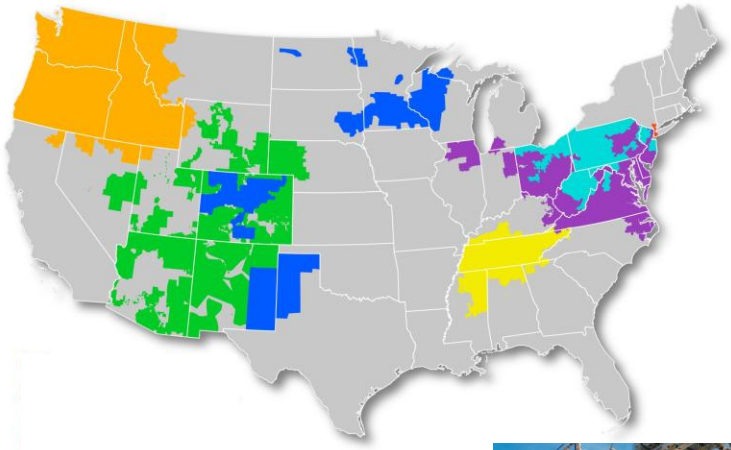
# Collaborative Transmission Technology Roadmap

## Rollout Webinar

**Feb. 4, 2014**

*Version Feb. 4, 2014*



Bonneville Power Administration ▪ Consolidated Edison ▪ Electric Power Research Institute ▪ FirstEnergy ▪ PJM Interconnection ▪ Tennessee Valley authority ▪ Western Area Power Administration ▪ Xcel Energy

# Thank you for coming!

# Logistics

To minimize distractions,

**please mute your phone**

when you are not speaking:

*** 6** to **MUTE**

**# 6** to **UN-MUTE**


This call is being **RECORDED** so that we may have capture key outcomes.

# Objectives

1. Introduce the *Collaborative Transmission Technology Roadmap*.
2. Discuss the strengths, weaknesses, opportunities, and threats associated with this pilot project and the Roadmap deliverable.
3. Determine next steps

# Agenda

| | | |
|---|---|---|
| **2:00 p.m.** | Welcome & Introductions | Larry Bekkedahl, BPA<br>Mark McGranaghan, EPRI<br>Jeff Hildreth, BPA |
| **2:05 p.m.** | Project Overview | James Hillegas-Elting, BPA |
| **2:10 p.m.** | Content Overview | Jeff Hildreth, BPA |
| **2:15 p.m.** | Application at BPA | |
| **2:20 p.m.** | Prioritization Method—Example | Tugrul Daim, PSU |
| **2:30 p.m.** | Facilitated Discussion Based on S.W.O.T. Questions:<br>▪ (Strengths) What are the most useful aspects of the document?<br>▪ (Weaknesses) Where is the roadmap unclear, confusing, or inaccurate?<br>▪ (Opportunities) How might this document be used within your organization?<br>▪ (Threats) What barriers might exist in using this document within your organization? | Jeff Hildreth, BPA<br><br>Workshop Participants |
| **3:20 p.m.** | Summary and Next Steps | Jeff Hildreth, BPA |

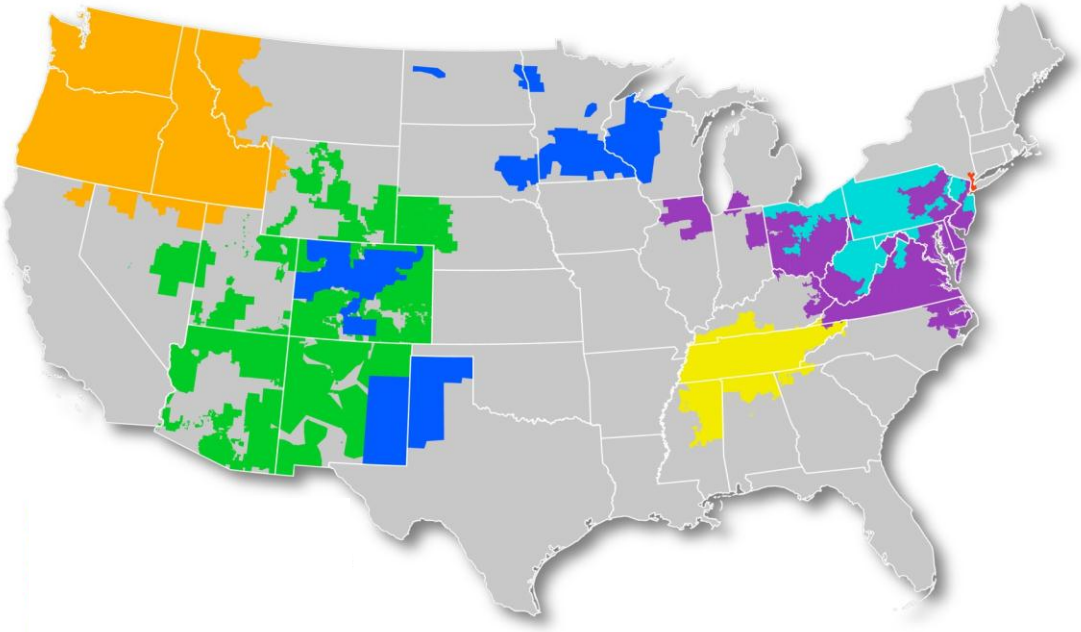
# Mark McGranaghan – EPRI

## Vice President of Power Delivery and Utilization

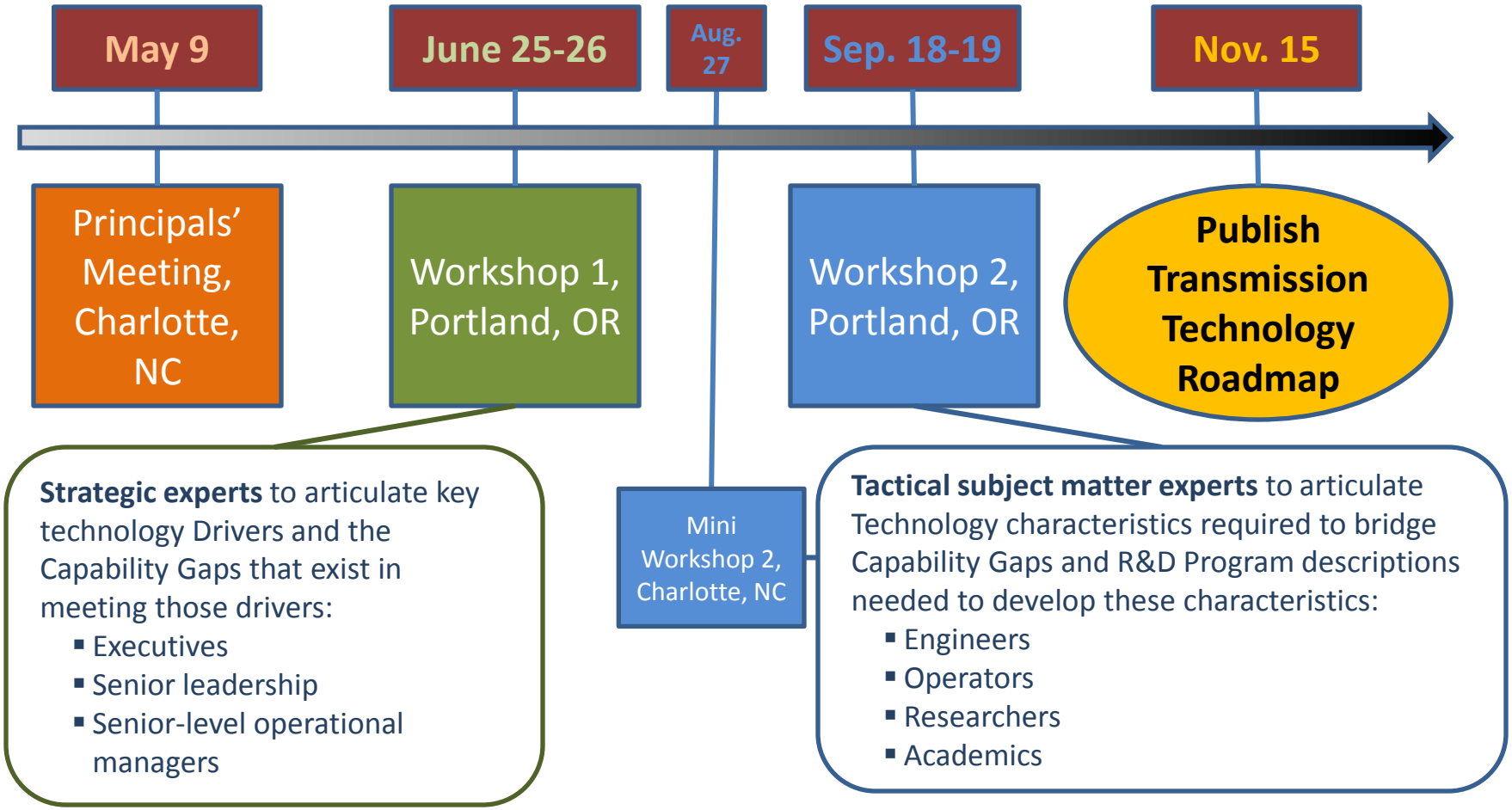
# Larry Bekkedahl – BPA

## Sr. Vice President of Transmission

# INTRODUCTIONS



# Project Tasks, Schedule, & Deliverables



# Content Overview

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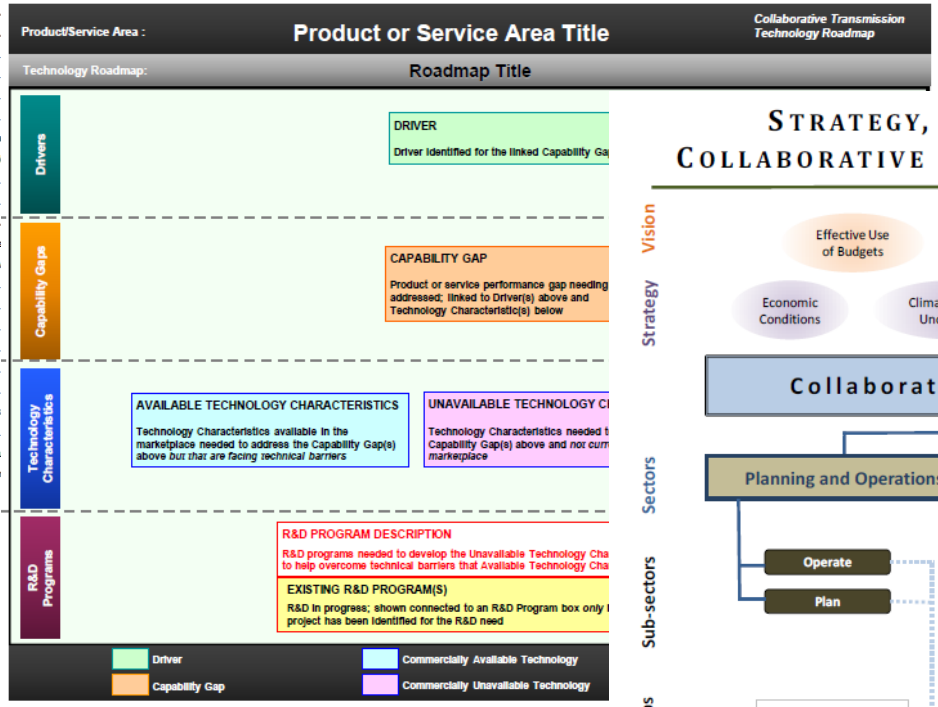


## Contributors

### Workshop Participants

Principals' Meeting, May 9, 2013

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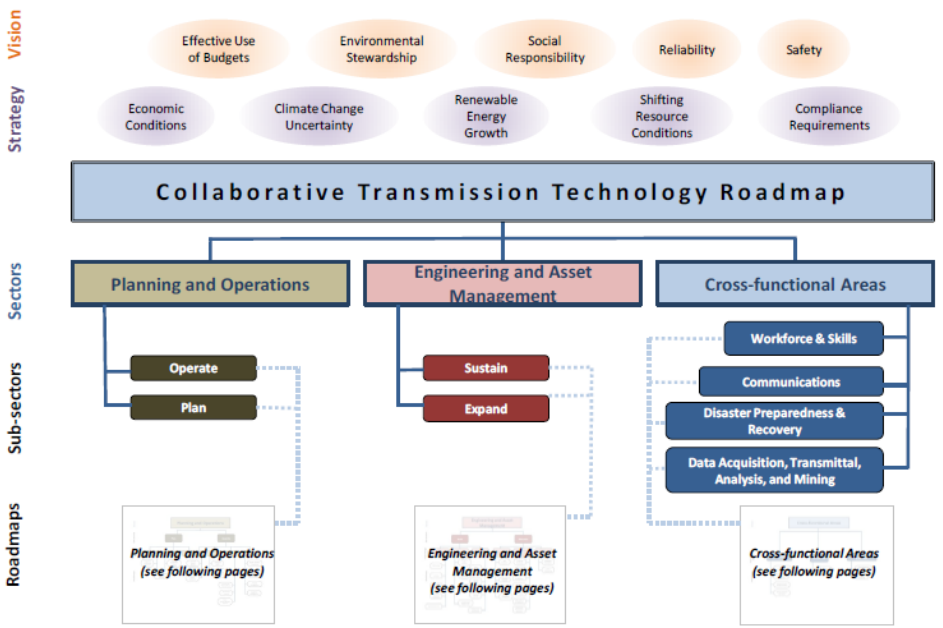
rgy Services, Inc.
ices, Inc.
Valley Authority

7. DeJim Lowe, Tennessee Valley Authority
8. Sarada Madugula, Tennessee Valley Authority
9. Terry Oliver, Bonneville Power Administration
10. Mahendra Patel, PJM Interconnection

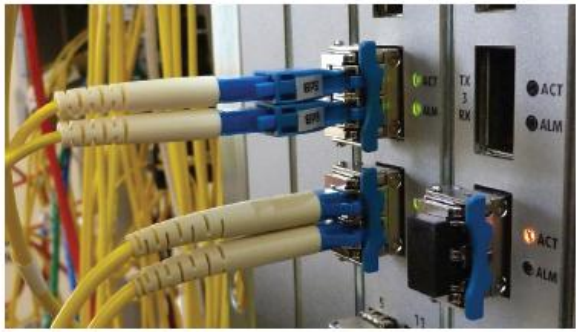
### Strategy, Vision, and Structure of the Collaborative Transmission Technology Roadmap



# Application at BPA

## Operational Multi-Gigabyte Ethernet Transport

BPA is upgrading its telecommunications network to support increasing demands for both information and more sophisticated applications. BPA's new Operational Multi-Gigabyte Ethernet Transport system enhances reliability and efficiency of system operations and allows integration of essential applications and systems, including synchrophasor and intermittent generation data and demand response programs. OMET provides a three orders-of-magnitude increase in available bandwidth (a thousand fold increase) and slows capacity depletion of BPA's existing Synchronous Optical Networking system, avoiding a $15 million upgrade. BPA expects to fully deploy the OMET system by the end of 2017.




*On BPA's legacy SONET system it takes about six hours to transfer 4.5 gigabytes of data. Whereas OMET can move the same amount of data in just over three seconds, at 10 gigabits per second.*

## Synchrophasor success lands BPA its first Platts Award

**December 17, 2013**




Larry Bekkedahl, senior vice president of Transmission Services, accepted the Grid Optimization award on behalf of BPA's entire synchrophasor team at the Dec. 12 ceremony in New York. (Photo courtesy of Platts Global Energy Awards)

# Steps

- Quantify importance of Capability Gaps (CGs)
  - Importance = Impact X Urgency
    - Measure impact (1=low, 3= medium, 5=high)
    - Measure urgency (short=5, medium=3, long=1)
- Define relationships between R&D Programs (RDPs) and CGs
- Calculate importance of RDPs
  - Importance for a given RDP = Sum importance of all related CGs (neglects importance of contribution)

# Case Analysis

- **Product and Service Area:** Data Acquisition, Transmittal, Analysis and Mining
- **Roadmap:** Data Management for Non-Real Time

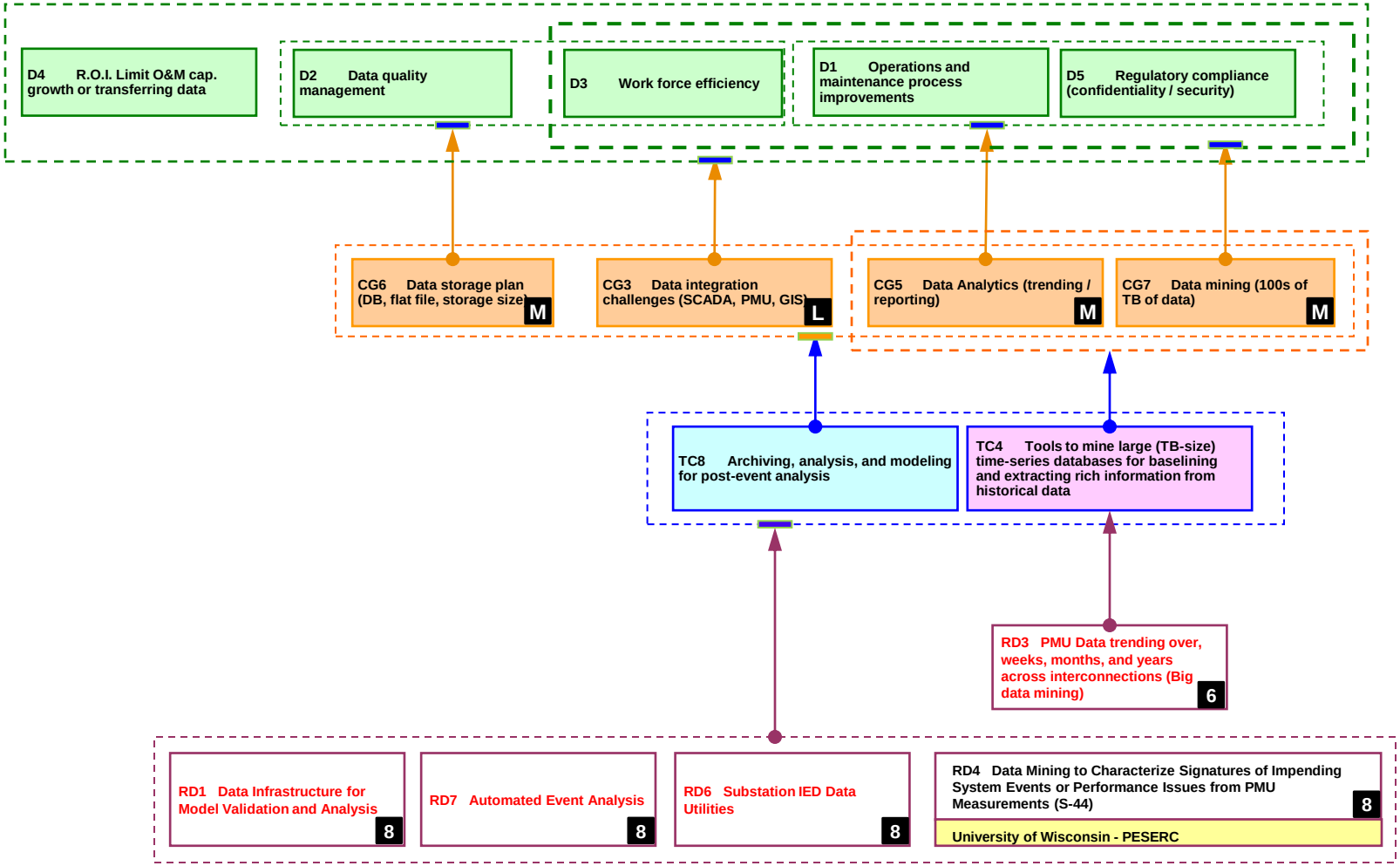
# Prioritization Method

| Capability Gaps | Impact | Urgency | Total |
|---|---|---|---|
| | Impact (1=Low, 3=Medium, 5=High) | Urgency (5=Short, 3=Medium, 1=Long) | |
| CG1 Data quality metrics | 5 | 5 | 25 |
| CG2 CIM (Common Information Model | 5 | 1 | 5 |
| CG3 Data integration challenges (SCADA, PMU, GIS) | 3 | 1 | 3 |
| CG5 Data Analytics (trending / reporting) | 3 | 3 | 9 |
| CG6 Data storage plan (DB, flat file, storage size) | 1 | 3 | 3 |
| CG7 Data mining (100s of TB of data) | 5 | 3 | 15 |
| CG8 QA/QC to reduce erroneous data | 5 | 5 | 25 |
| CG9 Real/non-real time driven maintenance related to data | 3 | 5 | 15 |

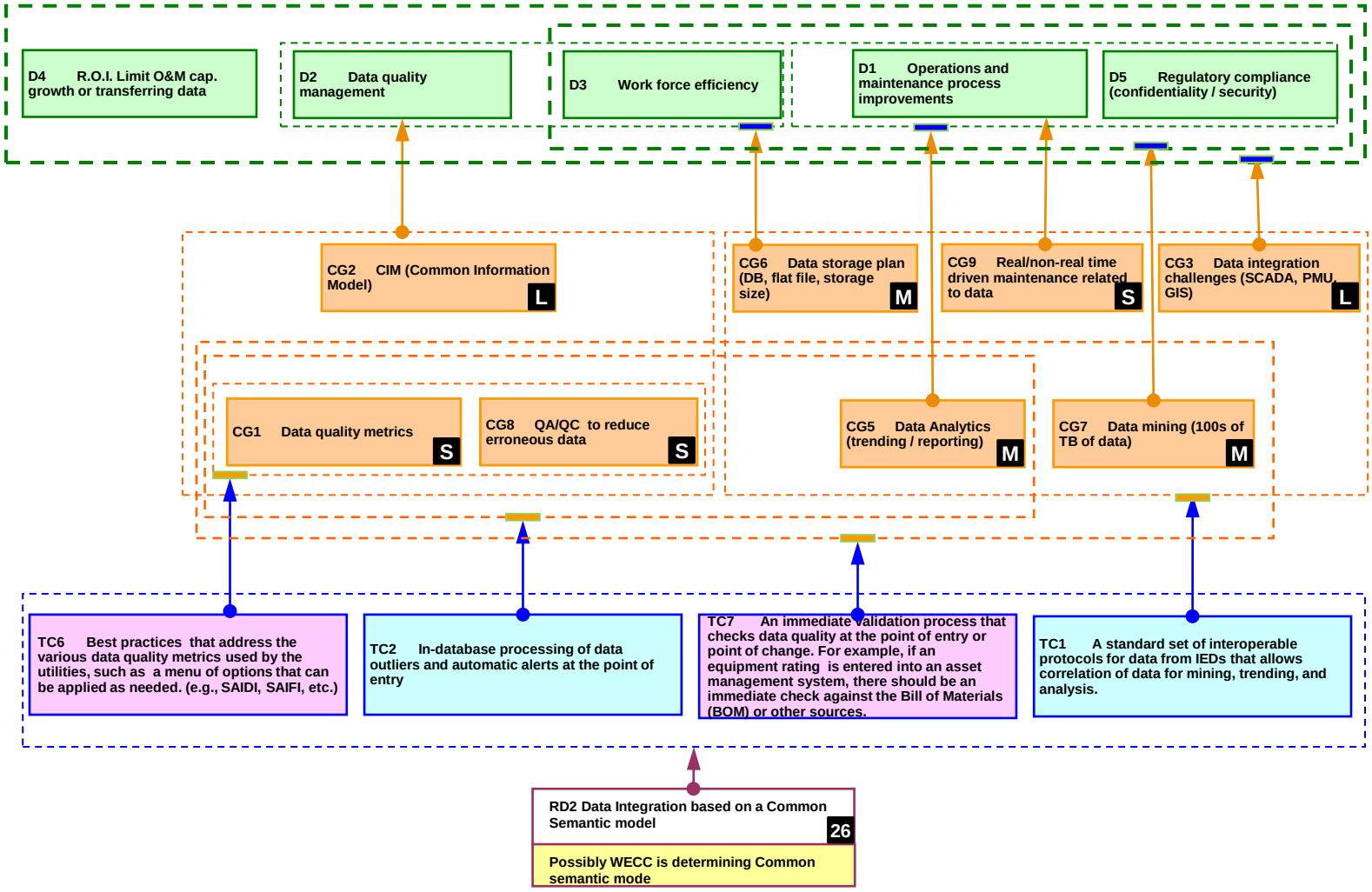
| RD Programs | CGs linked | Score | **Relative** |
|---|---|---|---|
| RD1 Data Infrastructure for Model Validation and Analysis | 3, 5, 6, 7 | 30 | **8%** |
| RD7 Automated Event Analysis Utilities | 3, 5, 6, 7 | 30 | **8%** |
| RD4 Data Mining to Characterize Signatures of Impending System Events or Performance Issues from PMU Measurements (S-44) | 3, 5, 6, 7 | 30 | **8%** |
| RD2 Data Integration based on a Common Semantic model | 1, 2, 3, 5, 6, 7, 8, 9 | 100 | **26%** |
| RD5 Systematic Integration of Large Data Sets for Improved Decision-Making (T-51) | 1, 2, 3, 5, 6, 7, 8, 9 | 100 | **26%** |
| RD8 EPRI Program 161 : Smart Grid Standards and Communications Technology Tracking and Analysis | 3, 5, 6, 7, 9 | 45 | **12%** |
| RD3 PMU Data trending over, weeks, months, and years across interconnections (Big data mining) | 5,7 | 24 | **6%** |
| RD6 Substation IED Data | 3, 5, 6, 7 | 30 | **8%** |

# PRIORITIZATION METHOD

## *Roadmap: Data Management for Non-Real Time (1/3)*

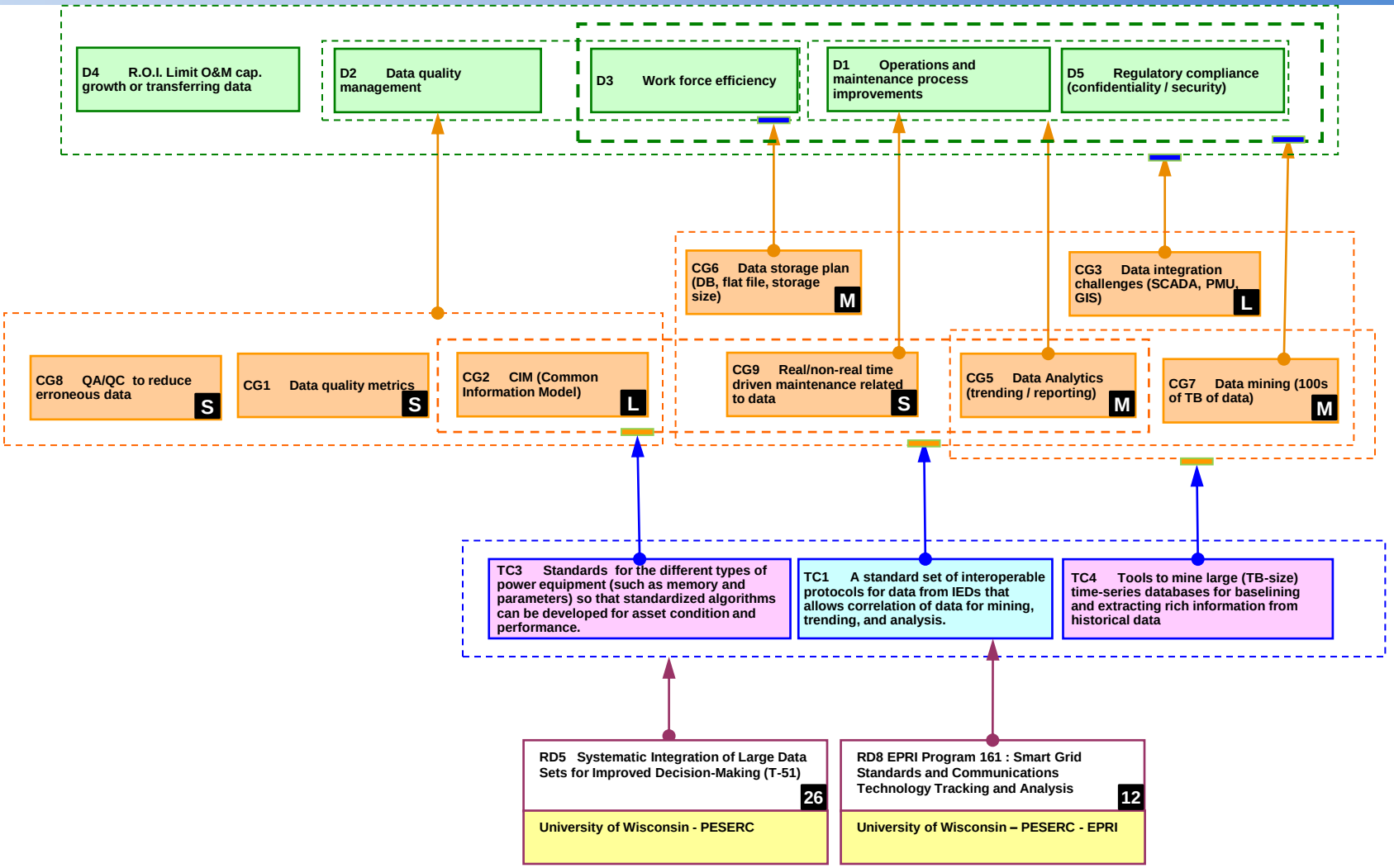


## *Roadmap: Data Management for Non-Real Time (2/3)*



# PRIORITIZATION METHOD

## *Roadmap: Data Management for Non-Real Time (3/3)*



# Strengths

What are the most useful aspects of the document?

# Weaknesses

Where is the roadmap;
unclear,
confusing,
inaccurate?

# Opportunities

How might the document be used within your organization?

# Threats

What barriers might exist in using this document within your organization?

# Summary and Next Steps

- Plans to respond to the BPA Technology Innovation solicitation March 2014
- Opportunities for Outreach / Announcements
- EPRI PDU Advisory Council mtg., Feb. 2014
- Check-in meeting in about six months

# Closing

## Thank you for participating!

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