



# Community Perspectives in Practice Adoption

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*Points of view from two communities*

**Software Assurance Forum**

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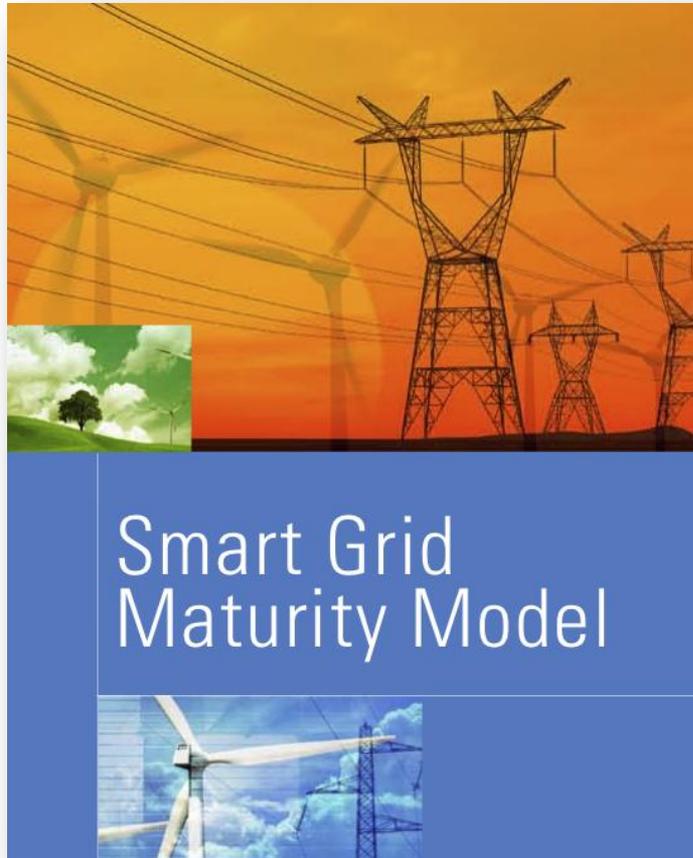
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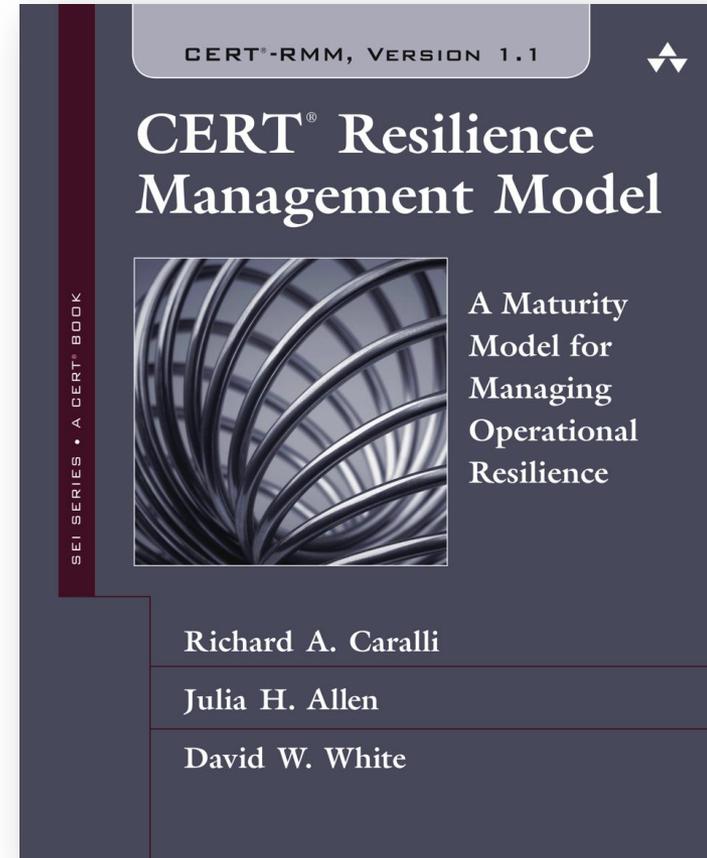
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# Perspectives in change: 2 communities



**SGMM**  
Smart Grid Maturity Model



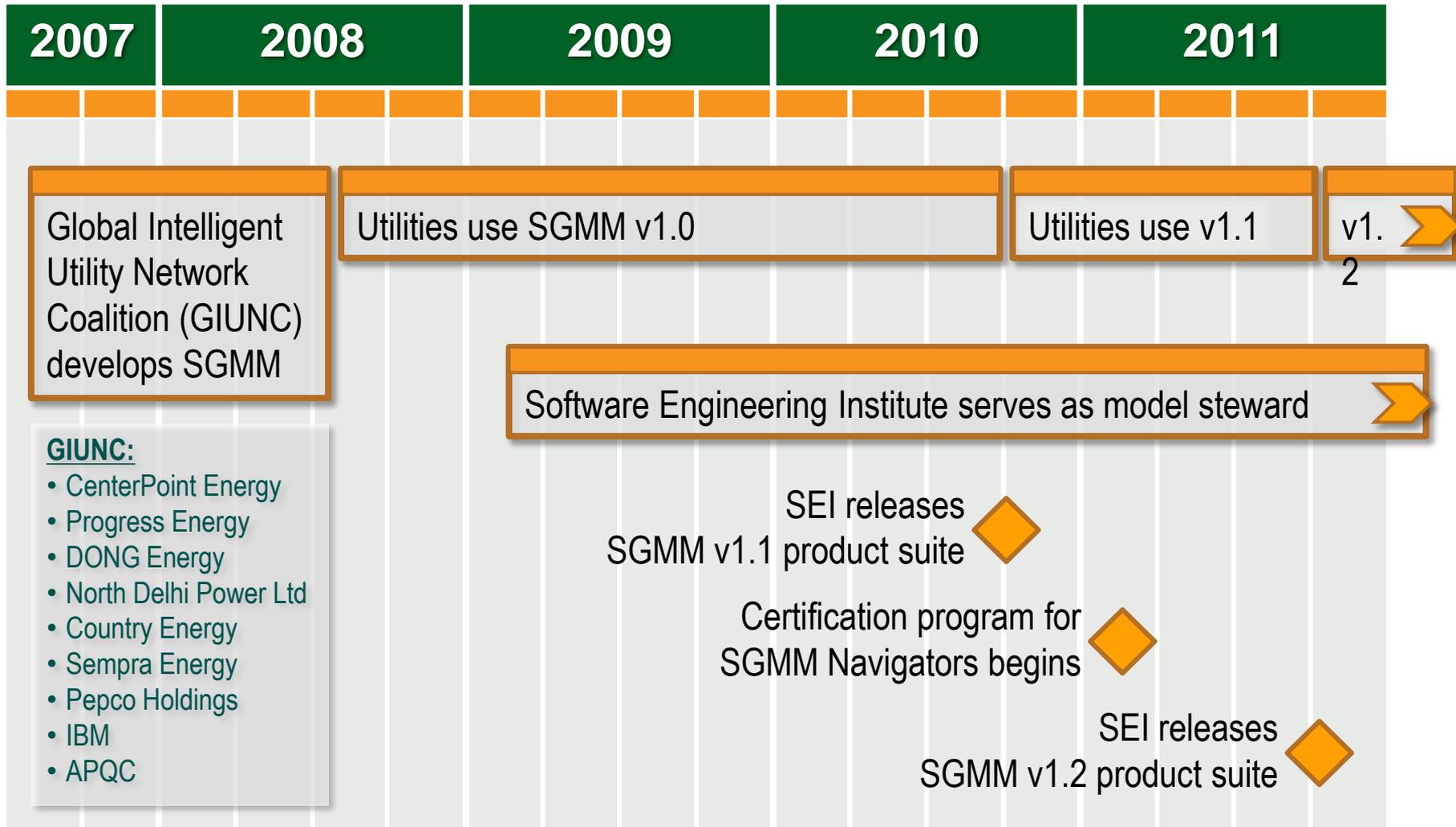
**CERT-  
RMM**

# What Is the Smart Grid Maturity Model?

SGMM is a  
**MANAGEMENT TOOL**  
that provides a  
**COMMON FRAMEWORK**  
for defining key elements of  
**SMART GRID TRANSFORMATION**  
and helps utilities develop a  
**PROGRAMMATIC APPROACH**  
and track their progress.



# SGMM History



*Developed by utilities for utilities*



# SGMM at a Glance

**8 Domains: Logical groupings of smart grid related capabilities and characteristics**

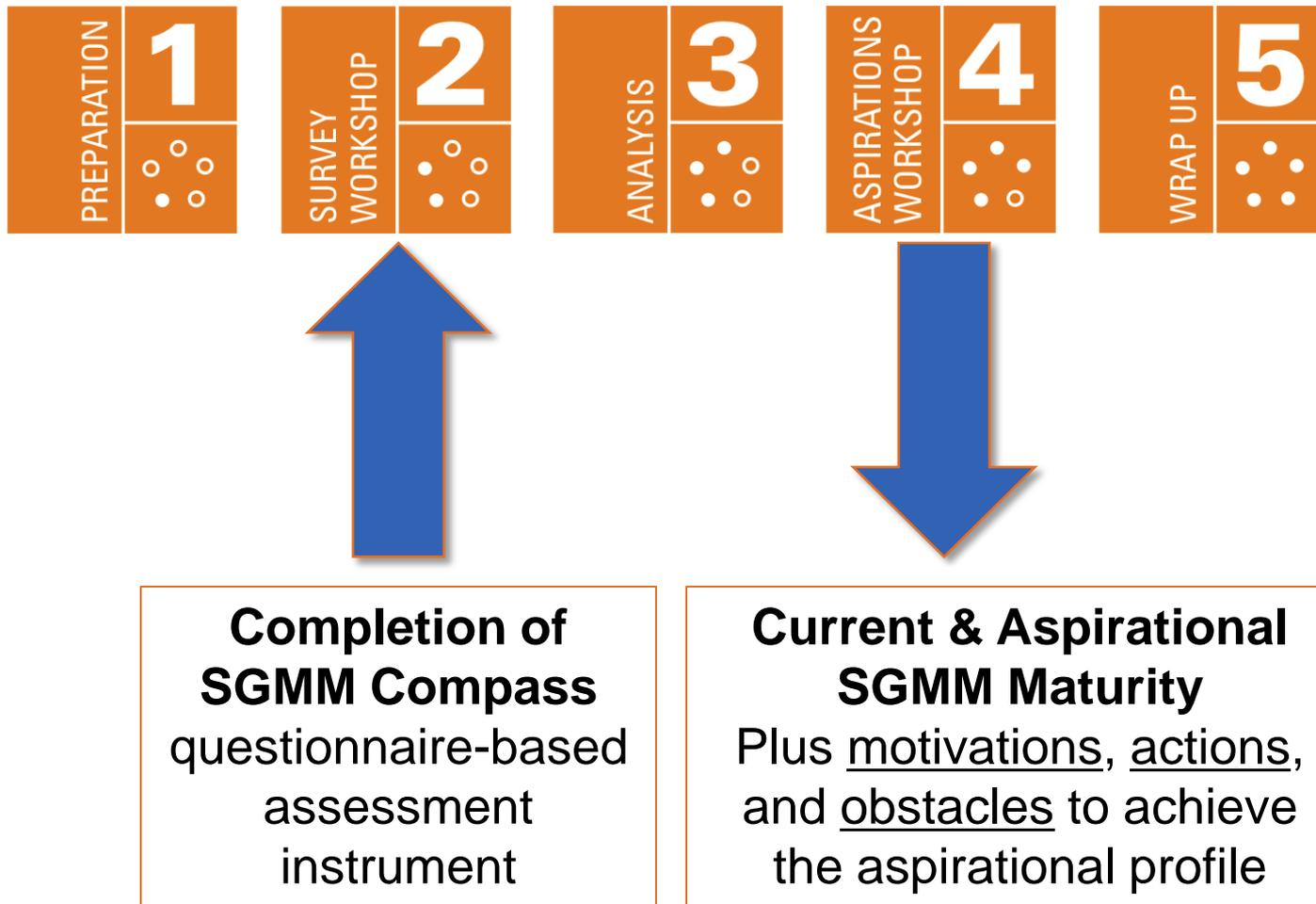
	SMR	OS	GO	WAM	TECH	CUST	VCI	SE
5 PIONEERING	<ul style="list-style-type: none"> <li>1. New services and product offerings.</li> <li>2. Grid business activities provide sufficient financial resources to enable continued investment in smart grid sustainment and innovation.</li> <li>3. Channels are in place to harvest ideas, develop them, and regard those who help shape future advances in process, workforce competencies, and technology.</li> </ul>	<ul style="list-style-type: none"> <li>1. Stakeholders to optimize overall grid operation and health.</li> <li>2. The organization is able to readily adapt to support new ventures, products, and services that emerge as a result of smart grid.</li> <li>3. There is end-to-end grid observability that can be leveraged by internal and external stakeholders.</li> <li>4. Decision making occurs at the closest point of need as a result of an efficient organizational structure and the increased availability of information due to smart grid.</li> </ul>	<ul style="list-style-type: none"> <li>2. System-wide, analytics-based, and automated grid decision making is in place.</li> </ul>	<ul style="list-style-type: none"> <li>1. Optimized with processes defined and executed across the supply chain.</li> <li>2. Assets are leveraged to maximize utilization, including just-in-time asset retirement, based on smart grid data and systems.</li> </ul>	<ul style="list-style-type: none"> <li>2. The enterprise information infrastructure can automatically identify, mitigate, and recover from cyber incidents.</li> </ul>	<ul style="list-style-type: none"> <li>2. There is automatic outage detection at premise or device level.</li> <li>3. Plug-and-play, customer-based generation is supported.</li> <li>4. Security and privacy for all customer data is assured.</li> <li>5. The organization plays a leadership role in industry-wide information sharing and standards development efforts for smart grid.</li> </ul>	<ul style="list-style-type: none"> <li>2. Resources are adequately dispatchable and controllable so that the organization can take advantage of granular market options.</li> <li>3. The organization's automated control and resource optimization schemes consider and support regional and/or national grid optimization.</li> </ul>	<ul style="list-style-type: none"> <li>2. Customers control their energy-based environmental footprints through automatic optimization of their end-to-end energy supply and usage level (energy source and mix).</li> <li>3. The organization is a leader in developing and promoting industry-wide resilience best practices and/or technologies for protection of the national critical infrastructure.</li> </ul>
4 OPTIMIZING	<ul style="list-style-type: none"> <li>1. Smart grid vision and strategy drive the organization's strategy and execution.</li> <li>2. Smart grid is a core competency throughout the organization.</li> <li>3. Smart grid strategy is shared and revised collaboratively with internal stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>1. Management systems and organizational structure are capable of taking advantage of the increased visibility and control provided through smart grid.</li> <li>2. There is end-to-end grid observability that can be leveraged by internal and external stakeholders.</li> <li>3. Decision making occurs at the closest point of need as a result of an efficient organizational structure and the increased availability of information due to smart grid.</li> </ul>	<ul style="list-style-type: none"> <li>1. Operational data from smart grid deployments is being used to optimize processes across the organization.</li> <li>2. Grid operational management is based on near real-time data.</li> <li>3. Operational forecasts are based on data gathered through smart grid.</li> <li>4. Grid operations information has been made available across functions and LOBs.</li> <li>5. There is an automation/decision-making within protection schemes that is based on wide-area monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>1. A complete view of assets based on status, connectivity, and proximity is available to the organization.</li> <li>2. Asset models are based on real performance and monitoring data.</li> <li>3. Performance and usage of assets is optimized across the asset fleet and across asset classes.</li> <li>4. Service life for key grid components is managed through condition-based and predictive maintenance, and is based on real and current asset data.</li> </ul>	<ul style="list-style-type: none"> <li>1. Data flows end to end from customer to generation.</li> <li>2. Business processes are optimized by leveraging the enterprise IT architecture.</li> <li>3. Systems have sufficient wide-area situational awareness to enable real-time monitoring and control for complex events.</li> <li>4. Predictive modeling and near real-time simulation are used to optimize support processes.</li> <li>5. Performance is improved through sophisticated systems that are informed by smart grid data.</li> <li>6. Security strategy and tactics continually evolve based on changes in levels.</li> </ul>	<ul style="list-style-type: none"> <li>1. Support is provided to customers to help analyze and compare usage against all available pricing programs.</li> <li>2. There is outage detection and proactive notification at the circuit level.</li> <li>3. Customers have access to near real-time data on their own usage.</li> <li>4. Residential customers participate in demand response and/or utility-managed remote load control programs.</li> <li>5. Automatic response to pricing signals for devices within the customer's premises is supported.</li> <li>6. In-home net billing programs are enabled.</li> <li>7. A common customer experience has been integrated.</li> </ul>	<ul style="list-style-type: none"> <li>1. Energy resources (including Volt/VAR, DC, and DR) are dispatchable and tradable.</li> <li>2. Portfolio optimization models that encompass available resources and real-time markets are implemented.</li> <li>3. Secure two-way communications with Home Area Networks (HANs) are available.</li> <li>4. Visibility and potential control of customers' large-demand appliances to balance demand and supply is available.</li> </ul>	<ul style="list-style-type: none"> <li>1. The organization collaborates with external stakeholders to address environmental and societal issues.</li> <li>2. A public environmental and societal scorecard is maintained.</li> <li>3. Programs are in place to shave peak demand.</li> <li>4. End-user energy usage and devices are actively managed through the ability's network.</li> <li>5. The organization fulfills its critical infrastructure assurance goals for resiliency, and contributes to those of the region and the nation.</li> </ul>
3 INTEGRATING	<ul style="list-style-type: none"> <li>1. Smart grid vision, strategy, and business case are incorporated into the vision and strategy.</li> <li>2. Smart grid governance model is established.</li> <li>3. Smart grid leaders with explicit authority across functions and lines of business are designated to ensure effective implementation of smart grid strategy.</li> <li>4. Smart grid authorities for smart grid investments have been established.</li> </ul>	<ul style="list-style-type: none"> <li>1. The smart grid vision and strategy are driving organizational change.</li> <li>2. Smart grid measures are incorporated into the measurement system.</li> <li>3. Performance and compensation are linked to smart grid success.</li> <li>4. Leadership is consistent in communication and actions regarding smart grid.</li> <li>5. A matrix or other organizational structure is in place.</li> <li>6. Education and training is underway.</li> </ul>	<ul style="list-style-type: none"> <li>1. Smart grid information is available across systems and organizational functions.</li> <li>2. Control analytics have been implemented and are used to improve cross-LOB decision-making.</li> <li>3. Grid operations planning is now fact-based using grid data made available across organizational boundaries.</li> </ul>	<ul style="list-style-type: none"> <li>1. Performance, trend analysis, and event audit data are available for components of the organization's systems.</li> <li>2. CBM programs for key components are in place.</li> <li>3. Remote asset monitoring capabilities are integrated with asset management.</li> <li>4. Integration of remote asset monitoring with mobile workforce is in progress.</li> </ul>	<ul style="list-style-type: none"> <li>1. Smart grid-impacted business processes are aligned with the enterprise IT architecture across LOBs.</li> <li>2. Systems adhere to an enterprise IT architectural framework for smart grid.</li> <li>3. Smart grid-specific technology has been implemented to improve cross-LOB performance.</li> </ul>	<ul style="list-style-type: none"> <li>1. The organization tailors programs to customer segments.</li> <li>2. Two-way meter communication has been deployed.</li> <li>3. A remote connect/disconnect capability is deployed.</li> <li>4. Demand response and/or remote load control is available to customers.</li> <li>5. There is automatic outage detection at the abstraction level.</li> <li>6. Residential customers have an expanded access to utility usage data.</li> </ul>	<ul style="list-style-type: none"> <li>1. An integrated resource plan is in place and includes new targeted resources and technologies.</li> <li>2. Customer premise energy management solutions with market and usage information are enabled.</li> <li>3. Additional resources are available and deployed to provide substitutes for market products to support reliability or other objectives.</li> </ul>	<ul style="list-style-type: none"> <li>1. Performance of societal and environmental programs are measured and effectiveness is demonstrated.</li> <li>2. Segmented and tailored information that includes environmental and societal benefits and costs is available to customers.</li> <li>3. Programs to encourage off-peak usage by customers are in place.</li> <li>4. The organization regularly reports on the sustainability and the societal and environmental impacts of its smart grid programs and technologies.</li> </ul>
2 ENABLING	<ul style="list-style-type: none"> <li>1. Final smart grid strategy and a business plan are approved by management.</li> <li>2. Common smart grid vision is accepted across the organization.</li> <li>3. Smart grid investment is explicitly aligned to the smart grid strategy.</li> <li>4. Roles are established specifically for funding the implementation of smart grid vision.</li> <li>5. Collaboration with regulators and other stakeholders is underway to ensure implementation of the smart grid vision and strategy.</li> <li>6. Smart grid investment and funding for conducting proof-of-concept projects is available and aligned.</li> </ul>	<ul style="list-style-type: none"> <li>1. A new vision for smart grid is articulated in a smart grid strategy.</li> <li>2. The organization processes are in place to support smart grid implementation and deployment teams include participants from all functions and LOBs that the deployment will impact.</li> <li>3. Education and training to develop smart grid competencies have been identified and are available.</li> <li>4. The linking of performance and compensation plans to achieve smart grid milestones is in progress.</li> </ul>	<ul style="list-style-type: none"> <li>3. Aside from SCADA, piloting of remote asset monitoring of key grid assets to support decision-making is underway.</li> <li>4. Investment in and expansion of data communications networks in support of grid operations is underway.</li> </ul>	<ul style="list-style-type: none"> <li>1. Status, and performance data is available across the organization.</li> <li>2. An organization-wide mobile workforce is in progress.</li> </ul>	<ul style="list-style-type: none"> <li>3. Standards are selected to support the smart grid strategy within the enterprise IT architecture.</li> <li>4. Smart grid technology evaluation and selection process is applied across LOBs.</li> <li>5. Smart grid strategy for the grid is in progress.</li> <li>6. Smart grid implementation is underway.</li> </ul>	<ul style="list-style-type: none"> <li>3. The organization is modeling the reliability of grid equipment.</li> <li>4. Remote connect/disconnect is being piloted for residential customers.</li> <li>5. The impact on the customer of new services and delivery processes is being assessed.</li> <li>6. Security and privacy requirements for customer protection are specified for smart grid-related pilot projects and BPPs.</li> </ul>	<ul style="list-style-type: none"> <li>3. Pilots to support a diverse resource portfolio have been conducted.</li> <li>4. Secure interactions have been piloted with an expanded portfolio of value chain partners.</li> </ul>	<ul style="list-style-type: none"> <li>1. Smart-grid strategies and work plans address societal and environmental issues.</li> <li>2. Energy efficiency programs for customers have been established.</li> <li>3. The organization considers a "triple bottom line" view when making decisions.</li> <li>4. Environmental proof-of-concept projects are underway that demonstrate smart grid benefits.</li> <li>5. Increasingly granular and more frequent consumption information is available to customers.</li> </ul>
1 INITIATING	<ul style="list-style-type: none"> <li>1. Smart grid vision and strategy are articulated in the organizational strategy.</li> <li>2. The organization has articulated its need to build smart grid competencies in its workforce.</li> <li>3. Leadership has demonstrated a commitment to change the organization in support of achieving smart grid.</li> <li>4. Smart grid implementation efforts to inform the workforce of smart grid are underway.</li> </ul>	<ul style="list-style-type: none"> <li>1. The organization has articulated its need to build smart grid competencies in its workforce.</li> <li>2. Leadership has demonstrated a commitment to change the organization in support of achieving smart grid.</li> <li>3. Smart grid implementation efforts to inform the workforce of smart grid are underway.</li> </ul>	<ul style="list-style-type: none"> <li>1. Business cases for new equipment and systems related to smart grid are approved.</li> <li>2. New services, switches, and communications technologies are evaluated for grid monitoring and control.</li> <li>3. Proof-of-concept projects and component testing for grid monitoring and control are underway.</li> <li>4. Outage and distribution management systems linked to substation automation are being explored and evaluated.</li> <li>5. Safety and security (physical and cyber) requirements are in progress.</li> </ul>	<ul style="list-style-type: none"> <li>1. Enhancements to work and asset management have been built into approved business cases.</li> <li>2. Potential uses of remote asset monitoring are being evaluated.</li> <li>3. Asset and workforce management equipment and systems are being evaluated for their potential alignment to the smart grid vision.</li> </ul>	<ul style="list-style-type: none"> <li>1. An enterprise IT architecture exists.</li> <li>2. Smart grid implementation is underway.</li> </ul>	<ul style="list-style-type: none"> <li>3. The organization is modeling the reliability of grid equipment.</li> <li>4. Remote connect/disconnect is being piloted for residential customers.</li> <li>5. The impact on the customer of new services and delivery processes is being assessed.</li> <li>6. Security and privacy requirements for customer protection are specified for smart grid-related pilot projects and BPPs.</li> </ul>	<ul style="list-style-type: none"> <li>1. Assets and programs necessary to facilitate load management are identified.</li> <li>2. Smart grid implementation is underway.</li> </ul>	<ul style="list-style-type: none"> <li>1. The smart grid strategy addresses the organization's role in societal and environmental issues.</li> </ul>
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**175 Characteristics: Features you would expect to see at each stage of the smart grid journey**

**6 Maturity Levels: Defined sets of characteristics and outcomes**

**Not a process model**  
 – a lightweight set of ordered characteristics that reflect maturity of smart grid implementation

# SGMM Navigation: 5-step, expert led process



# SGMM Strategy: Meet the community where it is

1. Kept the model and the assessment lightweight
2. Focused development and transition activities on SGMM  
Navigation process – utilities report high value from Navigation
3. Grew the community – moved quickly to licensing & certification
  - 7 organizations have licensed the process to date:
    - Ebiz Labs, Inc.
    - Horizon Energy Group, LLC
    - IBM
    - Infotech Enterprises America, Inc.
    - SAIC Energy, Environment & Infrastructure, LLC
    - TCS America
    - Wipro
  - More than 30 SGMM Navigators have been trained
  - More than 120 utilities have used the model to date



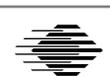
# What is CERT® Resilience Management Model?

*CERT-RMM is a capability model for managing and improving operational resilience.*

***“...an extensive super-set of the things an organization could do to be more resilient.”***

- CERT-RMM adopter

- Converges key operational risk management activities:
  - Security
  - BC/DR
  - IT operations
- Defines maturity through capability levels (*like CMMI*)
- Improves confidence in how an organization responds in times of operational stress



# CERT-RMM Users Group (RUG)

*Innovation in supporting model adoption*

Year-long series of 4 workshops helps participating organizations use CERT-RMM to make improvements



First year participants:

1. United States Postal Inspection Service
2. Discover Financial Services
3. Lockheed Martin
4. Carnegie Mellon University IT
5. CERT

# RUG Participants Report Top Benefits

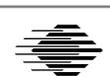
**Focus on CERT-RMM implementation** and push to make measurable progress (homework)

**Diversity of member organizations** – cross-sector breadth & diverse experiences for sharing; trust and candor in the workshops

**Access to CERT-RMM team** for field experience and feedback

**Useful artifacts** (presentations, diagnostics, templates, examples, etc.) provided for each workshop

**CERT's participation** with its own improvement project



# RMM Strategy: Meet the community where it is

1. **RUG** – direct, low-cost-of-entry support to users
2. **Flexible scoping** – model content can be scoped to specific focus areas or assets in the organization
3. **Lightweight derivative methods** – RMM Compass and Navigation are in development, similar methods in use at DHS
4. **Lead Appraiser Apprenticeship Program** – will establish first cadre of lead appraisers outside of SEI to work directly with organizations using the model



# Summary

**Meet people where they are to  
enable practice adoption**



# Contact information

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**[www.cert.org/resilience](http://www.cert.org/resilience)**

**[www.sei.cmu.edu/smartgrid](http://www.sei.cmu.edu/smartgrid)**

