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About this document

This document is an informative version of the SEI Smart Grid Maturity Model (SGMM) Assessment Survey. The purpose is to provide prospective users the opportunity to view the scope, extent, and specific questions included in the survey.

The primary objective of the SEI SGMM Assessment Survey is to assess the degree to which an organization meets the stated domains, levels, and required characteristics as described in the SEI Smart Grid Maturity Model Overview document. The survey scope includes questions and multiple choice answers related to all required characteristics at each maturity level (i.e., Initiating) and specific domain (i.e., Grid Operations).

Questions are arranged by maturity level and model domain. Survey questions cover the model characteristics for each model domain at each maturity level. The survey also includes a glossary (at the end of the document) which explains relevant terms.

1.1 Participating in the Assessment Survey

Participating in the SEI SGMM Assessment Survey will allow your organization to determine the degree to which smart grid characteristics (relative to practices and technologies) are being implemented and to benchmark accomplishments in achieving smart grid objectives against other organizations. To participate in the SEI SGMM Assessment Survey, visit www.sei.cmu.edu/smartgrid to obtain information on receiving and completing the survey and having it scored. You may also contact SEI Customer Relations at 412-268-5800 or customer-relations@sei.cmu.edu to participate.
1  Level 1: Initiating

Strategy, Management, and Regulatory

SMR-1.1 Has a smart grid vision been defined within your organization?
   A. No
   B. Within a single function
   C. Across multiple functions (encompasses and is communicated across functions)
   D. Across the enterprise (encompasses and is communicated across the enterprise)

SMR-1.2 Have you had discussions with regulators about your smart grid vision?
   A. No
   B. Yes, limited
   C. Extensive
   D. Completely aware

SMR-1.3 Has experimentation on smart grid components, tools, and techniques been given support within your organization?
   A. No
   B. Not specifically for smart grid vision (any amount)
   C. Very little, targeted for smart grid
   D. Moderate amount, targeted for smart grid
   E. To a great extent, targeted for smart grid

Organization and Structure

OS-1.1 Is there an articulated need for change toward smart grid competencies within your organization?
   A. No, not specifically for smart grid vision
   B. Somewhat
   C. To a great extent

OS-1.2 Are executives and senior leaders committed to changes to achieve smart grid competencies?
   A. No, not specifically for smart grid vision
   B. Somewhat
   C. To a great extent
**Grid Operations**

**GO-1.1** Are you evaluating new sensors, switches and communications devices for grid monitoring and control?
- A. No
- B. To some extent
- C. To a great extent

**GO-1.2** Are you evaluating outage and distribution management systems linked to sub-station automation?
- A. No
- B. To some extent
- C. To a great extent
- D. Already in place

**GO-1.3** Do you have a functional-level business case for new equipment and systems related to smart grid?
- A. No
- B. In development
- C. Approved
- D. Being executed to

**GO-1.4** Are proof-of-concept projects and/or component level testing in progress for grid monitoring and control?
- A. No
- B. To some extent, not directly for smart grid
- C. To some extent, for smart grid
- D. To a great extent

**GO-1.5** Are safety and physical security factored in to all smart grid initiatives?
- A. No
- B. Some
- C. Most
- D. All

**GO-1.6** Are you evaluating communication technologies to enable smart grid?
- A. No
- B. In documented plan
- C. Underway
- D. Evaluation complete
- E. Completed and technology already in place
**Work and Asset Management**

**WAM-1.1** Do you have a functional-level business case for work and asset management enhancements via smart grid?
- A. No
- B. In development
- C. Approved
- D. Being executed to

**WAM-1.2** Are you conducting value analysis for new equipment and systems?
- A. No
- B. For asset management equipment and systems, not aligned to smart grid vision
- C. Yes, aligned to smart grid vision
- D. Yes and aligned to smart grid business case

**WAM-1.3** Are you evaluating uses of remote asset monitoring?
- A. No
- B. In documented plan
- C. In progress
- D. Complete

**Customer Management and Experience**

**CME-1.1** Do you conduct research on the customer experience benefits of smart grid?
- A. No
- B. Indirectly
- C. Yes, directly, as needed
- D. Directly, on a regularly cycle (monthly, annually, etc.)
- E. Continuously
Technology

TECH-1.1  Do you have an enterprise IT architecture?
A. No
B. Evaluating benefits
C. In development
D. Executing to

TECH-1.2  Do you have a change control process for applications and IT infrastructure?
A. No
B. Partial
C. Complete
D. Previously in place

TECH-1.3  Have you identified where technology can improve functional department performance (e.g. reduce cost, improve workflow, simplify, automate, reduce risk, improve flexibility/adaptability, etc.)?
A. No
B. Indirectly
C. A little
D. To a great extent
E. Part of roadmap/blueprint

TECH-1.4  Do you have a process to evaluate and select technologies in alignment with your smart grid vision and strategies?
A. No
B. Indirectly
C. Partially
D. To a great extent

Value Chain Integration

VCI-1.1  Have you identified the assets and programs needed to facilitate load management?
A. No
B. Somewhat
C. To a great extent

VCI-1.2  Are you evaluating distributed generation sources and the capabilities to support them?
A. No
B. Somewhat
C. To a great extent

VCI-1.3  Do you have a strategy for creating and managing a diverse resource portfolio (e.g. integration of new resources such as DR, DG, etc.)?
A. No
B. In process of creating strategy
C. Yes, complete
D. Being executed to
Societal and Environmental

SE-1.1 Is your organization aware and up to date on societal and environmental issues (cost increases, global warming, oil/water issues, hazardous materials, “not in my backyard”, etc.)?
   A. No
   B. A little
   C. Moderately
   D. To a great extent

SE-1.2 Do you track your organization’s environmental compliance?
   A. No
   B. A little, moderately
   C. To a great extent
   D. Completely
2  Level 2: Functional Investing

Strategy, Management, and Regulatory

SMR-2.1  Does your organization have an integrated smart grid vision?
A. No
B. Yes and partially acknowledged
C. Yes and comprehensively acknowledged

SMR-2.2  Are operational investments aligned to your smart grid vision
A. Not at all
B. Partial, indirect alignment (not driven specifically from smart grid vision)
C. Partial, explicit alignment (driven from smart grid vision)
D. Significant (>60% of investments), indirect alignment
E. Significant, explicit alignment

SMR-2.3  Does a distinct smart grid funding/budget exist within your organization?
A. Not at all
B. Very limited (up to 30% of estimated need for current funding year)
C. Moderate amounts (between 30% and 70% of estimated need for current funding year)
D. Extensive (greater than 70% of estimated need for current funding year)

SMR-2.4  Have you begun collaboration with regulators and stakeholders about your Smart Grid vision and strategy?
A. Not at all
B. With stakeholders only
C. With regulators only
D. With both regulators and stakeholders

SMR-2.5  Is your organization committed to conducting smart grid proof-of-concept projects in order to achieve your smart grid vision?
A. No
B. Informally
C. Yes
D. Part of smart grid roadmap/blueprint
E. Coordinated with regulators

SMR-2.6  Has a smart grid strategy and business case been developed
A. No
B. In progress
C. Completed
D. Approved, being executed to

Organization and Structure

OS-2.1  Has your smart grid vision influenced changes in interactions between groups and individuals?
A. No
B. Not specifically for smart grid
C. Somewhat
D. To a great extent

**OS-2.2** Has your organization aligned operations around end-to-end processes to leverage smart grid capabilities?
A. No
B. Already organized that way
C. Changes underway
D. Re-alignment complete

**OS-2.3** Do smart grid implementation and deployment teams include participants from all impacted functions and lines of business?
A. No
B. Partial support (40-70% of impacted groups)
C. Most (~80%)
D. Full participation

**OS-2.4** Are you evaluating performance and compensations options linked to implementing smart grid strategy milestones?
A. No
B. In documented plan
C. In progress
D. Complete

**Grid Operations**

**GO-2.1** Do you have any distribution/sub-station automation projects?
A. No
B. In documented plan
C. In progress
D. Some completed (40% - 70%)
E. Many completed (>70%)

**GO-2.2** Are you implementing advanced outage restoration schemes?
A. No
B. In documented plan
C. In progress
D. Many completed (>20% of network)

**GO-2.3** Do you have remote asset monitoring in place (monitoring of remote devices on the grid, including wires, substations, etc.)?
A. No
B. In documented plan
C. In progress
D. Partially completed (>20% of network)
E. Completed

**GO-2.4** Are you expanding and investing in extended communications networks?
A. No
B. In documented plan
C. In progress
D. Partially completed (>20% of network)
E. Completed
F. Previously in place
Work and Asset Management

WAM-2.1 Have you developed a mobile workforce strategy?
   A. No
   B. In documented plan
   C. In progress
   D. Completed

WAM-2.2 Do you have an approach for tracking and inventory of assets using smart grid capabilities?
   A. No
   B. In documented plan
   C. In development
   D. Being piloted
   E. Completed

WAM-2.3 Have you developed an integrated view of GIS and asset monitoring based upon location, status and interconnectivity (nodal)?
   A. No
   B. In documented plan
   C. In development
   D. Being piloted
   E. Completed
**Customer Management and Experience**

**CME-2.1** Do you have remote AMI/AMR?
- A. No
- B. In documented plan
- C. Piloting
- D. A little
- E. To a great extent
- F. Completely

**CME-2.2** Do you have more frequent (e.g. more than monthly) or continuous knowledge of customer usage (i.e., the residential consumer)?
- A. No
- B. In documented plan
- C. In development
- D. Partially deployed to customers (up to 40%)
- E. To a great extent (greater than 40%)

**CME-2.3** Are you modeling reliability of grid equipment?
- A. No
- B. In documented plan
- C. Piloting
- D. In place

**CME-2.4** Do you have remote connect/disconnect for residential customers?
- A. No
- B. In documented plan
- C. Piloting
- D. Partially deployed to customers (up to 40%)
- E. To a great extent (greater than 40%)
- F. Completely

**CME-2.5** Are you assessing the impact of new services and delivery processes (HAN, meter installs, etc.)?
- A. No
- B. In documented plan
- C. In Progress
- D. Completed
**Technology**

**TECH-2.1** Do you align tactical IT investments to your enterprise IT architecture?
A. No  
B. Within a function or line of business  
C. Across functions or lines of business  
D. Completely

**TECH-2.2** Do you have a common architectural vision with IT standards (e.g., communications, software development, installation and maintenance, etc.)?
A. No  
B. Under development  
C. Internal – within a function or line of business  
D. Internal – across functions or line of business  
E. Internal and external – within a function or line of business  
F. Internal and external – across functions or lines of business  
G. External only – within a function or line of business  
H. External only – across functions or lines of business

**TECH-2.3** Is your technology evaluation and selection process applied to all smart grid activities?
A. No  
B. Indirectly  
C. Partially  
D. To a great extent  
E. Completely

**TECH-2.4** Do you have a data communications strategy for your grid?
A. No  
B. In documented plan  
C. Under development  
D. Partially completed  
E. Completed  
F. Being executed to

**TECH-2.5** Do you have connectivity to intelligent electrical devices?
A. No  
B. In documented plan  
C. Pilots underway  
D. Partially  
E. To a great extent  
F. Completely

**TECH-2.6** Do you have projects that apply technology to improve functional departmental performance and integrated performance?
A. No  
B. Some pilots underway  
C. Some projects complete  
D. To a great extent

**TECH-2.7** Is Information security built into all smart grid initiatives?
A. No  
B. Indirectly  
C. Directly, partial  
D. Directly, in all cases
Value Chain Integration

VCI-2.1 Have you introduced support for home energy management systems (e.g., via customer portals or in home displays)?
   A. No
   B. In documented plan
   C. In progress
   D. Moderately (available to up to 40% of customers)
   E. To a great extent (available to greater than 40% of customers)

VCI-2.2 Are you investing in pilots to support a diverse resource portfolio (e.g. DG, DM, DR, etc.)?
   A. No
   B. In documented plan
   C. Pilots in progress
   D. Being implemented
   E. Being executed to

VCI-2.3 Have you begun to redefine the valued chain toward the new ecosystem (collaboration with RTOs, resource providers, customers, suppliers, regulators, etc.)?
   A. No
   B. Being evaluated
   C. Changes underway
   D. Business practices now align and support
Societal and Environmental

SE-2.1  Do you have strategies and work plans to address societal and environmental issues (cost increases, global warming, oil/water issue, hazardous materials, “not in my backyard”, etc.)?
   A. No
   B. In development
   C. A little
   D. Moderately
   E. To a great extent

SE-2.2  Have you established energy efficiency programs for customers (i.e., residential, commercial, industrial)?
   A. No
   B. In documented plan
   C. Being piloted
   D. A little
   E. To a great extent

SE-2.3  Do you have a “triple bottom line” view within your organization?
   A. No
   B. Being investigated
   C. Functional implementation considers triple bottom line view
   D. Functional implementation incorporates triple bottom line view

SE-2.4  Do you have environmental programs?
   A. No
   B. In documented plan
   C. Proof of concepts underway
   D. A little
   E. Moderately
   F. Extensive

SE-2.5  Is consumption information provided to your residential customers?
   A. No
   B. Monthly
   C. More frequent than monthly
   D. Daily or better
3  Level 3: Integrating – Cross Functional

*Strategy, Management, and Regulatory*

**SMR-3.1**  Has a smart grid vision, strategy and business case been incorporated into your corporate vision and strategy?
- A. No
- B. Limited
- C. Extensive
- D. Complete

**SMR-3.2**  Do you have a smart grid governance model in place (roles, processes, tools, etc.)?
- A. No
- B. Partial
- C. Extensive
- D. Integrated into existing organization

**SMR-3.3**  Do you have one or more smart grid leaders with explicit authority across functions and lines of business to ensure application of smart grid?
- A. No
- B. A single leader
- C. Multiple leaders

**SMR-3.4**  Have regulators authorized your smart grid investments (e.g. via mandate or other technique)?
- A. No
- B. Indirectly
- C. Partially
- D. Explicit and complete
**Organization and Strategy**

**OS-3.1** Is your smart grid vision and strategy driving organizational change? (e.g., roles, interactions, compensation, hiring criteria, etc.)
- A. No
- B. Indirectly
- C. At least one line of business
- D. Across two or more lines of business
- E. Across the entire enterprise

**OS-3.2** Are smart grid measures part of your performance measures (e.g., on balanced score card)?
- A. No
- B. Indirectly
- C. At least one line of business
- D. Across two or more lines of business
- E. Across the entire enterprise

**OS-3.3** Are performance and compensation linked to smart grid success?
- A. No
- B. For some key resources
- C. For most key smart grid leaders (>70%)
- D. For all leaders
- E. For all smart grid workers (leaders and staff)

**OS-3.4** Is your leadership consistent in both communications and actions toward smart grid?
- A. No
- B. To some extent (<40%)
- C. Moderately (40-80%)
- D. To a great extent (>80%)

**OS-3.5** Does your organization have a matrix or overlay structure to support smart grid?
- A. No
- B. Evaluating
- C. Not necessary, has been evaluated and no change needed to adapt to new smart grid capabilities
- D. Evaluated, changes in documented plan
- E. Evaluated, changes now in place
**Grid Operations**

**GO-3.1** Is new information enabled by smart grid flowing across functions and systems?
A. No  
B. A little  
C. Moderately  
D. To a great extent

**GO-3.2** Has implementation of control analytics improved cross line of business decision-making?
A. No  
B. In documented plan  
C. A little  
D. Moderately  
E. Significantly

**GO-3.3** Has planning transitioned from estimation to fact-based using grid data?
A. No  
B. A little  
C. Moderately  
D. To a great extent  
E. Completely

**GO-3.4** Have meters become an integral grid management sensor within your network?
A. No  
B. In documented plan  
C. Partially (<40%)  
D. Significantly (>40%)
Work and Asset Management

WAM-3.1 Is performance and trend analysis available for individual components of your system?
A. No
B. In documented plan
C. In development
D. Completed to one or more components
E. Completed (>80% of components)

WAM-3.2 Do you have condition-based maintenance programs?
A. No
B. In documented plan
C. In development
D. Completed to one or more assets classes
E. Completed (>80% of assets classes)

WAM-3.3 Have you integrated remote asset monitoring with asset management?
A. No
B. In documented plan
C. In development
D. Completed to one or more assets classes
E. Completed (>80% of assets classes)

WAM-3.4 Have you integrated remote asset monitoring to mobile workforce solutions, automating work order creation?
A. No
B. In documented plan
C. In development
D. Completed to one or more assets classes
E. Completed (>80% of assets classes)

WAM-3.5 Do you have an integrated view of GIS and asset monitoring based upon location, status and interconnectivity?
A. No
B. In documented plan
C. In development
D. Completed to one or more assets classes
E. Completed (>80% of assets classes)

WAM-3.6 Are you tracking inventory from source to utilization?
A. No
B. In documented plan
C. In development
D. Completed to one or more assets classes
E. Completed (>80% of assets classes)

WAM-3.7 Are you modeling asset investments for key components based upon smart grid data?
A. No
B. In documented plan
C. In development
D. Completed to one or more components
E. Completed (>80% of components)
**Customer Management and Experience**

**CME-3.1** Do you have a high degree of customer segmentation? (e.g., price conscious, green, cost is no object, etc.)
A. No
B. Being evaluated
C. Segmented (ability to segment based upon up to a multiple combinations of criteria)
D. Very highly segmented (ability to segment based upon extensive combinations of criteria)

**CME-3.2** Do you have two-way meter communication?
A. No
B. In development
C. A little (<10% of all meters)
D. To a great extent (10% - 70% of all meters)
E. Completely (>70% of all meters)

**CME-3.3** Do you have remote connect/disconnect
A. No
B. In development
C. A little (<10% of all meters)
D. To a great extent (10% - 70% of all meters)
E. Completely (>70% of all meters)

**CME-3.4** Do you have remote load control of customer high energy devices?
A. No
B. In development
C. A little (<10% of all customers)
D. To a great extent (10% - 70% of all customers)
E. Completely (>70% of all customers)

**CME-3.5** Do you have automatic outage detection at the substation?
A. No
B. In development
C. A little (<10% of substations)
D. To a great extent (10% - 70% of substations)
E. Completely (>70% of substations)

**CME-3.6** Have you implemented a common customer experience (e.g., look and feel, consistency of message to the consumer)?
A. No
B. In documented plan
C. In development
D. Completed for at least one channel (e.g., web, voice response, hand-helds, etc.)
E. Completed across multiple channels (e.g., web, voice response, etc.)

**CME-3.7** Do you have customer participation in demand/response?
A. No
B. In development
C. A little (<10% of all customers)
D. To a great extent (10% - 70% of all customers)
E. Completely (>70% of all customers)
**Technology**

TECH-3.1 Are smart grid impacted business processes aligned with your strategic IT architecture across LOBs?
   A. No
   B. In development
   C. A little (<30% of impacted processes)
   D. To a great extent (30% - 70% of impacted processes)
   E. Completely (>70% of impacted processes)

TECH-3.2 Do you use a common architectural framework (e.g., standards, common data models, etc.)?
   A. No
   B. A little (<50% of implemented systems)
   C. To a great extent (50% - 80% of implemented systems)
   D. Completely (>80% of implemented systems)

TECH-3.3 Have you implemented smart grid specific technology to improve integrated performance?
   A. No
   B. Indirectly
   C. Within functions and/or lines of business
   D. Across functions and/or lines of business
   E. Across the enterprise

TECH-3.4 Do you have distributed intelligence and analytics enabled through smart grid?
   A. No
   B. In development
   C. Within functions and/or lines of business
   D. Across functions and/or lines of business
   E. Across the enterprise

TECH-3.5 Do you have advanced sensor plan (e.g., using phasor measurement units)?
   A. No
   B. In development
   C. Within functions and/or lines of business
   D. Across functions and/or lines of business
   E. Across the enterprise

TECH-3.6 Do you have a detailed communications strategy and tactics?
   A. No
   B. In development
   C. Within functions and/or lines of business
   D. Across functions and/or lines of business
   E. Across the enterprise
**Value Chain Integration**

**VCI-3.1** Do you have an integrated resource plan including new types of resources (e.g., Volt/Var, demand response, distributed generation)?
- A. No
- B. In development
- C. Partly in place (supporting at least one new resource e.g., DR)
- D. Mostly in place (supporting multiple resources)
- E. Completely in place (supporting all available resources)

**VCI-3.2** Have you enabled customer premise energy management solutions with market and usage information?
- A. No
- B. In development
- C. A little (<10% of all customers)
- D. To a great extent (10% - 70% of all customers)
- E. Completely (>70% of all customers)

**VCI-3.3** Are new resources available as substitute for market products to meet reliability objectives?
- A. No
- B. In development
- C. Partly in place (supporting at least one new resource e.g., DR)
- D. Mostly in place (supporting multiple resources)
- E. Completely in place (supporting all available resources)
Societal and Environmental

SE-3.1 Are active programs to address societal and environmental issues in place?
   A. No
   B. In development
   C. A little
   D. To a great extent

SE-3.2 Do you have segmented and tailored information for your customers pertaining to environmental and social benefits regarding their consumption and use of energy?
   A. No
   B. In development
   C. A little (<30% of all customers)
   D. To a great extent (30% - 80% of all customers)
   E. Completely (>80% of all customers)

SE-3.3 Do you have programs to encourage off-peak usage?
   A. No
   B. In development
   C. A little (available to <30% of all customers)
   D. To a great extent (available to 30% - 80% of all customers)
   E. Completely (available to >80% of all customers)

SE-3.4 Do you have regular and integrated reporting of sustainability and impact?
   A. No
   B. In development
   C. A little
   D. To a great extent
4  Level 4: Optimizing – Enterprise-Wide

**Strategy, Management, and Regulatory**

**SMR-4.1**  Does your smart grid vision and approach drive corporate strategy and direction?
- A. No
- B. Smart grid has limited impact on corporate strategy
- C. Smart grid has moderate impact on corporate strategy
- D. Smart grid drives corporate strategy

**SMR-4.2**  Is smart grid a core competency throughout your organization?
- A. No
- B. It is across part of the organization
- C. It is a core competency across the entire organization
- D. It is across the entire organization and driving future competency

**SMR-4.3**  Is your strategy shared and communicated with stakeholders, excluding some sensitive aspects?
- A. No
- B. Some stakeholders
- C. All stakeholders (e.g., suppliers, customers, financial, regulatory, etc.)
- D. All stakeholders including sensitive aspects

**Organization and Structure**

**OS-4.1**  Do the capabilities of smart grid systems and control (for smart grid competency) drive the evolution of your organization and workforce?
- A. No
- B. Indirectly
- C. To some extent
- D. To a great extent

**OS-4.2**  Has end-to-end grid observability allowed stakeholders to become more active across your organization?
- A. No
- B. A little (<60% of stakeholders)
- C. Moderately (60% - 90%)
- D. To a great extent (>90%)

**OS-4.3**  Has your organization (i.e., decision-making) flattened as a result of smart grid competency?
- A. No
- B. Indirectly
- C. To some extent
- D. To a great extent
Grid Operations

GO-4.1  Has information from smart grid been integrated into the enterprise processes?
A. No
B. A little (<50% of impactable processes)
C. To a great extent (50% - 80% of impactable processes)
D. Completely (>80% of impactable processes)

GO-4.2  Do you have dynamic grid management in place?
A. No
B. A little (for <30% of network)
C. To a great extent (for 30% - 80% of network)
D. Completely (>80% of network)

GO-4.3  Are long-term forecasts based upon data gathered through smart grid capabilities?
A. No
B. A little
C. Moderately
D. To a great extent

GO-4.4  Has observability information been made available across functions and lines of business (i.e. the entire enterprise)?
A. No
B. A little (to <50% of affected functions)
C. To a great extent (to 50% - 80% of affected functions)
D. Completely (>80% of affected functions)

GO-4.5  Have you implemented automated decision-making within protection schemes?
A. Little or none
B. A little (10% - 50% of affected network functions)
C. To a great extent (to 50% - 80% of affected network functions)
D. Completely (>80% of affected network functions)
**Work and Asset Management**

**WAM-4.1** Do you have a complete view of assets (including location, interrelationships) based upon status, connectivity and proximity?
   A. Little or none  
   B. A little (<10% - 50% of asset classes)  
   C. To a great extent (50% -80% of asset classes)  
   D. Completely (>80% of asset classes)

**WAM-4.2** Are your asset models based upon real and current date?
   A. Little or none  
   B. A little (<10% - 50% of asset models)  
   C. To a great extent (50% -80% of asset models)  
   D. Completely (>80% of asset models)

**WAM-4.3** Have you implemented optimization between and across your asset fleet?
   A. Little or none  
   B. A little (<10% - 49% of asset classes)  
   C. To a great extent (50% -80% of asset classes)  
   D. Completely (>80% of asset classes)

**WAM-4.4** Do you have condition based and predictive maintenance on key components?
   A. A little or none  
   B. A little (10% - 49% of key components)  
   C. To a great extent (50% - 80% of key components)  
   D. Completely (>80% of key components)
Customer Management and Experience

CME-4.1 Do you support customer analysis of actual usage within all pricing programs?
   A. A little or none
   B. To a great extent (available >70% of customers for all programs)
   C. completely

CME-4.2 Do you have automatic outage detection and proactive notification at the circuit level?
   A. No
   B. In development
   C. A little (10% - 29% of circuits)
   D. To a great extent (30% - 80% of circuits)
   E. Completely (>80% of circuits)

CME-4.3 Do you have automated response to pricing signals for major energy using devices within a premise?
   A. No
   B. In development
   C. A little (10% - 30% of all customers)
   D. To a great extent (30% - 80% of all customers)
   E. Completely (>80% of all customers)

CME-4.4 Do you have net billing procedures enabled in the home (e.g., vehicle to grid)?
   A. No
   B. In development
   C. A little (available to 10% - 29% of all customers)
   D. To a great extent (available to 30% - 80% of all customers)
   E. Completely (available to >80% of all customers)

CME-4.5 Do you have recent customer usage data (e.g. daily)?
   A. No
   B. In development
   C. A little (10% - 29% of all customers)
   D. To a great extent (30% - 80% of all customers)
   E. Completely (>80% of all customers)

CME-4.6 Have you integrated a common customer experience across all means of interfacing with residential customers for all services provided (e.g., leveraging common data sources)?
   A. No
   B. In development
   C. Integrated across three or more channels (e.g. web, VRU, hand-holds, mass media, etc.)
   D. Integrated across all channels (e.g. web, VRU, etc.)
TECH-4.1 Are your business processes optimized leveraging your enterprise IT architecture (e.g., through lean, six sigma, etc.)
   A. No
   B. A little (10% - 49% of impactable processes)
   C. To a great extent (50% - 80% of impactable processes)
   D. Completely (>80% of all impactable processes)

TECH-4.2 Do you have world-aware systems that drive complex event processing and granular monitoring/control?
   A. No
   B. In development
   C. A little (10% - 49% of applicable systems)
   D. To a great extent (50% - 80% of applicable systems)
   E. Completely (>80% of applicable systems)

TECH-4.3 Do you have end-to-end data flow (e.g. from customer to generation)?
   A. No
   B. In development
   C. A little (connecting 10% - 49% of customers and sources)
   D. To a great extent (50% - 80% of customers and sources)
   E. Completely (>80% of customers and sources)

TECH-4.4 Do you have predictive modeling and near real-time simulation for support processes (e.g., analytics drive optimization)?
   A. No
   B. In development
   C. A little (10% - 49% of impactable processes)
   D. To a great extent (50% - 80% of impactable processes)
   E. Completely (>80% of impactable processes)

TECH-4.5 Is technology deployed and utilized to improve enterprise performance (e.g., business intelligence or knowledge management tools)?
   A. No
   B. In development
   C. A little (10% - 49% of impactable processes are improved due to smart grid technology)
   D. To a great extent (50% - 80% of impactable processes)
   E. Completely (>80% of impactable processes)
**Value Chain Integration**

**VCI-4.1**  If you have available energy resources, whether they are new or existing, are they dispatchable and tradable (including resources such as Volt/Var, DR, DG)?
A. No  
B. In development  
C. Partly in place (for one resource)  
D. Mostly in place (for two or more resources)  
E. Completely in place (for all available resources)

**VCI-4.2**  Do you have expanded portfolio optimization models to accommodate new resources and real-time markets?
A. No  
B. In development  
C. Partly in place (for at least one new resource, e.g., demand response)  
D. Mostly in place (for multiple resources)  
E. Completely in place (for all available resources)

**VCI-4.3**  Are you able to communicate with home automation networks?
A. No  
B. In development  
C. A little (available to 10% - 49% of customers for common HAN systems)  
D. To a great extent (50% - 80% of customers)  
E. Completely (>80% of customers)

**VCI-4.4**  Do you have visibility and control of customer’s large demand appliances?
A. No  
B. In development  
C. A little (supporting 10% - 49% of customers for enabled appliances)  
D. To a great extent (50% - 80% of customers)  
E. Completely (>80% of customers)
Societal and Environmental

SE-4.1 Do you collaborate with outside stakeholders on societal and environmental issues?
A. No
B. Key stakeholders for key issues
C. All stakeholders for key issues
D. All stakeholders for all issues

SE-4.2 Do you report/scorecard your environmental performance to all internal and external stakeholders?
A. No
B. A little
C. To a great extent
D. Completely

SE-4.3 Do you have programs to shave peak demand using all potentials methods?
A. No
B. In development
C. A little
D. To a great extent (>70% of all potential methods)
E. For every potential method (e.g., DR, pricing signals, managing end user devices, etc.)

SE-4.4 Do you have active management of end user energy usage and devices?
A. No
B. In development
C. A little (supporting 10% - 49% of customers)
D. To a great extent (50% - 80% of customers supporting most common devices)
E. Completely (>80% of customers for wide range of devices)
5 Level 5: Innovating – Next Wave of Improvements

**Strategy, Management, and Regulatory**

SMR-5.1 Has your organization’s strategy expanded due to insights gained through deployed smart grid capabilities?
   A. No
   B. A little
   C. Moderately
   D. Extensively
   E. Total transformation

SMR-5.2 Has smart grid changed your rate design and regulatory policies such that you can effectively invest in new technologies and products and recover costs efficiently?
   A. No
   B. Limited
   C. Moderately
   D. Extensively

SMR-5.3 Have you identified and implemented new business models as a result of smart grid enablement?
   A. No
   B. Limited
   C. Moderately
   D. Extensively
   E. Total transformation

**Organization and Structure**

OS-5.1 Are internal and external stakeholders collaboratively engaged in key aspects of your business, where appropriate?
   A. No
   B. Not appropriate
   C. To some extent
   D. Moderately
   E. To all aspects of your business

OS-5.2 Does your organization adapt via organizational changes to support new ventures, products and services as they emerge?
   A. No
   B. To some extent
   C. To a great extent (e.g., optimizing collaboration and data flow, etc.)
   D. Always
**Grid Operations**

**GO-5.1** Are self-healing operations in place (e.g., a grid that is capable of automatically anticipating and responding to power system disturbances while optimizing performance and service)?

A. A little or none  
B. A little (across 10% - 49% of your grid)  
C. To a great extent (50% - 80% of your grid)  
D. Completely (>80% of your grid)

**GO-5.2** Do you have analytics-based and automated decision-making system-wide (applying proven analytics-based control)?

A. No  
B. A little (across 10% - 49% of your systems)  
C. To a great extent (50% - 80% of your systems)  
D. Completely (>80% of your systems)

**GO-5.3** Do you have optimized rate design and regulatory policies (beneficial regulatory treatment for investments made and risks taken)?

A. No  
B. A little  
C. To a great extent  
D. In all cases (investment costs are naturally recovered due to optimized rate design)

**Work and Asset Management**

**WAM-5.1** Are you optimizing the use of assets between and across supply chain participants (processes defined and executing across partners)?

A. Little or none  
B. A little (across 10% - 49% of asset classes and partners)  
C. To a great extent (50% - 80% of asset classes and partners)  
D. Completely (>80% of asset classes and partners)

**WAM-5.2** Do you have just in time retirement of assets using smart grid actual and recent data?

A. Little or none  
B. A little (10% - 49% of asset classes)  
C. To a great extent (50% - 80% of asset classes)  
D. Completely (>80% of asset classes)
**Customer Management and Experience**

CME-5.1 Can your customers manage their end-to-end energy supply and usage levels (energy source and mix)?
- A. No
- B. A little (available to 10% - 49% of customers)
- C. To a great extent (50% - 80% of customers, ability to adjust on demand)
- D. Completely (>80% of customers, ability to adjust on demand)

CME-5.2 Do you have automatic outage detection at the customer level (e.g., at the device)?
- A. No
- B. A little (available to 10% - 49% of customers)
- C. To a great extent (50% - 80% of customers)
- D. Completely (>80% of customers)

CME-5.3 Do you support plug-and-play customer-based generation (including necessary support infrastructure such as net billing, control, etc.)?
- A. No
- B. A little (available to 10% - 49% of customers)
- C. To a great extent (50% - 80% of customers)
- D. Completely (>80% of customers)

CME-5.4 Do you provide customers near real-time data on usage?
- A. No
- B. A little (available to 10% - 49% of customers)
- C. To a great extent (50% - 80% of customers)
- D. Completely (>80% of customers)

**Technology**

TECH-5.1 Do you have autonomic computing and/or machine learning?
- A. No
- B. In development
- C. A little
- D. Extensively

TECH-5.2 Are your IT standards applied pervasively throughout your enterprise?
- A. No
- B. A little (given experience in deployment of smart grid technology through level 4)
- C. To a great extent (given experience in deployment of smart grid through level 4)
- D. Complete, leading the development of emerging standards (given experience in deployment of smart grid)
**Value Chain Integration**

VCI-5.1 Are dispatchable resources controllable for granular market options (e.g., Locational Marginal Pricing)?
   A. No
   B. In development
   C. A little (supporting 30% - 49% of resources)
   D. To a great extent (50% - 80% of resources)
   E. Completely (>80% of resources)

VCI-5.2 Do you have coordinated energy management of generation throughout your supply chain through near real-time data transfer?
   A. No
   B. In development
   C. A little (supporting 30% - 49% of supply chain participants)
   D. To a great extent (50% - 80% of supply chain participants)
   E. Completely (>80% of supply chain participants)

VCI-5.3 Do you enable and support integrated optimization of entire energy assets across the value chain (consumer to operator)?
   A. No
   B. In development
   C. A little (supporting 30% - 49% of energy assets)
   D. To a great extent (50% - 80% of energy assets)
   E. Completely (>80% of energy assets)

**Societal and Environmental**

SE-5.1 Do you meet or exceed “triple bottom line” targets?
   A. No
   B. A little
   C. Moderately
   D. To a great extent

SE-5.2 Are customers able to manage their own usage?
   A. No
   B. In development
   C. A little (available to 10% - 49% of customers)
   D. To a great extent (50% - 80% of customers)
   E. Completely (>80% of customers)

SE-5.3 Do you have tailored analytics and advice to customers?
   A. No
   B. In development
   C. A little (available to 10% - 49% of customers)
   D. To a great extent (50% - 80% of customers)
   E. Completely (>80% of customers)
Glossary of Terms

**Automation, substation**
Substation automation goes beyond traditional SCADA to provide added capability and information that can further improve operations and maintenance, increase system and staff efficiencies, and leverage and defer major capital investments. Applications and data of interest may include remote access to IED/relay configuration ports, waveforms, event data, diagnostic information, video for security or equipment status assessment, metering, switching, volt/VAR management, and others maintain uninterrupted power services to the end users.

**Connect/disconnect, remote**
The ability to connect or disconnect service to a customer without sending a technician to the physical location.

**Estimate of Restoration Time (ERT) accuracy**
The percentage of actual restoration times (time from outage detection until service is restored to a customer, or actual clock time of restoration) that meet or exceed the initial ERT.

**Field visit**
An event where utility personnel go to a physical location to operate, maintain, or inspect some aspect of their grid.

**Industrial customers**
Customers that have factories or are involved in manufacturing; they typically have the highest energy needs. Other customers are residential and commercial.

**Line losses**
Energy waste resulting from the transmission of electrical energy across power lines.

**Operating costs**

**Personnel cost:** The cost associated with personnel compensation and fringe benefits of employees (i.e., those classified as FTEs, which includes both full-time and part-time salaried and hourly employees) contributing to each respective process. Personnel cost should include all of the following costs: employee compensation (includes salaries and wages, bonuses, overtime, and benefits), fringe (includes contributions made towards the employees’ government retirement fund), workers compensation, insurance plans, savings plans, pension funds/retirement plans, and stock purchase plans. This should also include special allowances, such as relocation expenses and car allowances.

**Systems cost:** Include all expenses, paid or incurred, in conjunction with computer hardware or computer software acquired by the organization or provided to the organization through service contracts. Any related costs to process, service and maintain computer hardware or computer software. The costs of providing and maintaining services for each applicable process (e.g., computer system(s)
processing (CPU) time, network/system communication charges, maintenance costs for applications and data storage). This includes the costs related to LANs, WANs, etc. This does not include one-time costs for major new systems developments/replacements. Consultant fees should not be included in depreciation of new system implementations. Include only those costs that occur more than six (6) months after implementation, as normal system maintenance costs.

Any systems cost (e.g., maintenance) which is outsourced to a third-party supplier should be captured in the separate cost category labeled outsourced cost. All salaries, overtime, employee benefits, bonuses or fees paid to full-time, part-time or temporary employees or independent contractors who perform services relating to computer hardware, computer software, processing or systems support.

**Overhead cost:** For the purpose of this study, provide the total actual overhead costs for the year related to the specified process. These are costs that cannot be identified as a direct cost of providing a product or a service. Include the primary allocated costs such as occupancy, facilities, materials handling equipment, fleet equipment, utilities, facility, materials handling and fleet maintenance costs, and other major costs allocated to the consuming departments. Exclude systems costs that are allocated, since these will be captured separately as systems cost.

**Other costs:** Other costs are costs associated with the specified process, but not specifically covered in personnel cost, systems cost, overhead cost and outsourced cost in this questionnaire. These other costs include costs for supplies and office equipment, travel, training and seminars. Include the cost of telephones, except for that portion captured in systems cost.

**Outsourced cost:** In determining outsourced cost, include the total cost of outsourcing all aspects of the specified process to a third-party supplier or third party logistics provider. Exclude one-time charges for any type of restructuring or reorganization. Outsourced costs should also include costs for intracompany outsourcing (i.e., reliance on a shared services center).

**Outage duration**

The time from first indication of outage to restoration of service to all impacted customers.

**Outage frequency**

Total number of customer interruptions/total number of customers over a year; this is the same as SAIFI.

**Recover Strategy, cost or rate**

A strategy for how a utility will manage reduced revenue and/or increased costs from the implementation of smart grid; this must be worked with regulators to ensure viability.

**Revenue**

For the purpose of this survey, total annual revenue is net revenue generated from the sale of products or services. This should reflect the selling price less any allowances such as quantity, discounts, rebates and returns.

**Total customer count**

Total number of customers, not meter count (since some customers may have multiple meters).