A Zero-depth Entry to Using the TSP:
How TSP was used to turn around the SGMM project that was drowning in details

November 4, 2014
SGMM Smart Grid Maturity Model. A Zero-depth Entry to Using the TSP: How TSP was used to turn around the SGMM project that was drowning in details

Approved for public release; distribution unlimited

Security classification of: unclassified

Limitation of abstract: Same as Report (SAR)

Number of pages: 36

Name of responsible person: unclassified
The Smart Grid Maturity Model is

*A management tool* that provides a

*common language and framework* for defining key elements of

*smart grid transformation* and helping utilities develop a

*programmatic approach* and track their progress

Developed by Utilities for Utilities

<table>
<thead>
<tr>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Intelligent Utility Network Coalition (GIUNC) develops SGMM</td>
<td>Utilities use SGMM v1.0</td>
<td>v1.1</td>
<td>v1.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SEI, supported by Department of Energy, is model steward

- V1.1 Improved model released
- Licensing & certification program released
- SGMM v1.2 product suite released
<table>
<thead>
<tr>
<th>Model</th>
<th>Fully described in the Model Definition document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compass Survey</td>
<td>Questionnaire-based assessment yields maturity ratings and comparisons</td>
</tr>
<tr>
<td>Navigation Process</td>
<td>Expert-led workshops to complete Compass and use results to develop consensus aspirations</td>
</tr>
<tr>
<td>Training</td>
<td>Overview Seminar and SGMM Navigator Course</td>
</tr>
<tr>
<td>Partner Program</td>
<td>License organizations and certify individuals to deliver Navigation process</td>
</tr>
</tbody>
</table>

www.sei.cmu.edu/smartgrid
The Problem…

$$$ Spent

Nothing Produced

Team not organized

Dragging each other down!
A Solution…

Photo: tripadvisor.com
TSP is not just for software

Initially we used TSP as a project management framework.

Later we used TSP to develop/evolve

- core product (model and survey)
- navigation and support processes
- training

Stayed true to the TSP principles.

- team building
- planning and post mortems
- design
- Implementation and testing
- support processes (CM, Inspections, etc.)
**Team building**

Team attributes:

- geographically distributed
- part-time on several projects
- specific skill sets
- never worked together
- a lot of personnel changes – consistent core team

Launches and post-mortems were the primary team building activities.

Feedback from the launches

+ great team, energizing, missed old team members, great to have new team members, good meeting, great food
- ran out of time, doing math was BAD

<table>
<thead>
<tr>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project manager</td>
</tr>
<tr>
<td>Model owner and architect</td>
</tr>
<tr>
<td>Course owner</td>
</tr>
<tr>
<td>Process owner</td>
</tr>
<tr>
<td>Program development and transition, DOE relationship manager</td>
</tr>
<tr>
<td>Licensing POC</td>
</tr>
<tr>
<td>Certification POC</td>
</tr>
<tr>
<td>Technical writer</td>
</tr>
<tr>
<td>Marketing and communications</td>
</tr>
<tr>
<td>Navigator</td>
</tr>
<tr>
<td>Instructor</td>
</tr>
</tbody>
</table>
Team launches

Launches were conducted following a standard launch agenda.

Our first agenda item for each launch was a review of project status (post mortem.)

Major differences the launch process were

- team roles were functional
- used MS Project for planning and tracking tasks and costs
- used several cost planning tools
- quality planning improved as the product suite advanced

Note: Cost data was handled like defect data. Only aggregate cost data was shown at a team level.
Launch artifacts

Meeting 9 Presentation

WBS with cost data

Funding Plan
Load balancing

For each team member, we calculated hours per month and compared that to percentage allocation.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mullaney</td>
<td>33%</td>
</tr>
<tr>
<td>White</td>
<td>25%</td>
</tr>
<tr>
<td>Montgomery</td>
<td>7%</td>
</tr>
<tr>
<td>Tyson</td>
<td>20%</td>
</tr>
<tr>
<td>Jones</td>
<td>30%</td>
</tr>
<tr>
<td>Ruggiero</td>
<td>15%</td>
</tr>
<tr>
<td>McGraw</td>
<td>0%</td>
</tr>
<tr>
<td>Zaccardi</td>
<td>10%</td>
</tr>
<tr>
<td>Gress</td>
<td>5%</td>
</tr>
<tr>
<td>Fowler</td>
<td>5%</td>
</tr>
</tbody>
</table>
Budget analysis

We analyzed data from three different approached to finalize the plan.

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Duration</th>
<th>% Complete</th>
<th>Start</th>
<th>Finish</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGMM FY12 All</td>
<td>285 days</td>
<td>89%</td>
<td>Mon 10/3/11</td>
<td>Mon 11/5/12</td>
<td>$320,565.28</td>
</tr>
<tr>
<td>DOE 5-461B SGMM Stewardship</td>
<td>285 days</td>
<td>90%</td>
<td>Mon 10/3/11</td>
<td>Mon 11/5/12</td>
<td>$264,488.40</td>
</tr>
<tr>
<td>Project Management (from workplan)</td>
<td>221 days</td>
<td>89%</td>
<td>Wed 12/7/11</td>
<td>Wed 10/12/11</td>
<td>$72,123.94</td>
</tr>
<tr>
<td>Quarterly Planning Meetings</td>
<td>186.5 days</td>
<td>99%</td>
<td>Wed 12/7/11</td>
<td>Thu 8/23/12</td>
<td>$34,432.36</td>
</tr>
<tr>
<td>FY12 Planning</td>
<td>0 days</td>
<td>0%</td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
<tr>
<td>Q1 Planning</td>
<td>2 days</td>
<td>100%</td>
<td>Wed 12/7/11</td>
<td>Thu 12/8/11</td>
<td>$0.00</td>
</tr>
<tr>
<td>Q2 Planning</td>
<td>1 day</td>
<td>100%</td>
<td>Thu 1/12/12</td>
<td>Thu 1/12/12</td>
<td>$8,171.72</td>
</tr>
<tr>
<td>Q3 Planning</td>
<td>0.5 days</td>
<td>100%</td>
<td>Wed 4/25/12</td>
<td>Wed 4/25/12</td>
<td>$4,085.86</td>
</tr>
<tr>
<td>Q4 Planning</td>
<td>2.5 days</td>
<td>100%</td>
<td>Thu 8/23/12</td>
<td>Thu 8/23/12</td>
<td>$22,174.78</td>
</tr>
<tr>
<td>Weekly Team Meetings</td>
<td>194 days</td>
<td>93%</td>
<td>Tue 1/3/12</td>
<td>Fri 9/28/12</td>
<td>$19,568.08</td>
</tr>
<tr>
<td>Monthly Finance Meetings (incl invoices)</td>
<td>194 days</td>
<td>88%</td>
<td>Tue 1/3/12</td>
<td>Fri 9/28/12</td>
<td>$12,818.43</td>
</tr>
<tr>
<td>Quarterly Reporting to DOE</td>
<td>220 days</td>
<td>75%</td>
<td>Thu 12/8/11</td>
<td>Wed 10/10/12</td>
<td>$0.00</td>
</tr>
<tr>
<td>Q1 DOE Report</td>
<td>1 day</td>
<td>100%</td>
<td>Thu 12/8/11</td>
<td>Thu 12/8/11</td>
<td>$0.00</td>
</tr>
<tr>
<td>Q2 DOE Report</td>
<td>1 day</td>
<td>100%</td>
<td>Thu 3/8/12</td>
<td>Thu 3/8/12</td>
<td>$0.00</td>
</tr>
<tr>
<td>Q3 DOE Report</td>
<td>1 day</td>
<td>100%</td>
<td>Tue 7/10/12</td>
<td>Tue 7/10/12</td>
<td>$0.00</td>
</tr>
<tr>
<td>Q4 DOE Report</td>
<td>1 day</td>
<td>0%</td>
<td>Wed 10/10/12</td>
<td>Wed 10/10/12</td>
<td>$0.00</td>
</tr>
</tbody>
</table>
Launch – lessons learned

- Planning made project AND project team successful
- Team members were overcommitted, but SGMM work got done on time
- Insight into cost “elevated” everyone to a senior management role with ability to make more informed decisions
- Reconciliation of finances was monthly, but the team meetings enable course corrections weekly
Design – lessons learned

We developed designs for all SGMM artifacts including

• Navigation process
• Training
• Presentations
• Workshops and meetings
• Documents

We developed products plans for each product that defined product objectives, intended audience, and intended usage.

The following are examples of our design documents for various products.
**Process design**

**Phase 2: Survey Workshop Workshop**
In this step, the organization completes the SGMM assessment survey under the direction of the SGMM Navigator. This step is composed of five steps.

- Kickoff
- SGMM Overview Seminar
- Guidelines for Completing the Survey
- Survey Completion
- Closing

The sponsor kicks off the workshop and motivates the participants by explaining why this effort is important and describes the business objectives of the organization's grid modernization effort. The SGMM Navigator then provides an SGMM overview seminar to establish a common understanding and vocabulary of SGMM. The guidelines for completing the survey are discussed next and the survey is completed. The workshop ends with the SGMM Navigator thanking everyone for their efforts and describing the next steps.

**Process Elements Needed**
- assessment workshop script
- assessment workshop agenda template
- assessment presentation template
- assessment survey support tool

**Process Element** | **Purpose** | **Type** | **Format** | **Size**
--- | --- | --- | --- | ---
Overall script | To guide the Navigator through the overall process | script | Word | 1-2 pgs
Schedule template | Provides the timing of the major steps of the navigation process | template | Word | 1 pg
Process Improvement Proposal form | Provide SEI with suggestion for improving the SGMM product suite | form | Word | 1 pg
FAQs for Navigators and Users | To provide answers to common questions that navigators as well as users and potential user may have | FAQ | Word | 1-2 pgs each
Role and responsibility Specification | To identify the key roles in the SGMM Navigation Process and detail their responsibilities | specification | Word | 1-2 pgs
Sponsor kickoff meeting guidelines | To prepare the sponsor to kickoff the overall effort at the facilitated assessment workshop | guideline | Word | 1 pg
# Training/Workshops HLD

## Day 1

### Course Overview (Barbara)
- Get acquainted with the class
- Students understand the course focus and why it is important to them.
- Students know what to expect from the course and what is not covered.

<table>
<thead>
<tr>
<th>Component</th>
<th>Educational Objectives</th>
<th>SGMM Reference</th>
<th>Detail</th>
<th>Time Estimate (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Introductions</td>
<td>45</td>
<td>After the standard introduction and logistics, discuss challenges in working with electric utilities that are implementing smart grid. Introductions include background, experience with electric utilities and consulting with the utilities. The lecture ends with an overview of the class including the agenda. NOTE: need to save challenges so we can incorporate them into the course.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Expectations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Course overview (schedule and agenda)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Review of the SGMM (Julia)
- The students can describe:
  - how the SGMM can support an electric utility.
  - how each of the components of the product suite is related to each other.
  - the 6 levels of the SGMM.

<table>
<thead>
<tr>
<th>Component</th>
<th>Educational Objectives</th>
<th>SGMM Reference</th>
<th>Detail</th>
<th>Time Estimate (min)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SGMM MDD</td>
<td>How the SGMM helps utilities implement smart grid?</td>
<td>45</td>
<td>Discuss with the class what the challenges are for utilities that are participating in modernizing the grid. The outcome of the discussion is common ground on what the smart grid is. The instructor presents how the SGMM supports modernizing the grid. The next topic is on the SGMM product suite (how they fit together) and the SGMM architecture. This leads to a discussion about what the levels are (note: have small group discussions before class discussion). Ask if there are any questions about the pre-test. NOTE: create 5 questions for certification exam.</td>
</tr>
</tbody>
</table>
Training Module/ Presentation DLD

### Lecture or Module: Module 7: Findings and Aspirations Workshop

**Course:** SGMM Navigator Training  
**Developer:** Barbara Tyson

<table>
<thead>
<tr>
<th>Delivery Choice / Instructional Materials:</th>
<th>Size:</th>
<th>Timing:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture / slides</td>
<td>Number of lecture slides: 17</td>
<td>Lecture: 45 minutes</td>
</tr>
<tr>
<td></td>
<td>Number of workbook pages: ??</td>
<td>Exercises: 90 minutes</td>
</tr>
</tbody>
</table>

### Educational Objectives:
- Students
  - Understand the purpose and outcomes of the Findings and Aspirations workshop
  - Describe the navigator’s role including design, facilitation, and follow-up

### Transitional Flow
The instructor continues to walk the students through the steps of the navigation process. This module covers step 4 of the process, the findings and aspirations workshop. This module includes a lecture that describes the fourth step of the process and a class exercise to give the students practice conducting an aspirations identification session.

### Learning Assessments
Ask the following kinds of questions on the certification exam (15%? questions should come from this section.) Potential questions include:
- TBD later

### Storyboard (or at least a high level description)

**Topics:**
- Findings and Aspirations Workshop Overview
- Presentation of Findings
- Identifying Aspirations
  - Review of Organization’s Objectives
  - Identifying Gaps Between Objectives and Findings
  - Developing Aspirations Statements
- Identifying Next Steps and Workshop Closure
- After the Findings and Aspirations Workshop
- Aspirations Identification Exercise

### Findings and Aspirations Workshop Overview
**Slide 1: Entry Criteria:** The instructor will have the students open their resources notebook to the Findings and Aspirations Workshop tab. The slide will have a flow chart diagram of the five steps of the process. The instructor will provide a very quick overview of the process starting with the entry criteria. The instructor will note that each step will be discussed later in the lecture and that there will be an exercise simulating an identification of aspirations session. The instructor then has the students turn to the script.

**Slide 2. Workshop Kickoff:** The instructor explains the agenda template. The instructor will discuss the overall objectives of the workshop. It is important to discuss both the objectives related to the findings presentation and the identification of aspirations. The instructor leads a discussion on the importance of having the right people at the workshop. This is an opportunity for the sponsor to reinforce commitment to the process and restate the organization’s business objectives.

### Presentation of Findings
**Slide 3. Review of the Findings Presentation Template:** The instructor will quickly review the findings presentation template. The students should be very familiar with the template because they presented their “findings” in the previous exercise. However, if there are any lingering questions, they can be answered here.

**Slide 4. Presentation of Findings:** The instructor will describe how the presentation of the findings will be conducted. The instructor will lead a discussion on possible interactions during the presentation of the findings. For example, there may be questions regarding how a particular finding was developed; or there may be disagreement with some findings.
# SGMM Leadership Workshop Special Report – High-Level Design

<table>
<thead>
<tr>
<th>Component</th>
<th>Objectives</th>
<th>Reference (used by writer)</th>
<th>Detail</th>
<th>Size Est. (pps)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgments</td>
<td>Thank</td>
<td></td>
<td>One paragraph</td>
<td>1</td>
<td>We’ll include TCS as a participant since they sent us input for the workshop.</td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: sponsor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: workshop coordinators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive Summary</td>
<td>Not needed for this report.</td>
<td></td>
<td></td>
<td></td>
<td>The report will be highly organized and easy to navigate so we don’t think we need an executive summary.</td>
</tr>
<tr>
<td>Abstract</td>
<td>Descriptive summary of the report</td>
<td></td>
<td>Not more than 200 words</td>
<td>.5</td>
<td>Abstracts are descriptive or informative. A descriptive abstract just summarizes the structure of report. A descriptive abstract does not draw conclusions or “sum up” the report or go into the content of the report.</td>
</tr>
<tr>
<td>Overview</td>
<td>Document the purpose of the workshop and how it was conducted.</td>
<td>Workshop Objectives: product plan</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: invitations on emails</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: DLs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: overview of slides</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About This SR</td>
<td>Tell the reader</td>
<td></td>
<td></td>
<td>1</td>
<td>Write this section last.</td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: what is in the report (and what isn’t in the report)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Objectives</strong>: report structure (by topic, not agenda)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Implementation

The following slides show the team accomplishments with what we produced.
SGMM at a glance

6 Maturity Levels: Defined sets of characteristics and outcomes

1. The smart grid vision and strategy drive the organization's strategic and operational plans.
2. The organization's strategy is based on a comprehensive analysis of market opportunities and threats.
3. The organization's strategy is based on a comprehensive analysis of market opportunities and threats.
4. The organization's strategy is based on a comprehensive analysis of market opportunities and threats.
5. The organization's strategy is based on a comprehensive analysis of market opportunities and threats.
6. The organization's strategy is based on a comprehensive analysis of market opportunities and threats.

175 Characteristics: Features you would expect to see at each stage of the smart grid journey

8 Domains: Logical groupings of smart grid related characteristics

SMR
Strategy, Management, & Regulatory

OS
Organization, Structure & Processes

GO
Grid Operations

WAM
Work & Asset Management

TECH
Technology

CUST
Customer

VCI
Value Chain Integration

SE
Societal & Environmental

Software Engineering Institute
Carnegie Mellon University
SGMM Compass Survey

Contains

- One question for each expected characteristic in the model and
- Attribute and performance questions

Example questions:

WAM-2.1 An approach to track, inventory, and maintain event histories of assets is in development.

WAM-3.2 Condition-based maintenance programs for key components are in place.
SGMM Navigation: five-phase, expert-led process

1. PREPARATION
   Stakeholders complete SGMM Compass survey
   Discussion and consensus answers lead to internal alignment on current state

2. SURVEY WORKSHOP
   Stakeholders review survey findings & set aspirational profile
   Consensus on aspirational state and identification of motivations, actions, and obstacles to achieve it

3. ANALYSIS

4. ASPIRATIONS WORKSHOP

5. WRAP UP
SGMM Partners

SGMM Partners are licensed by the SEI to provide official SGMM services, which are delivered by SEI-certified SGMM Navigators.

http://partners.clearmodel.com/partners

John F. Ryskowski Consulting
SGMM Navigator population

SGMM Navigator Certification Statistics

- 18 Candidate Navigators *(passed exam)*
- 18 Certified Navigators *(completed all requirements)*
SGMM History – 142 utilities, 29 countries, 157 submissions

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>6</td>
</tr>
<tr>
<td>Belgium</td>
<td>2</td>
</tr>
<tr>
<td>Brazil</td>
<td>4</td>
</tr>
<tr>
<td>Canada</td>
<td>10</td>
</tr>
<tr>
<td>China</td>
<td>3</td>
</tr>
<tr>
<td>Denmark</td>
<td>3</td>
</tr>
<tr>
<td>Ecuador</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>1</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1</td>
</tr>
<tr>
<td>India</td>
<td>13</td>
</tr>
<tr>
<td>Ireland</td>
<td>1</td>
</tr>
<tr>
<td>Israel</td>
<td>1</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1</td>
</tr>
<tr>
<td>Japan</td>
<td>1</td>
</tr>
<tr>
<td>Korea, Republic of</td>
<td>1</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1</td>
</tr>
<tr>
<td>Oman</td>
<td>6</td>
</tr>
<tr>
<td>Philippines</td>
<td>1</td>
</tr>
<tr>
<td>Poland</td>
<td>1</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1</td>
</tr>
<tr>
<td>South Africa</td>
<td>2</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
</tr>
<tr>
<td>Sweden</td>
<td>1</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1</td>
</tr>
<tr>
<td>U.K.</td>
<td>1</td>
</tr>
<tr>
<td>United States</td>
<td>85</td>
</tr>
</tbody>
</table>

United States: 54%
Europe, Middle East, Africa: 15%
Asia Pacific: 17%
Other: 14%
SGMM in the press
SGMM webinars

1:20 - 2:05

Smart Grid Maturity Model: A Vision for the Future of Smart Grid

The smart grid represents a whole new framework for improved management of electricity generation, transmission, and distribution. A reliable, secure energy supply is vital to our economy, our security, and our well being. With the support of the U.S. Department of Energy, the SEI is ...

read the full abstract and meet the presenter+

http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=21502

SGMM
Smart Grid Maturity Model

Empower your Smart Grid Transformation

David White
SGMM Project Manager

10 March 2011

http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=21966

The Smart Grid Maturity Model Around the World

May 15, 2014

http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=22004

Smart Grid Maturity Model Webinar:
Defining the Pathway to the California Smart Grid of 2020, for Publicly Owned Utilities

Steve Rupp, SAIC

March 21, 2012

http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=18614

http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=21966
Overall lessons learned

Need better methods to conduct requirements analysis

We didn’t gather usable historical data

Stickiness – worked great on this project, but team members didn’t transfer approach to other projects

Quality was a “journey”

The project produced two complete versions of the product suite with the same budget that was used to produce one document prior to the adoption of TSP

Overall…
Zero depth entry enabled synchronized team
Contact Information

Julia Mullaney
SGMM Project Manager
jlg@sei.cmu.edu
865-558-8819

Summer Fowler
Deputy Technical Director CS2
sfowler@cert.org
412-268-9639

www.sei.cmu.edu/smartgrid
info@sei.cmu.edu
Notices

Copyright 2014 Carnegie Mellon University

This material is based upon work funded and supported by the Department of Defense under Contract No. FA8721-05-C-0003 with Carnegie Mellon University for the operation of the Software Engineering Institute, a federally funded research and development center.

Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the United States Department of Defense.

NO WARRANTY. THIS CARNEGIE MELLON UNIVERSITY AND SOFTWARE ENGINEERING INSTITUTE MATERIAL IS FURNISHED ON AN “AS-IS” BASIS. CARNEGIE MELLON UNIVERSITY MAKES NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, AS TO ANY MATTER INCLUDING, BUT NOT LIMITED TO, WARRANTY OF FITNESS FOR PURPOSE OR MERCHANTABILITY, EXCLUSIVITY, OR RESULTS OBTAINED FROM USE OF THE MATERIAL. CARNEGIE MELLON UNIVERSITY DOES NOT MAKE ANY WARRANTY OF ANY KIND WITH RESPECT TO FREEDOM FROM PATENT, TRADEMARK, OR COPYRIGHT INFRINGEMENT.

This material has been approved for public release and unlimited distribution except as restricted below.

This material may be reproduced in its entirety, without modification, and freely distributed in written or electronic form without requesting formal permission. Permission is required for any other use. Requests for permission should be directed to the Software Engineering Institute at permission@sei.cmu.edu.


DM-0000130
A major power grid transformation is underway

How can utilities

• Develop effective roadmaps?
• Track progress?
• Understand their posture in comparison to peers?

The Smart Grid Maturity Model was developed by utilities to address these concerns
This is where we aspire to be in X years

This is where we are today

NOTE: There is no “correct” target profile implied in the model; the optimal profile will vary by utility.
SGMM Partner population

SGMM Partners

12 USA, 2 India, 1 South Africa
SGMM History – 142 utilities, 29 countries, 157 submissions

AES Electropaulo
Alameda Municipal Power
Allegheny Power
Alliander
Ameren Illinois
Ameren Missouri
American Electric Power
APCPDCL
ATCO Electric
ATCO Gas
Ausnet
Austin Energy
AZUSA Light and Water
BC Hydro
BESCOM
Bonneville Power Admin.
BSES-Rajdhani
BSES Yamuna Power Limited
Burbank Water and Power
CELP
CenterPoint Energy
Centro Sur
CESC Limited
CESC, Mysore
CFE (Mexico) Gulfonorte
CFE (Mexico) Jalisco
CFE (Mexico) Peninsular
Chelan County PUD
CitiPower and Powercor Australia Ltd
City of Anaheim
City of Columbus
City of Danville
City of Dover
City of Hamilton
City of Hudson
City of Jackson
City of Napoleon
City of Painesville
City of Palo Alto
City of Piqua Power System
City of Riverside Public Utilities
City of Wapakoneta
City of Westerville
CLP Power
Coldwater Board of Public Utilities
Comisión Federal de Electricidad-Corporativo
Country Energy
CPFL Paulista
Dhofar Power Company S.A.O.C.
Dominion Virginia Power
DONG Energy Sales & Distribution A/S
DPSC Limited
DTE Energy
Duke Energy
Eandis
East Miss EPA
EDF Energy Networks Branch
EDP - Energias do Brasil, S.A.
EnergyAustralia
Enexis
Entergy
EPCOR Distribution & Transmission
Ephrata Borough
ERDF
ESB Networks
 Eskom Holdings SOC Limited
eThekwini Municipality, Electricity Unit
Exelon/ComEd
Exelon/PECO Energy
FirstEnergy
Fortum
Glendale Water & Power
Guandong Power Co.
Holland Board of Public Works
Hydro One
Hydro One - Distribution
Hydro Ottawa Limited
IEC
Imperial Irrigation District
Integral Energy
Intergys
Jamaica Public Service Company
KEPCO
Los Angeles Department of Water and Power
Majan Electricity Company S.A.O.C.
Manila Electric Company
Manitoba Hydro - T&D
Marietta Board of Lights and Water
Mazoon Electricity Company
Memphis Light, Gas and Water Division
MSEDCL
Muscat Electricity Distribution Company S.A.O.C.
Muscatine Power & Water
Nashville Electric Service
NB Power
NDPL
Noida Power Company Limited
Oberlin Municipal Light & Power System
Oman Electricity Transmission Co.
Pasadena Water and Power
Pepco Holdings/PHI
PG&E
PGN Carolina
PGN Florida
PNM
Portland General Electric
PPL Electric Utilities
Princeton Electric Plant Board
Progress Energy
Puget Sound
Redding
Reliance Energy
Roseville Electric
Rural Areas Electricity Company
Sacramento Municipal Utility District
Salt River Project
Santee Cooper
SCANA
SDG&E
SIG Geneva
Silicon Valley Power
SMEPC - International Cooperation Dept.
Snohomish
Southern Company
Tata Power
Tenaga Nasional Berhad
Tokyo Electric Power Co.
Toronto Hydro Electric System Ltd.
Town of Front Royal
Tucson Electric Power
UGVCL
Unión Fenosa Distribución
Unison Networks Limited
Vattenfall Distribution
VELCO
Village of Carey, Ohio
Village of Clinton
Village of Oak Harbor
Village of Yellow Springs
Wadsworth Electric And Communications
Wyangotte Municipal Service
Xcel Energy
Yantarenergo
Zhejiang Jiaxing Electric Power Bureau
Color chart

Green
Utility as-is
R=4, G=129, B=60

Gold
Utility to-be
R=231, G=172, B=67

Blue
Full Community
R=64, G=108, B=187

Orange
Peer Community
R=222, G=102, B=33