner of the charger does not know that you need it, and you do not know that someone has the right charger.

2. The owner of the charger might not trust that once you have the charger you will give it back. He does not know you, or whether you have any friends in common.

3. The owner of the charger might not be sufficiently motivated.
Critical Spares Management

- One of the key elements in ensuring networking reliability is access to critical spare equipment.

- An effective spares optimization strategy requires a number of elements, including

1. Developing a definition of “critical”
2. Identifying critical assets, inventory and equipment components
3. Evaluating spares management risk exposure
Critical Spares Management

Developing a definition of “Critical” Spares

- Support the utilities contingency plans to ensure continuity of service
- Critical to the ongoing operation of the asset they support
- Generally equipment components or systems
- Long lead times
- High-dollar items
- Seldom replaced and have low frequency of failure
- Failure often results in significant disruption
Critical Spares Management

- The value of a spare often depends on where it is sited in the system.

- The marginal value of additional spares decreases, relatively few spares are required to achieve maximum risk reduction.

- A single spare can back up several different primary operating units.

- The value of a spare increases with the number of units it can cover.

- The value of a spare increases as budgets decrease.

- The value of a spare increases as replacement lead time increases.
Collaborative Spares Management Programs

- Existing Programs in Place
  - Edison Electric STEP
  - NERC Spare Equipment Database Programs

- These are intended for very large power transformers
- Typically >100 MVA Transmission Units
- Complicated Double Blind Agreements
- Not suited for most Municipals or Cooperatives
Collaborative Spares Platform

1. Generation Owners
2. Transmission Owners
3. Distribution Owners
4. OEM’s
5. Equipment Brokers

Critical Spares Network
1. Real-time awareness of a need – “Someone needs help”
2. Relevance/personalization of help – “I have resources”
3. Optimization of resource mobilization – “Going to the right place”
5. Reputation management – “Will I get help back”

The matching of needs and resources is becoming an increasingly dominant field.

More and more tools are being focused on the facilitation of peer-to-peer communication in order to allow the efficient allocation of resources.
Collaborative Platform

In order for a platform to be effective;

- Identified Need – “Burning Platform” – Mutual Aid & Critical Spares
- Willingness to Participate - “If you build it, will they come?”
- Agreement on Information Sharing
- Trust – Security & Privacy
- Reciprocity
Collaboration can be expanded to include many aspects

- Mutual Aid for Storm Response
- Spare Pooling
  - Sharing of Critical Equipment based on Voltage/Region
- Emergency Sourcing
- Managed Inventories
- Surplus Management
  - “One man’s junk….,”
Thank You!

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Rob Krysa
rkrysa@veracityamg.com

www.veracityamg.com
Thank You!

https://youtu.be/PQxEDredf0E

www.veracityamg.com
Veracity Connect Homepage
Mutual Aid Information Sharing

Mutual Aid Details:
- Emergency Contacts
- Vehicle Availability
- Crew Availability
- Electric System Overview
### Spare Equipment Sharing and Search

- **Transformers**
- **Generators**
- **Component Parts**

<table>
<thead>
<tr>
<th>Action</th>
<th>Spare ID</th>
<th>Power Rating Description</th>
<th>Primary Voltage Desc...</th>
<th>Secondary Voltage Desc...</th>
<th>Location</th>
<th>Status</th>
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<tbody>
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#### Spare Detail

- **Spare ID**: 1001
- **Account**: Veracity Asset Management Group
- **Description**: HK Porter 120000/185000/200000 MVA HV: 67000 LV: 13090Y/7560 LTC: Yes Class: OAFAFA Impedance: 9.5% @ 12 MVA HV Bushing Location: Top LV Bushing Location: Top

- **Power**
  - Power Rating: 12,000 MVA
  - Secondary Voltage: 13,090

- **Price**
  - Total Price: $12,000

**Full Details of Available Units**
- **Pictures**
- **PCB Reports**
- **Maintenance Records**
Surplus Marketplace

List & Find Available Surplus Items

- Utilities, Brokers and OEM’s from Across North America
# Service Providers & Third Party Contractors

## Instant Access To:

- Pole Line Contractors
- Tree Trimming Crews
- Emergency Response Providers
- Backup Power Providers

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<th>Service Name</th>
<th>Category</th>
<th>Primary Contact Name</th>
<th>Primary Contact Email</th>
<th>Operation Area(s)</th>
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<td>Tree Trimming / Vegetation Mgmt.</td>
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<td><a href="mailto:corp.comms@applundh.com">corp.comms@applundh.com</a></td>
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<td>Asplundh Tree Expert</td>
<td>Tree Trimming / Vegetation Mgmt.</td>
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<td>Callender Tree Service</td>
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<td>Dan Callender</td>
<td><a href="mailto:mcall0041@att.net">mcall0041@att.net</a></td>
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<td><a href="mailto:info@davem.com">info@davem.com</a></td>
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*Image and table from Service Providers & Third Party Contractors page.*
Collaboration

Recently Viewed Groups

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<th>Group</th>
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<th>Membership</th>
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<td>Owner</td>
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<td>IMEA Mutual Aid (Private)</td>
<td>Nov 5</td>
<td>Owner</td>
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<td>IAMU Mutual Aid</td>
<td>Nov 5</td>
<td>Owner</td>
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<tr>
<td>MMEA Mutual Aid</td>
<td>Oct 16</td>
<td>Owner</td>
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Public & Private Groups

- Communicate Instantly with State, Regional or Nationwide Groups
- Share Knowledge
- Find Critical Equipment

Recommendations

- IAMU Apprenticeship Committee
  - Popular group: 2 members
  - Join
Map View Search Capabilities

Configurable Search Results
Map View Search Capabilities

Search for Like Voltages Across Regions
Agenda

- A Definition of Collaboration
- Mutual Aid in Public Power
- Mutual Aid in Michigan – MMEA/MECA Collaboration
- Mutual Aid Technology Enablers
- Match.com for Disaster Response