



SGMM

Smart Grid Maturity Model

SGMM Around the World

May 15, 2014

Notices

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About the Speaker



Jeffere H. Ferris is a managing consultant in IBM's Global Center of Competency for Energy and Utilities, specialized in business case and roadmap development. He develops and executes business strategies for a range of utility clients in North American, Europe, Asia, and Australia. He offers depth with business case assessment, performance improvement and large initiative planning across utility Smart Grid planning and development.

Polling Question #1

How familiar are you with the SGMM?

- a) Not at all familiar
- b) Somewhat familiar
- c) Familiar
- d) Very familiar

Webinar objectives

The objectives are for you to learn:

- benefits of using a common model and data
- why the model applies to many different utility types without needing to be customized
- the demographics, structure, motivations, and maturity of the utilities included in the SGMM database
- how conclusions about utility peer groups are supported by actual data
- the importance of the Navigators in interpreting a utility's results and setting goals

A major power grid transformation is underway

How can utilities

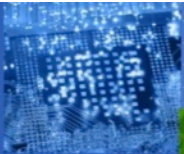
- Develop effective roadmaps?
- Track progress?
- Understand their posture in comparison to peers?

The Smart Grid Maturity Model was developed by utilities to address these concerns



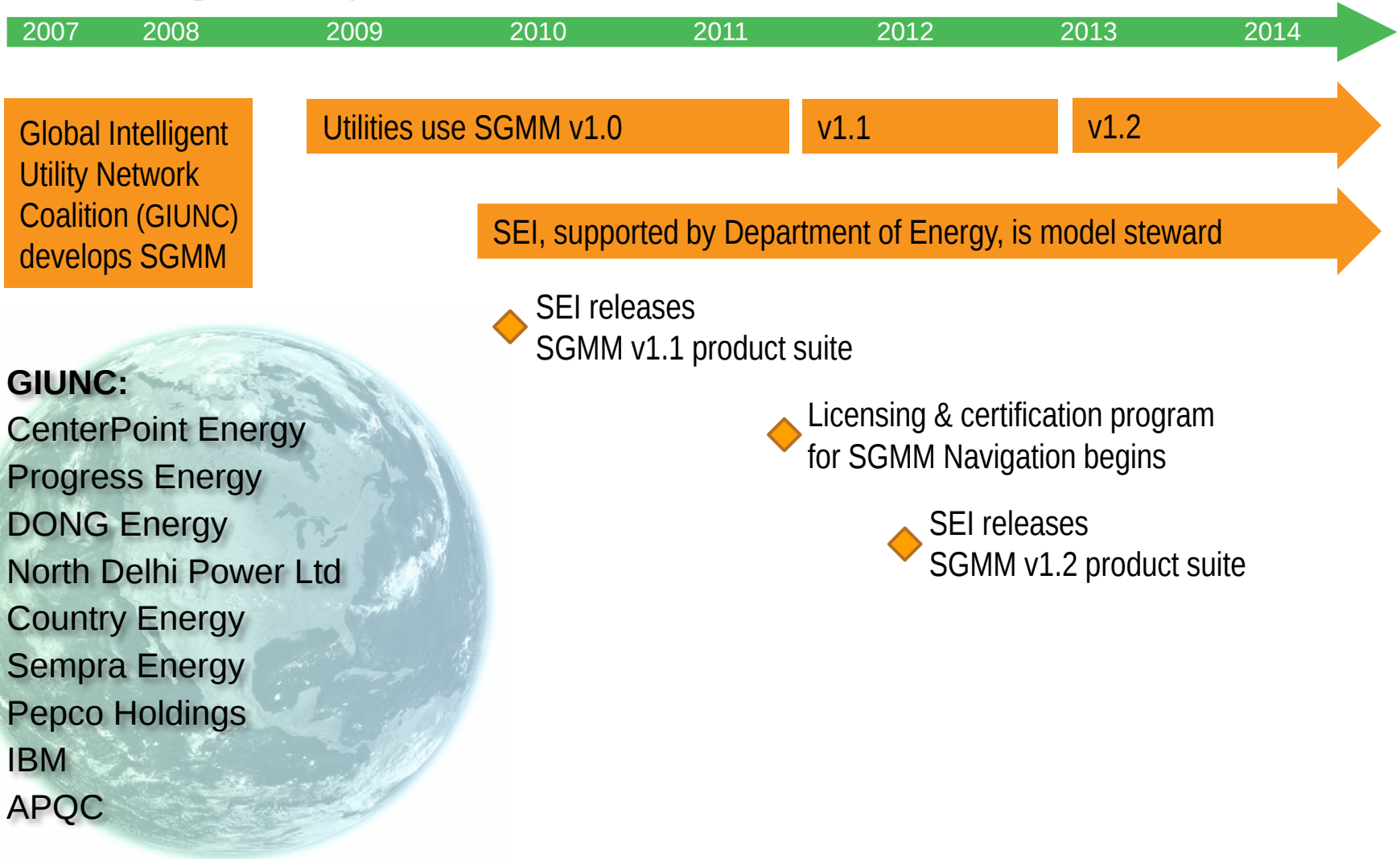
The Smart Grid Maturity Model is

A management tool
that provides a
common language and framework
for defining key elements of
smart grid transformation
and helping utilities develop a
programmatically approach
and track their progress



SGMM Timeline

Developed by Utilities for Utilities



The Software Engineering Institute

The SEI is a federally-funded research and development center at Carnegie Mellon University, a global university **recognized worldwide** for its energy and environmental research initiatives.

A **trusted, objective source** of best practices, methods and tools to organizations worldwide, the SEI is a **global leader** in software and systems engineering, process improvement and security best practices – all critical elements of smart grid success.

The SEI collaborates in **public-private partnership** with government and industry on important cybersecurity, architecture, and interoperability challenges of the smart grid. The Department of Energy sponsored the SEI's smart grid efforts.



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Mellon
University**

The SEI's Role as Steward of the SGMM



As a trusted third party between government and industry, and as part of the internationally recognized Carnegie Mellon University, the SEI

- provides **governance** working with multiple stakeholders
- enables **widespread availability**, adoption, and use of the model for the benefit of the community
- **evolves the model** based on stakeholder needs, market developments, user feedback, and interactions with domain experts
- develops **transition** mechanisms—education, training, awareness, research collaboration—to support the model
- grows the SGMM **community** of users worldwide

SGMM at a glance

6 Maturity Levels: Defined sets of characteristics and outcomes

5	- Smart grid strategy capitalizes on smart grid as a foundation for the introduction of new services and product offerings. - Smart grid business activities provide sufficient financial resources to enable continued investment in smart grid sustainment and expansion. - New business model opportunities emerge as a result of smart grid capabilities and are implemented.	- The organizational structure enables collaboration with other grid stakeholders to optimize overall grid operation and health. - The organization is able to readily adapt to support new ventures, products, and services that emerge as a result of smart grid. - Channels are in place to harvest ideas, develop them, and regard those who help shape future advances in process, workforce complexities, and technology.	- Self-healing capabilities are present. - System-wide, analytics-based, and automated grid decision making is in place.	- The use of assets between and across supply chain participants is optimized with processes defined and executed across the supply chain. - Assets are leveraged to maximize utilization, including just-in-time asset retirement, based on smart grid data and systems.	- Autonomic computing and machine learning are implemented. - The enterprise information infrastructure can automatically identify, mitigate, and recover from cyber incidents.	- Customers can manage their end-to-end energy supply and usage levels. - There is automatic outage detection at premise or device level. - Plug-and-play, customer-based generation is supported. - Security and privacy for all customer data is assured. - The organization plays a leadership role in industry-wide information sharing and standards development efforts for smart grid.	- The optimization of energy assets is automated across the full value chain. - Resources are adequately dispatchable and controllable so that the organization can take advantage of granular market options. - The organization's automated control and resource optimization schemes consider and support regional and/or national grid optimization.	- Triple bottom line goals align with local, regional, and national objectives. - Customers control their energy-based environmental footprints through automatic optimization of their end-to-end energy supply and usage level (energy source and mix). - The organization is a leader in developing and promoting industry-wide resilience best practices and/or technologies for protection of the national critical infrastructure.
4	- Smart grid vision and strategy drive the organization's strategy and direction. - Smart grid is a core competency throughout the organization. - Smart grid strategy is shared and revised collaboratively with external stakeholders.	- Management systems and organizational structure are capable of taking advantage of the increased visibility and control provided through smart grid. - There is end-to-end grid observability that can be leveraged by internal and external stakeholders. - 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.	- Operational data from smart grid deployments is being used to optimize processes across the organization. - Grid operational management is based on near real-time data. - Operational forecasts are based on data gathered through smart grid. - Grid operations information has been made available across functions and LOBs. - There is automated decision-making within protection schemes that is based on wide-area monitoring.	- A complete view of assets based on status, connectivity, and proximity is available to the organization. - Asset models are based on real performance and monitoring data. - Performance and usage of assets is optimized across the asset fleet and across asset classes. - A service life for key grid components is managed through condition-based and predictive maintenance, and is based on real and current asset data.	- Data flows end to end from customer to generation. - Business processes are optimized by leveraging the enterprise IT architecture. - Systems have sufficient wide-area situational awareness to enable real-time monitoring and control for complex events. - Predictive modeling and near real-time simulation are used to optimize support processes. - Performance is improved through sophisticated systems that are informed by smart grid data. - Security strategy and tactics continually evolve based on changes in	- Support is provided to customers to help analyze and compare usage against all available pricing programs. - There is outage detection and proactive notification at the circuit level. - Customers have access to near real-time data on their own usage. - Residential customers participate in demand response and/or utility-managed remote load control programs. - Automatic response to pricing signals for devices within the customer's premise is supported. - In-home net billing programs are enabled. - A common customer experience has been integrated.	- Energy resources (including VEH, DER, and DER) are dispatchable and tradable. - Portfolio optimization models that encompass available resources and real-time markets are implemented. - Secure two-way communications with Home Area Networks (HANs) are available. - Visibility and potential control of customers' large-demand appliances to balance demand and supply is available.	- The organization collaborates with external stakeholders to address environmental and societal issues. - A public environmental and societal scorecard is maintained. - Programs are in place to show peak demand. - End-user energy usage and devices are actively managed through the utility's network. - The organization fulfills its critical infrastructure assurance goals for resiliency, and contributes to those of the region and the nation.
3	- The smart grid vision, strategy, and business case are incorporated into the vision and strategy. - A smart grid governance model is established. - Smart grid leaders with explicit authority across functions and lines of business are designated to ensure effective implementation of the smart grid strategy. - Required authorizations for smart grid investments have been secured.	- The smart grid vision and strategy are driving organizational change. - Smart grid measures are incorporated into the measurement system. - Performance and compensation are linked to smart grid success. - Leadership is consistent in communication and actions regarding smart grid. - A matrix or overlay structure is in place. - Education and training are	- Smart grid information is available across systems and organizational functions. - Control analytics have been implemented and are used to improve cross-LOB decision-making. - Grid operations planning is now fact-based using grid data made	- Performance, trend analysis, and event audit data are available for components of the organization's systems. - CBM programs for key components are in place. - Remote asset monitoring capabilities are integrated with asset management.	- Smart grid-impacted business processes are aligned with the enterprise IT architecture across LOBs. - Systems adhere to an enterprise IT architectural framework for smart grid. - Smart grid-specific technology has been implemented to improve cross-LOB performance.	- The organization tailors programs to customer segments. - Two-way meter communication has been deployed. - A remote connect/disconnect capability is deployed. - Demand response and/or remote load control is available to customers. - There is automatic outage detection at the substation level.	- An integrated resource plan is in place and includes new targeted resources and technologies. - Customer premise energy management solutions with market and usage information are enabled. - Additional resources are available and deployed to provide	- Performance of societal and environmental programs are measured and effectiveness is demonstrated. - Segmented and tailored information that includes environmental and societal benefits and costs is available to customers. - Programs to encourage off-peak usage by customers are in place. - The organization regularly reports on the sustainability and the societal and environmental impacts of its smart grid programs and technologies.
175 Characteristics: Features you would expect to see at each stage of the smart grid journey								
2	- An initial smart grid strategy and a business plan are approved by management. - A common smart grid vision is accepted across the organization. - Operational investment is explicitly aligned to the smart grid strategy. - Budgets are established specifically for funding the implementation of the smart grid vision. - There is collaboration with regulators and other stakeholders regarding implementation of the smart grid vision and strategy. - There is support and funding for conducting proof-of-concept projects to evaluate feasibility and alignment.	- A new vision for a smart grid is articulated and approved by management. - The organization has aligned most operations around end-to-end processes. - Most smart grid implementation and deployment teams include participants from all functions and LOBs that the deployment will impact. - Education and training to develop smart grid competencies have been identified and are available. - The linking of performance and compensation plans to achieve smart grid milestones is in progress.	- Which resource is resource is negligible or originates through - Aside from SCADA, plotting of remote asset monitoring of key grid assets to support manual decision making is underway. - Investment in and expansion of data communications networks in support of grid operations is underway.	- An enterprise-level view of assets monitoring (status, location, status, and interconnectivity) model has been developed. - An organization-wide mobile workforce strategy is in development.	- Standards are selected to support the smart grid strategy within the enterprise IT architecture. - A common technology evaluation and selection process is applied for all smart grid activities. - There is a data communications strategy for the grid. - Pilots based on connectivity to distributed EEs are underway. - Security is built into all smart grid initiatives from the outset.	- The organization is modeling the reliability of grid equipment. - Remote connect/disconnect is being piloted for residential customers. - The impact on the customer of new services and delivery processes is being assessed. - Security and privacy requirements for customer protection are specified for smart grid-related pilot projects and RFPs.	- The vision of smart grid is articulated and approved by management. - Pilots to support a diverse resource portfolio have been conducted. - Secure interactions have been piloted with an expanded portfolio of value chain partners.	- Smart-grid strategies and work plans address societal and environmental issues. - Energy efficiency programs for customers have been established. - The organization considers a "triple bottom line" view when making decisions. - Environmental proof-of-concept projects are underway that demonstrate smart grid benefits. - Increasingly granular and more frequent consumption information is available to customers.
1	- Smart grid vision is developed with a goal of operational improvement. - Experimental implementations of smart grid concepts are supported. - Discussions have been held with regulators about the organization's smart grid vision.	- The organization has articulated its need to build smart grid competencies in its workforce. - Leadership has demonstrated a commitment to change the organization in support of achieving smart grid. - Smart grid awareness efforts to inform the workforce of smart grid activities have been initiated.	- Business cases for new equipment and systems related to smart grid are approved. - New sensors, switches, and communications technologies are evaluated for grid monitoring and control. - Proof-of-concept projects and component testing for grid monitoring and control are underway. - Design and distribution management systems linked to substation automation are being explored and evaluated. - Safety and security (physical and cyber) requirements are	- Enhancements to work and asset management have been built into approved business cases. - Potential uses of remote asset monitoring are being evaluated. - Asset and workforce management equipment and systems are being evaluated for their potential alignment to the smart grid vision.	- An enterprise IT architecture exists or is under development. - Existing or proposed IT architecture has been evaluated for quality attributes that support smart grid applications. - A change control process is used for applications and IT infrastructure. - Opportunities are identified to use technology to improve departmental performance. - There is a process to evaluate and select technologies in alignment with smart grid vision and strategies.	- Research is being conducted on how to use smart grid technologies to enhance the customer's experience, benefits, and participation. - Security and privacy implications of smart grid are being investigated. - A vision of the future grid is being communicated to customers. - The utility consults with public utility commissions and/or other government organizations concerning the impact on customers.	- Assets and programs necessary to facilitate load management are identified. - Distributed generation sources and the capabilities needed to support them are identified. - Energy storage options and the capabilities needed to support them are identified. - There is a strategy for creating and managing a diverse resource portfolio. - Security requirements to enable interaction with an expanded portfolio of value chain partners have been identified.	- The smart grid strategy addresses the organization's role in societal and environmental issues. - The environmental benefits of the smart grid vision and strategy are publicly promoted. - Environmental compliance performance records are available for public inspection. - The smart grid vision or strategy specifies the organization's role in protecting the nation's critical infrastructure.
0								
SMR	OS	GO	WAM	TECH	CUST	VCI	SE	
Strategy, Management, & Regulatory	Organization & Structure	Grid Operations	Work & Asset Management	Technology	Customer	Value Chain Integration	Societal & Environmental	

8 Domains: Logical groupings of smart grid related characteristics

Smart Grid Maturity Model – levels

PIONEERING

5

Breaking new ground; industry-leading innovation

OPTIMIZING

4

Optimizing smart grid to benefit entire organization; may reach beyond organization; increased automation

INTEGRATING

3

Integrating smart grid deployments across the organization, realizing measurably improved performance

ENABLING

2

Investing based on clear strategy, implementing first projects to enable smart grid (may be compartmentalized)

INITIATING

1

Taking the first steps, exploring options, conducting experiments, developing smart grid vision

DEFAULT

0

Default level (status quo)

Smart Grid Maturity Model – domains

SMR	Strategy, Mgmt & Regulatory <i>Vision, planning, governance, stakeholder collaboration</i>	TECH	Technology <i>IT architecture, standards, infrastructure, integration, tools</i>
OS	Organization and Structure <i>Culture, structure, training, communications, knowledge mgmt</i>	CUST	Customer <i>Pricing, customer participation & experience, advanced services</i>
GO	Grid Operations <i>Reliability, efficiency, security, safety, observability, control</i>	VCI	Value Chain Integration <i>Demand & supply management, leveraging market opportunities</i>
WAM	Work & Asset Management <i>Asset monitoring, tracking & maintenance, mobile workforce</i>	SE	Societal & Environmental <i>Responsibility, sustainability, critical infrastructure, efficiency</i>

WAM Work and Asset Management	
PIONEERING 5	1 The use of assets between and across supply chain participants is optimized with processes defined and executed across the supply chain. 2 Assets are leveraged to maximize utilization, including just-in-time asset retirement, based on smart grid data and systems.
OPTIMIZING 4	1 A complete view of assets based on status, connectivity, and proximity is available to the organization. 2 Asset models are based on real performance and monitoring data. 3 Performance and usage of assets is optimized across the asset fleet and across asset classes. 4 Service life for key grid components is managed through condition-based and predictive maintenance, and is based on real and current asset data.
INTEGRATING 3	1 Performance, trend analysis, and event audit data are available for components of the organization's systems. 2 CBM programs for key components are in place. 3 Remote asset monitoring capabilities are integrated with asset
ENABLING 2	1 An approach to track, inventory, and maintain event histories of assets is in development. 2 An integrated view of GIS for asset monitoring based on
INITIATING 1	1 into approved business cases. 2 Potential uses of remote asset monitoring are being evaluated. 3 Asset and workforce management equipment and systems are being evaluated for their potential alignment to the smart grid vision.
DEFAULT 0	

SGMM Compass Survey

Contains

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

Example questions:

WAM-3.2 Condition-based maintenance programs for key components are in place.

WAM-3.2 For what percentage of key components have you implemented condition-based maintenance that uses real-time data from asset monitoring to drive maintenance and replacement decisions?

- A. 0%
- B. 1 - 25%
- C. 26 - 50%
- D. 51 - 75%
- E. 76 - 100%

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

WAM-2.1 Have you established an approach to track, inventory, and maintain event histories of assets using smart grid capabilities?

- A. No
- B. In documented plan including committed schedule and budget
- C. In development
- D. Being piloted
- E. Completed

SGMM

Smart Grid Maturity Model

V 1.2 Product Suite

Model	Fully described in the Model Definition document
Compass Survey	Questionnaire-based assessment yields maturity ratings and comparisons
Navigation Process	Expert-led workshops to complete Compass and use results to develop consensus aspirations
Training	Overview Seminar and SGMM Navigator Course
Partner Program	License organizations and certify individuals to deliver Navigation process

www.sei.cmu.edu/smartgrid

SGMM Navigation: five-phase, expert-led process



Stakeholders complete SGMM Compass survey

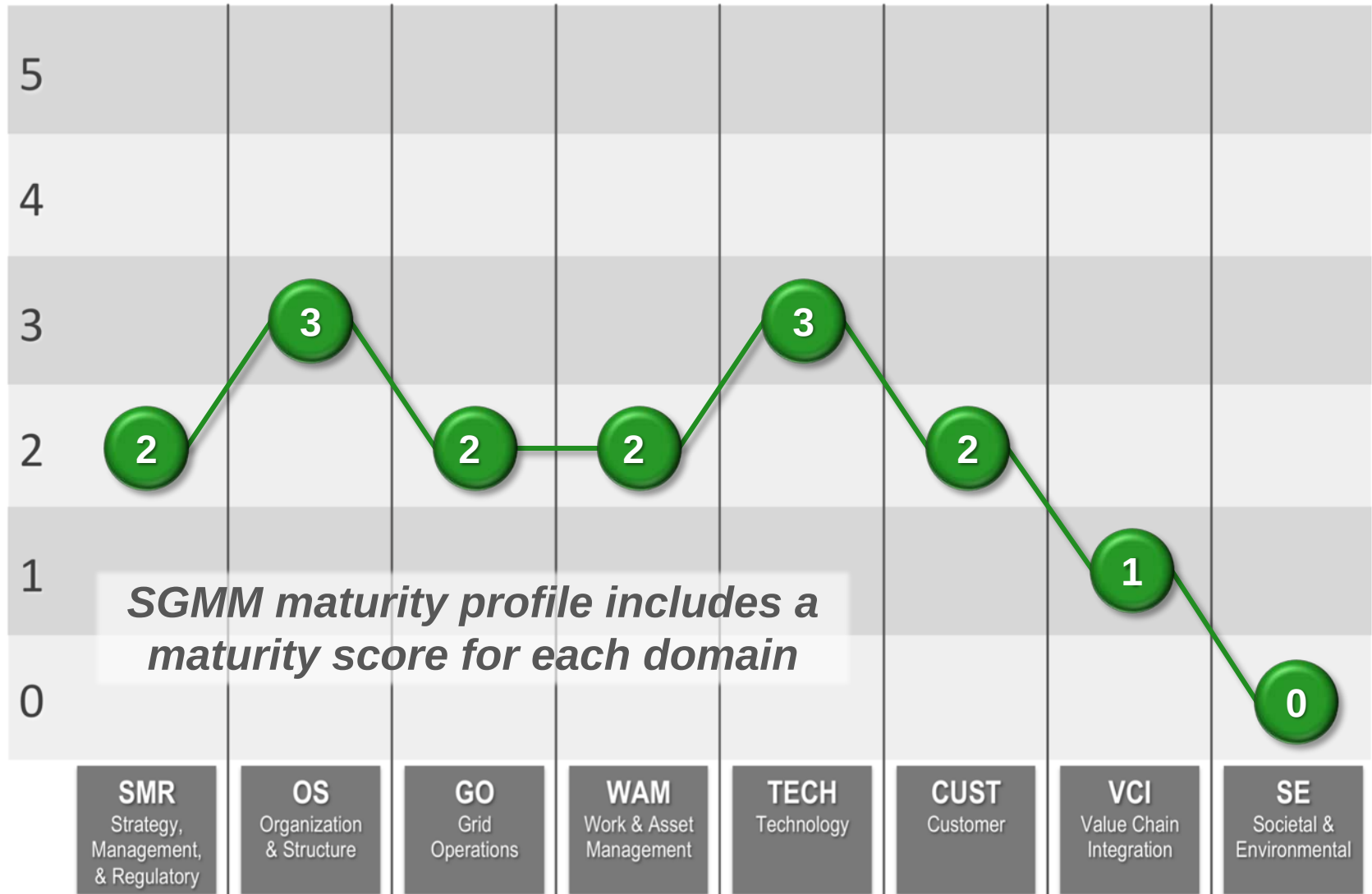
Discussion and consensus answers lead to internal alignment on current state

Stakeholders review survey findings & set aspirational profile

Consensus on aspirational state and identification of motivations, actions, and obstacles to achieve it

Compass results: maturity profile

example results



Compass results: dashboard

example results

Sample Results																
Level	Strategy, Management & Regulatory		Organization & Structure		Grid Operations		Work & Asset Management		Technology		Customer		Value Chain Integration		Societal & Environmental	
5		0.53		0.50		0.25		0.00		0.00		0.20		0.30		0.30
4		0.57		0.17		0.28		0.30		0.40		0.36		0.25		0.40
3		0.65		0.75		0.57		0.47		0.73		0.59		0.58		0.35
2		1.00		0.82		0.93		1.00		1.00		0.92		0.58		0.76
1		0.90		1.00		1.00		1.00		0.84		0.85		0.78		0.68
0		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00

Point Range

Meaning



≥ 0.70

Green reflects level compliance within the domain



≥ 0.40 and < 0.70

Yellow reflects significant progress



< 0.40

Red reflects initial progress

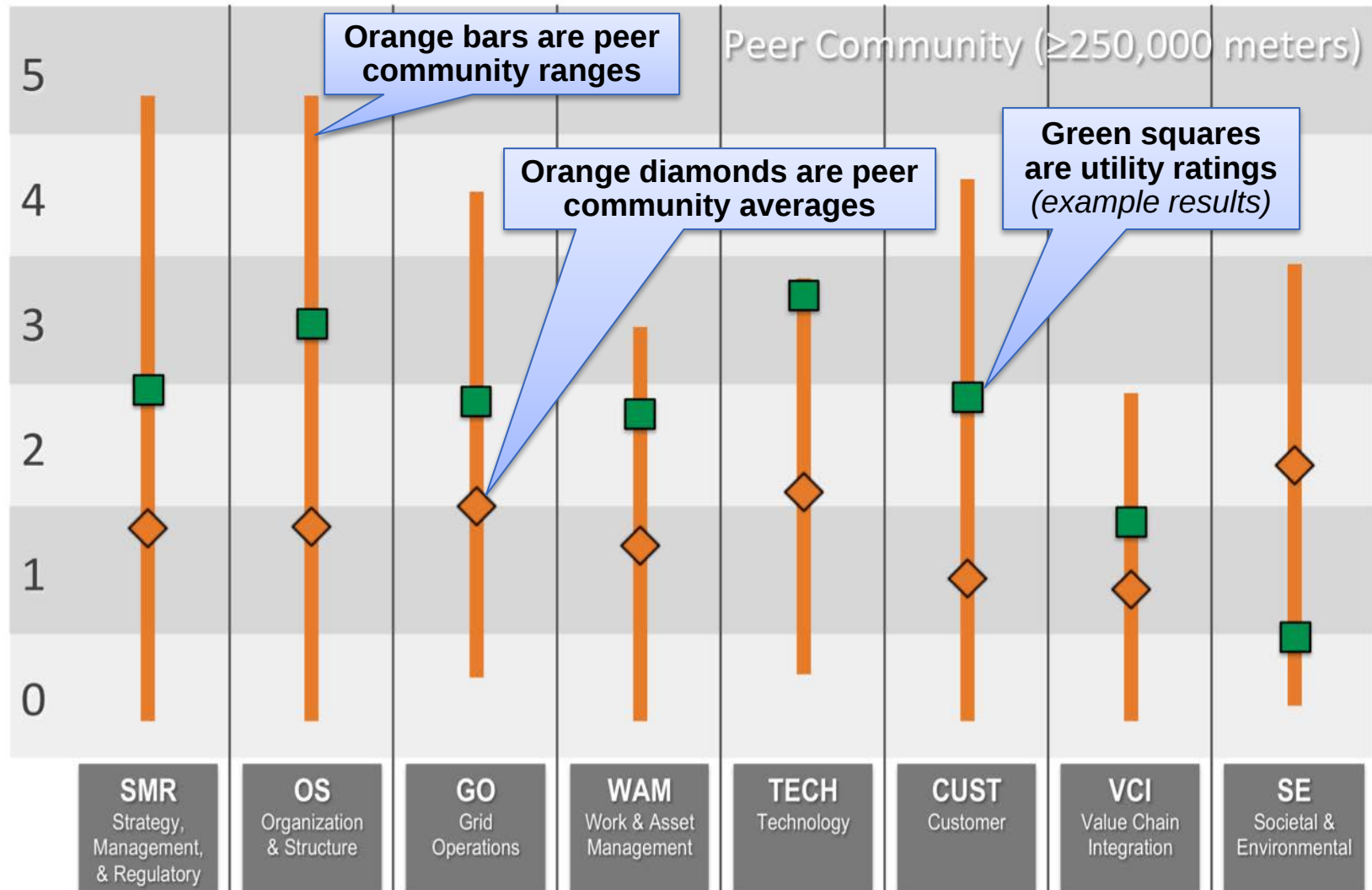


$= 0$

Grey reflects has not started

Compass results: peer community comparison

example results



Strategy, Mgmt, & Regulatory

*Example results
Fictitious organization*

Aspiration setting:

1. Model characteristics are sequentially reviewed, discussed, and considered for levels that have not yet been achieved.
2. Consensus on relevance and importance to organization for achieving characteristics is used to set aspiration.

5	5.3 New business model opportunities emerge as a result of smart grid capabilities and are
	5.2 Smart grid business activities provide sufficient financial resources to enable continued i sustainment and expansion.
	5.1 Smart grid strategy capitalizes on smart grid as a foundation for the introduction of new services and product offerings.
4	4.3 Smart grid strategy is shared and revised collaboratively with external stakeholders.
	4.2 Smart grid is a core c
	4.1 Smart grid v
3	3.4 Required authori
	3.3 Smart grid leaders w implementation of the
	3.2 A smart grid governa
	3.1 The smart grid vision
2	+ 2.6 There is support and
	2.5 There is collaboration with regulators and other stakeholders regarding implementation of the smart grid vision and strategy.
	↓ 2.4 Budgets are established specifically for funding the implementation of the smart grid vision.
	2.3 Operational investment is explicitly aligned to the smart grid strategy.
	2.2 A common smart grid vision is accepted across the organization.
	2.1 An initial smart grid strategy and a business plan are approved by management.
1	★ 1.3 Discussions have been held with regulators about the organization's smart grid vision.
	1.2 Experimental implementations of smart grid concepts are supported.
	1.1 Smart grid vision is developed with a goal of operational improvement.

Aspiration Setting Tool

Strategy, Mgmt, & Regulatory



What motivates this aspiration?

-
-
-
-

What actions must happen to achieve this aspiration?

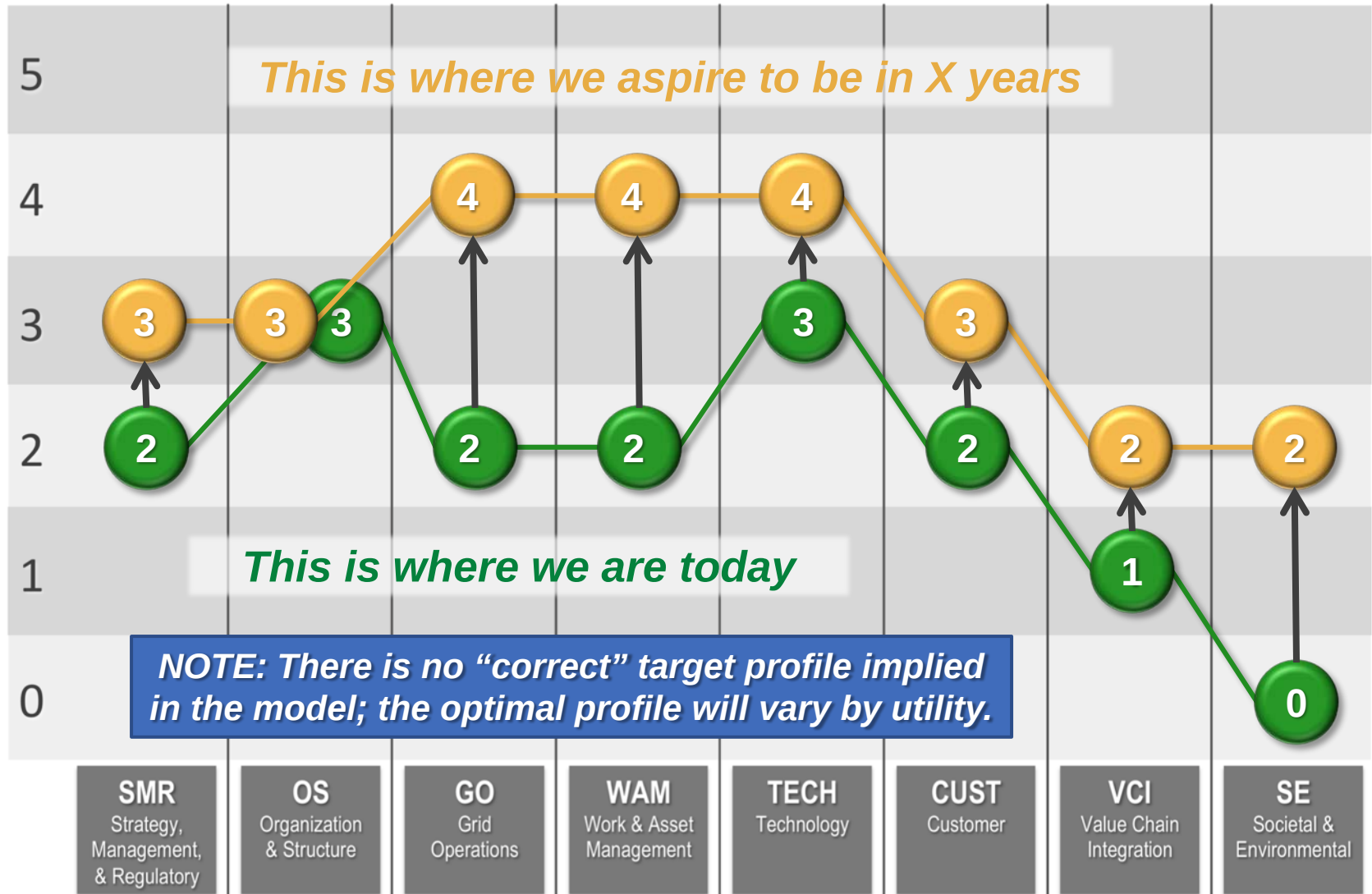
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What obstacles must be overcome to achieve this aspiration?

-
-
-

Navigation results: consensus aspirations

example results

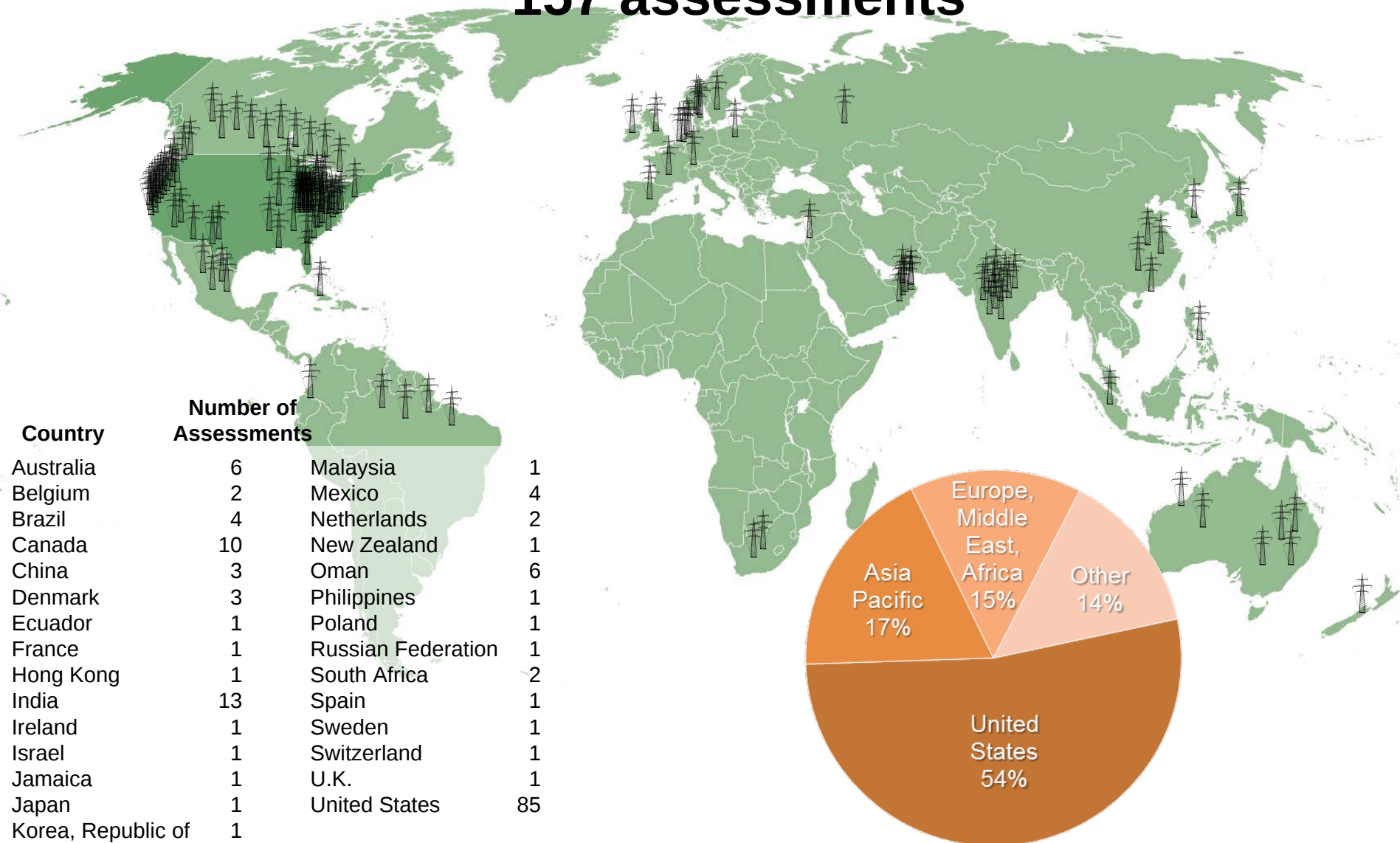


SGMM data

The following charts provide SGMM data from North American grid utilities and the international community:

- SGMM History
- Size (meter count)
- Type
 - Industry participation
 - Service territory (urban vs. rural)
 - Ownership structure
 - Regulatory environment
- Community
 - Partners
 - Navigators
 - Number of assessments per year
- Results
 - Motivations
 - SGMM maturity
 - Repeat users

SGMM History – 142 utilities, 29 countries, 157 assessments



SGMM History – 142 utilities, 29 countries, 157 assessments

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
 CELPE
 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

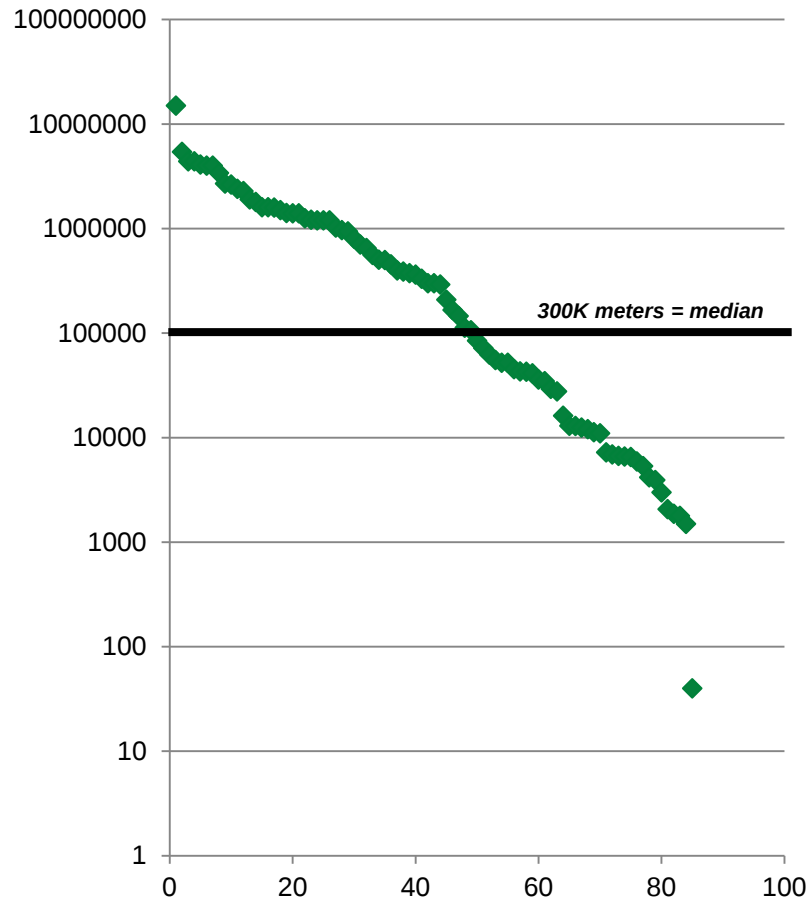
City of Painesville
 City of Palo Alto
 City of Piqua Power System
 City of Riverside Public Utilities
 City of Wapakoneta
 City of Westerville
 CLP Power
 Coldwater Board of Public Utilities
 Comisión Federal de Electricidad-
 Corporativo
 Country Energy
 CPFL Paulista
 Dhofar Power Company S.A.O.C.
 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
 eThekweni 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

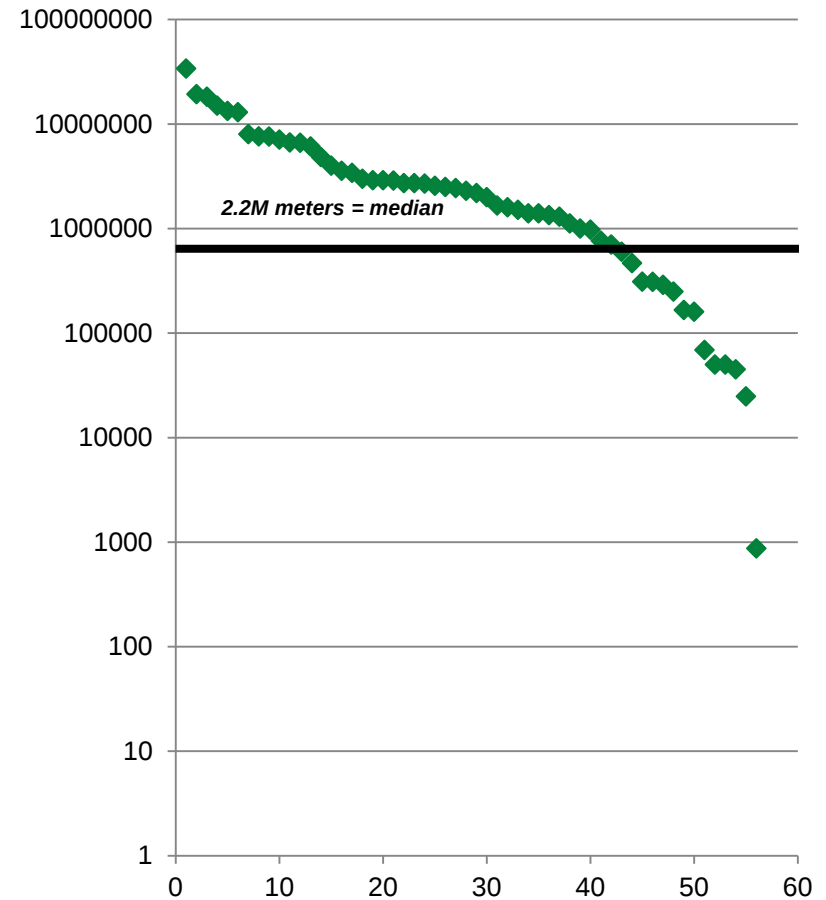
Progress Energy
 Puget Sound
 Redding
 Reliance Energy
 Roseville Electric
 Rural Areas Electricity Company
 Sacramento Municipal Utility District
 Salt River Project
 Santee Cooper
 SCANA
 SDG&E
 SIG Geneva
 Silicon Valley Power
 SMEPC - International Cooperation Dept.
 Snohomish
 Southern Company
 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
 Wyandotte Municipal Service
 Xcel Energy
 Yantarenergo
 Zhejiang Jiaxing Electric Power Bureau

Meter count

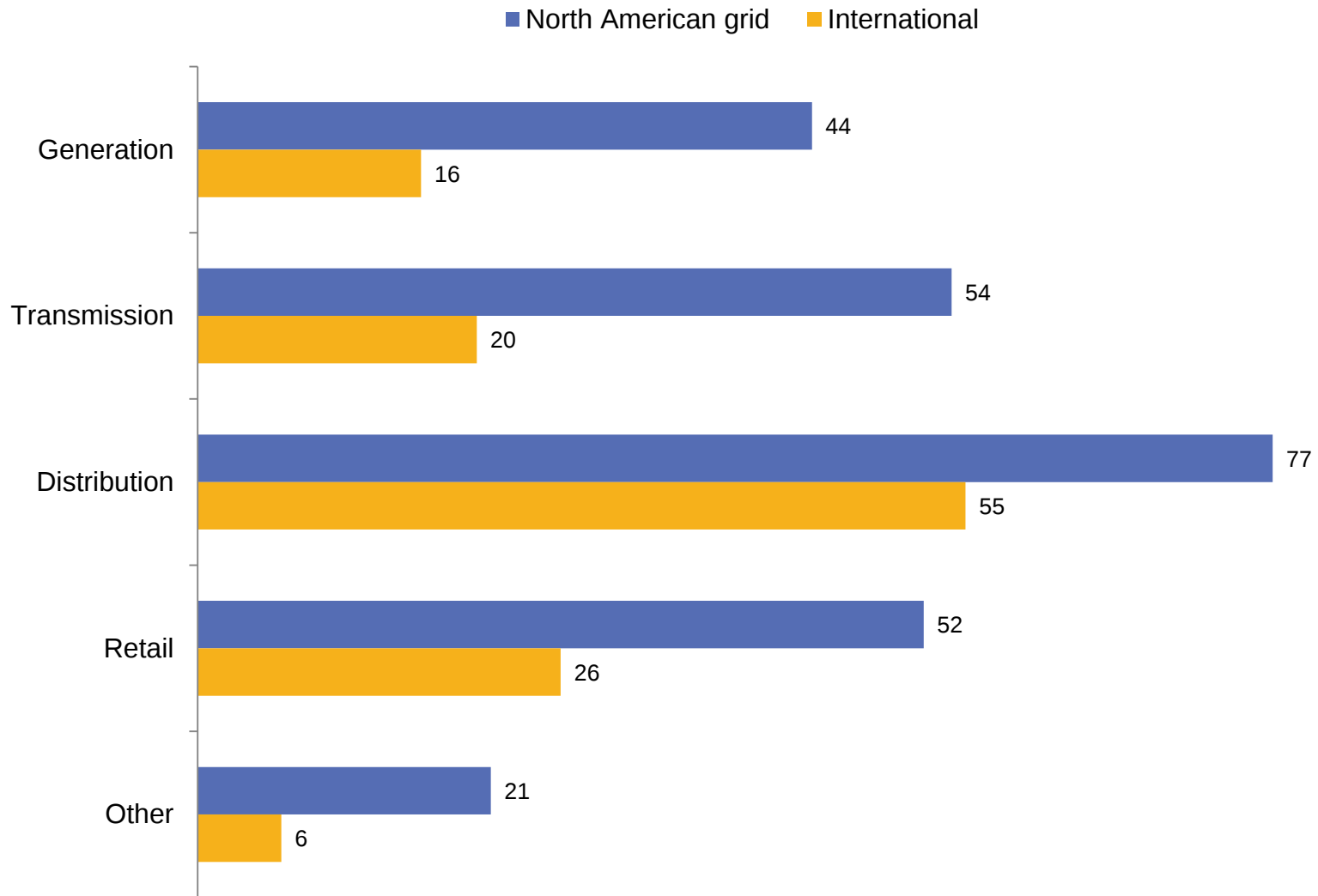
North American grid



International

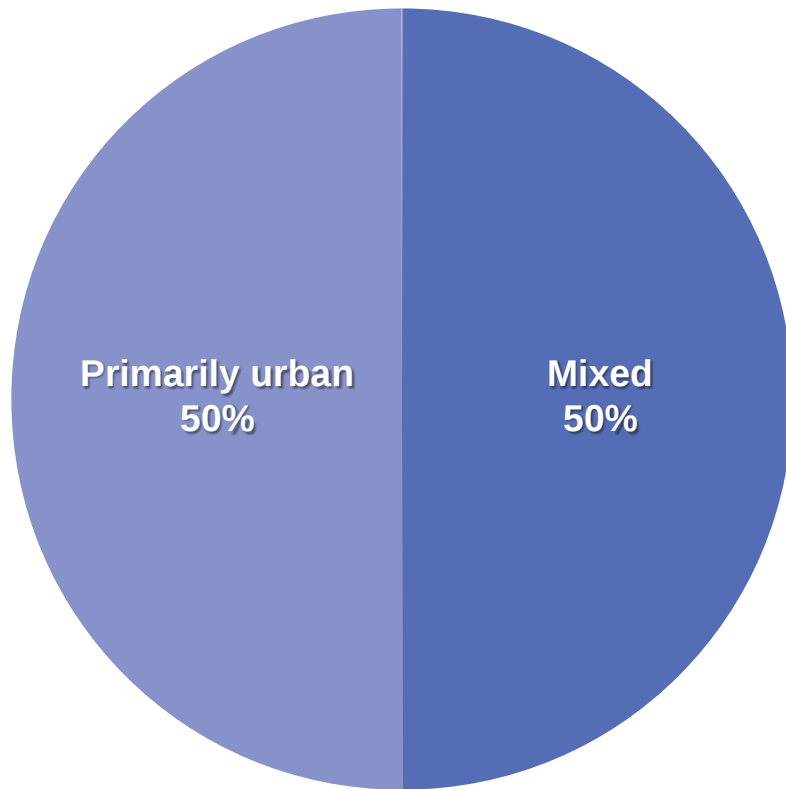


Industry participation

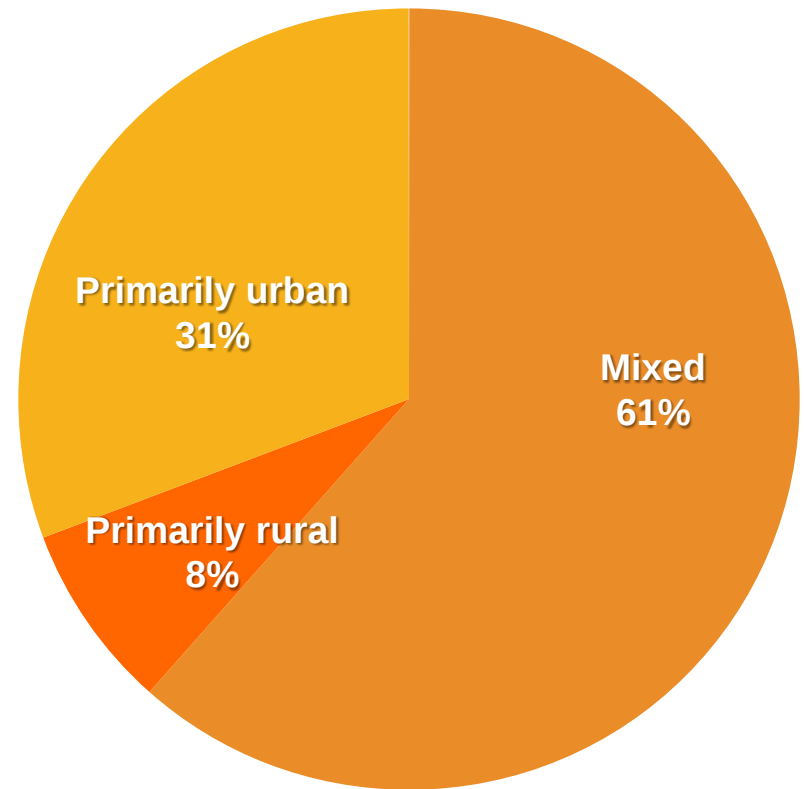


Service territory

North American grid

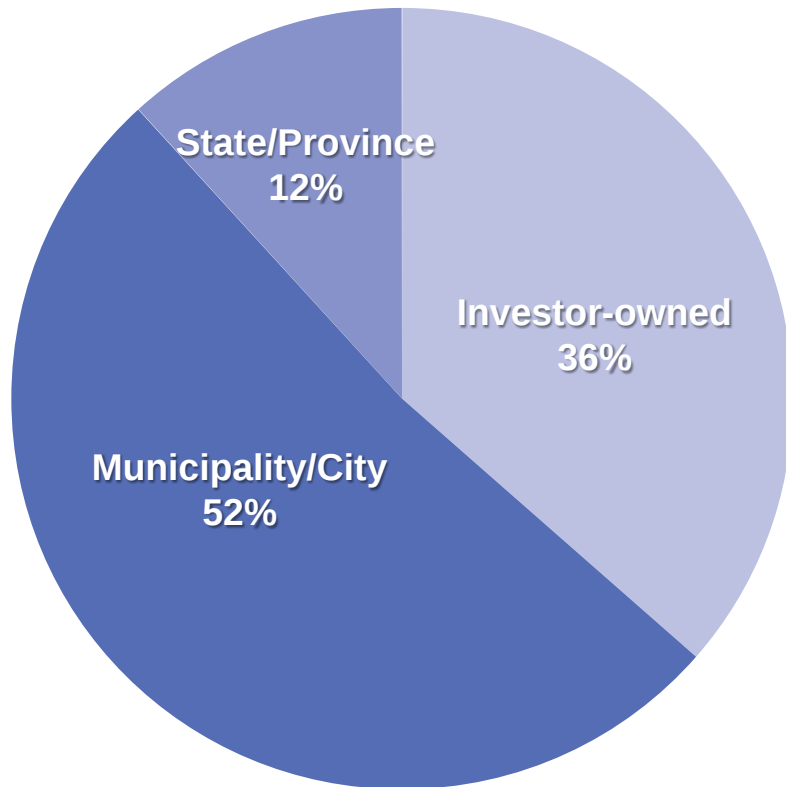


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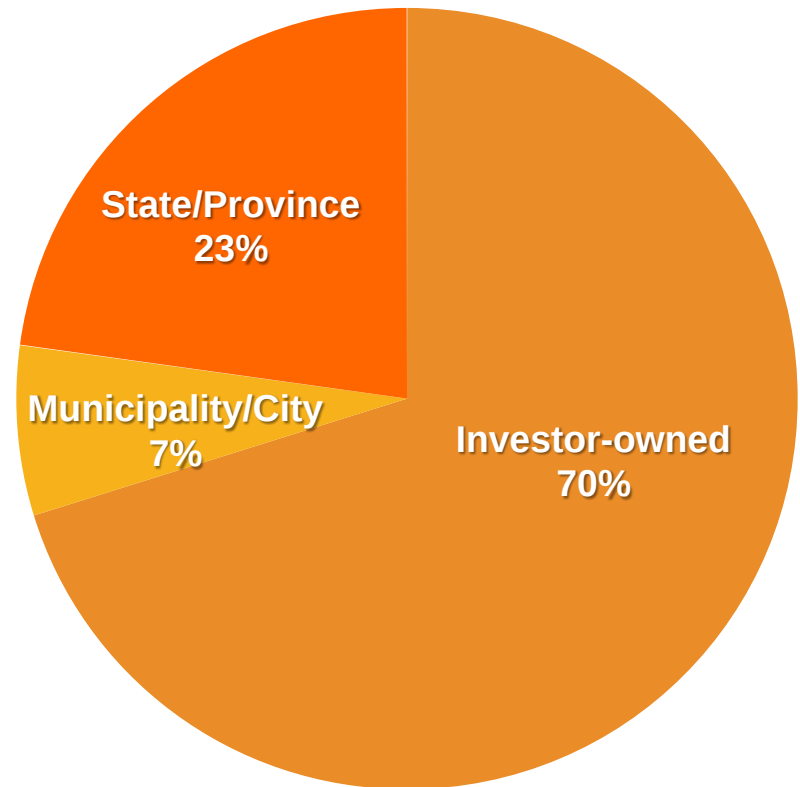


Ownership structure

North American grid

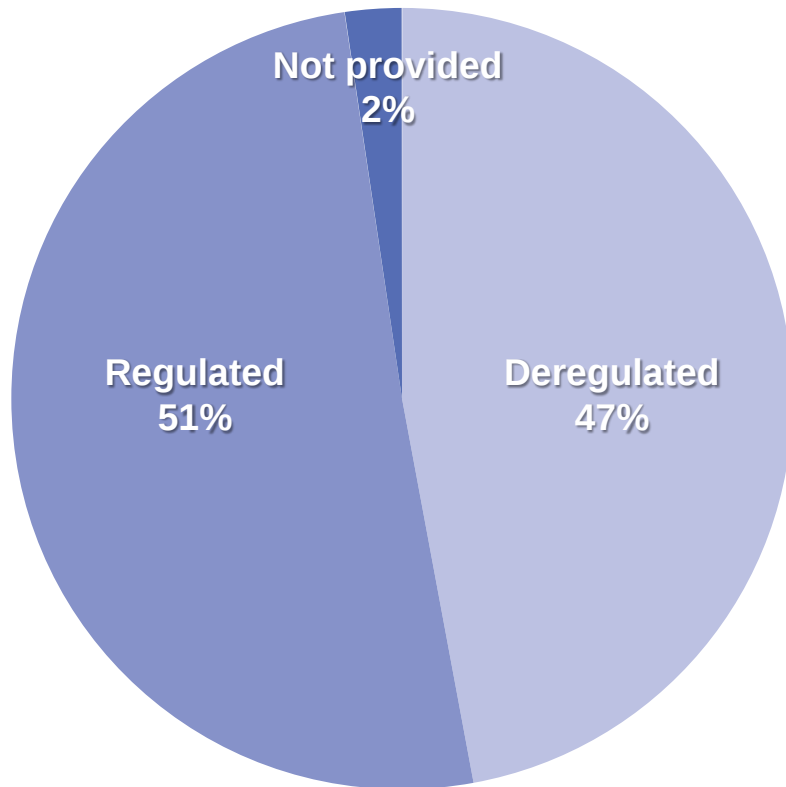


International

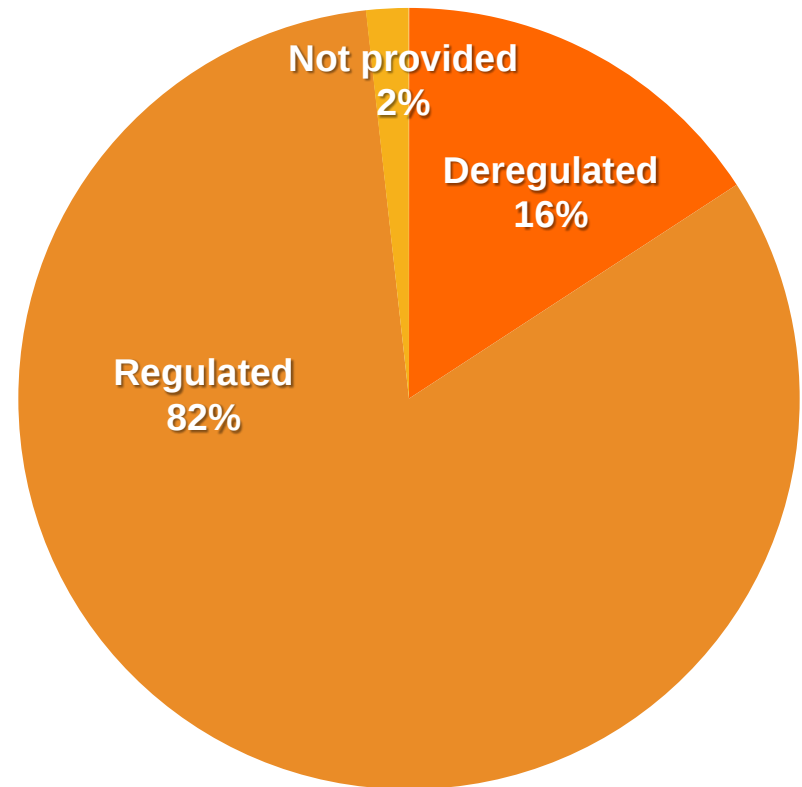


Regulatory environment

North American grid



International



SGMM Partners

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

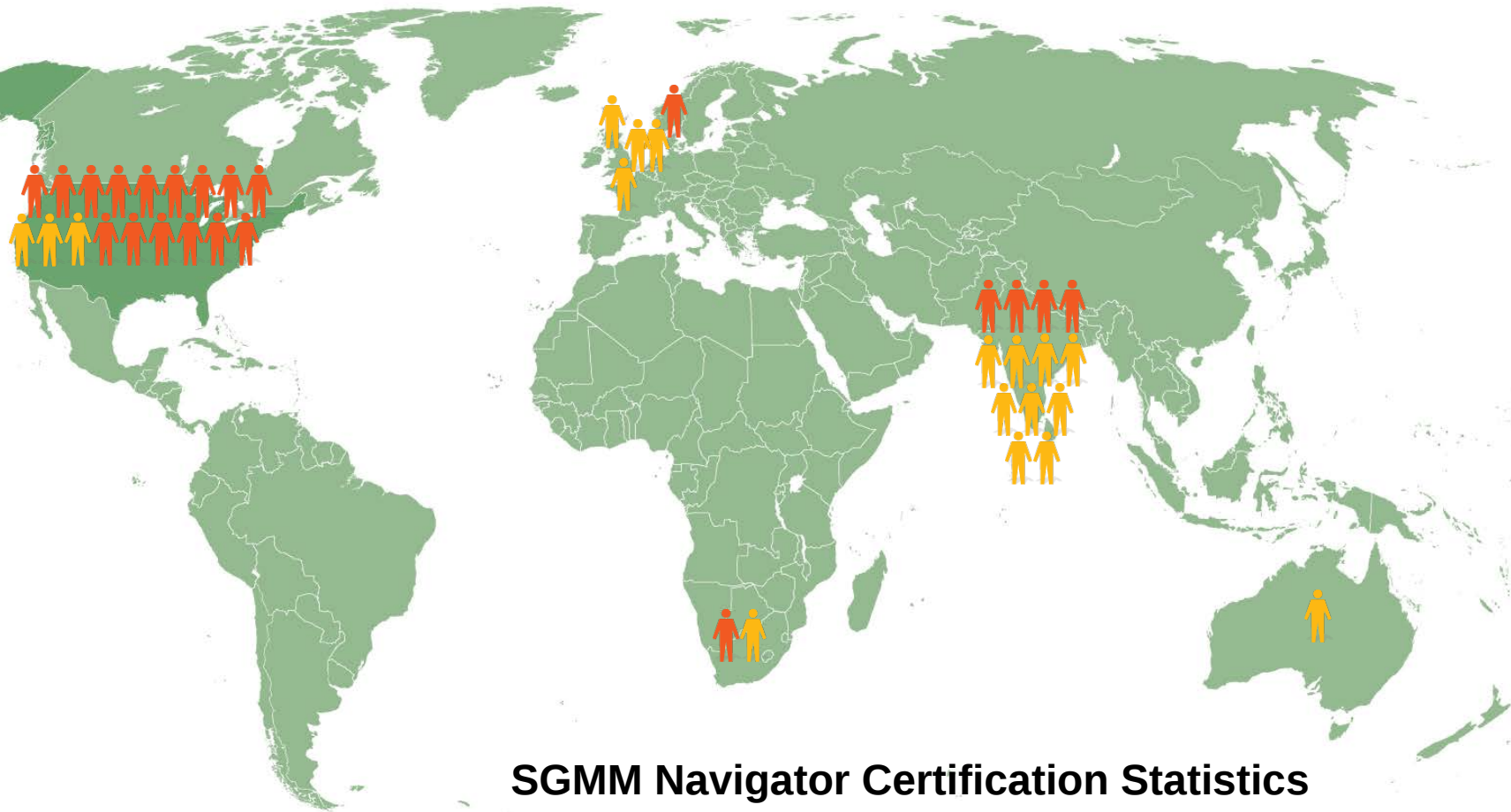


John F. Ryskowski Consulting



<http://partners.clearmodel.com/partners>

SGMM Navigator population



SGMM Navigator Certification Statistics

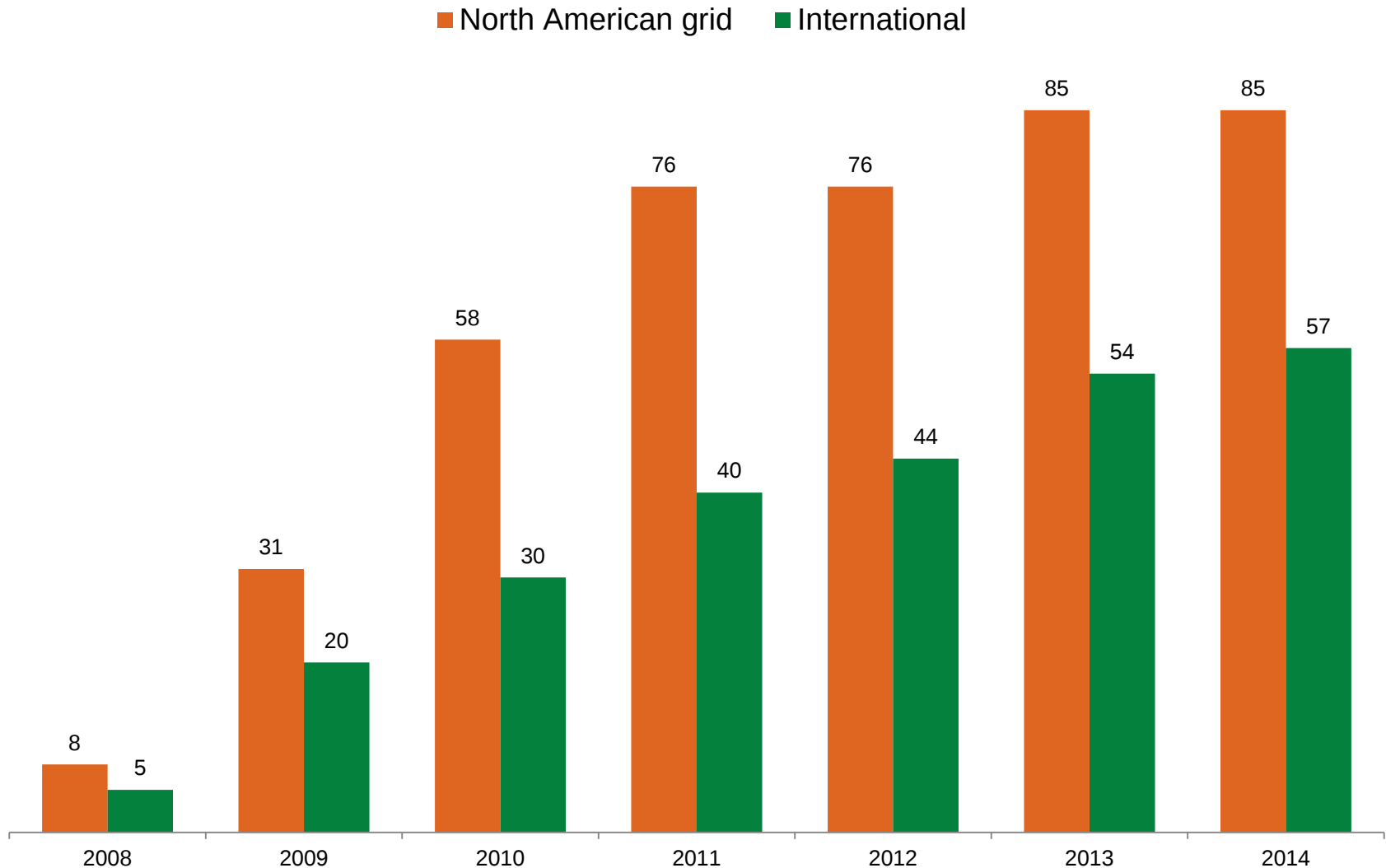


18 Candidate Navigators (*passed exam*)



18 Certified Navigators (*completed all requirements*)

Number of assessments per year

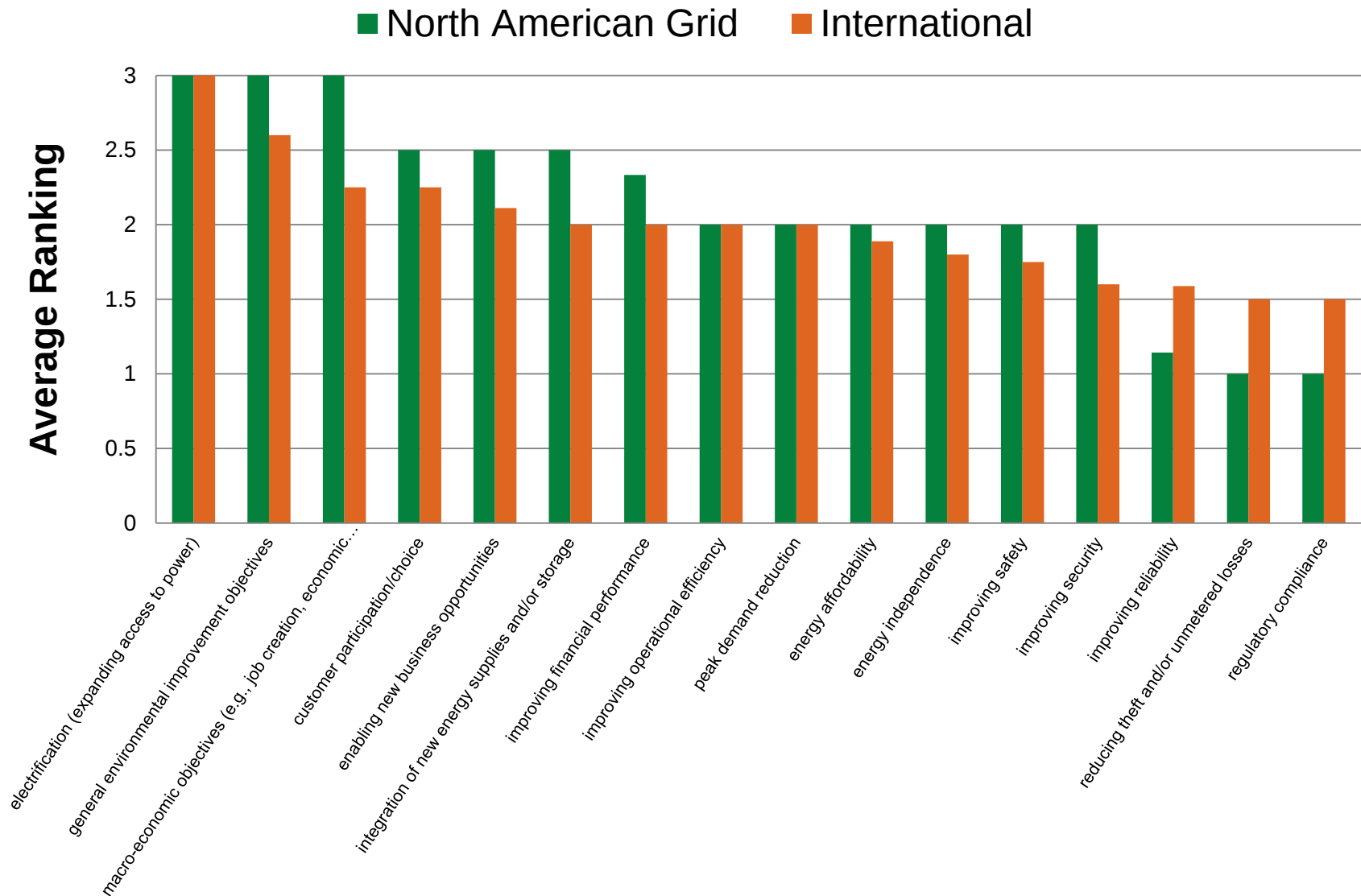


Polling Question #2

What do you think is the most frequent motivation for utilities to conduct an SGMM Navigation?

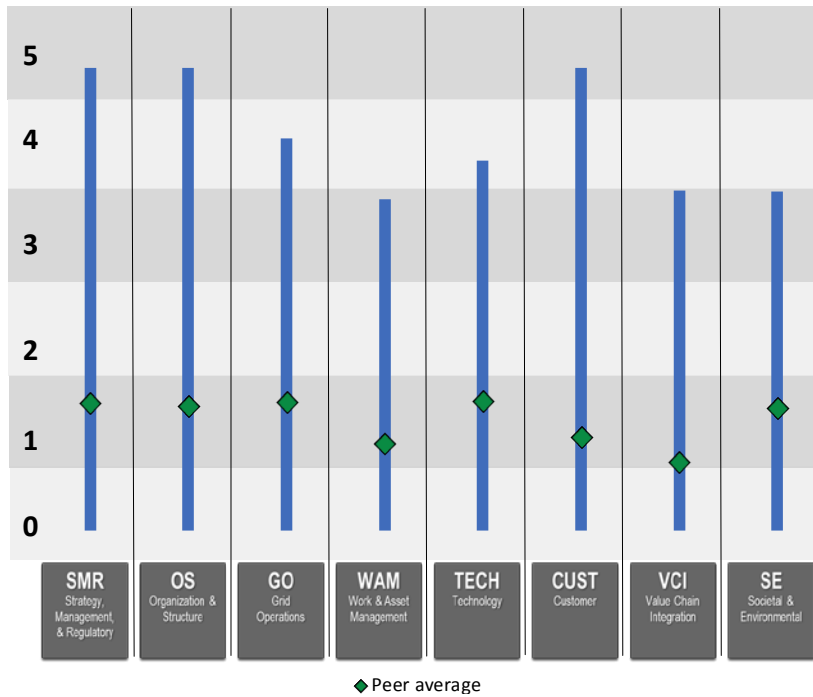
- a) Expanding access to electric power
- b) Enabling new business opportunities
- c) Regulatory compliance
- d) Improving reliability

Motivations

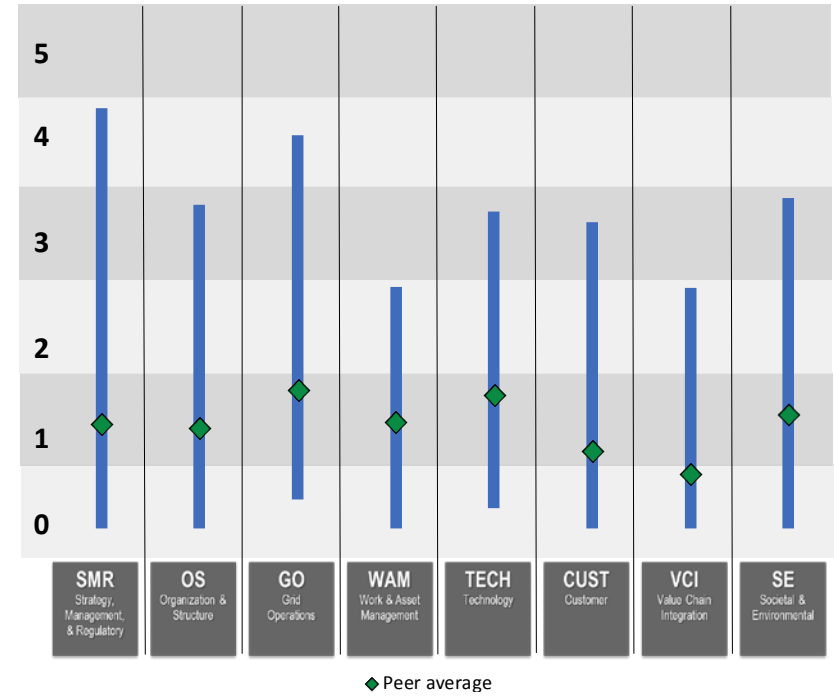


SGMM maturity

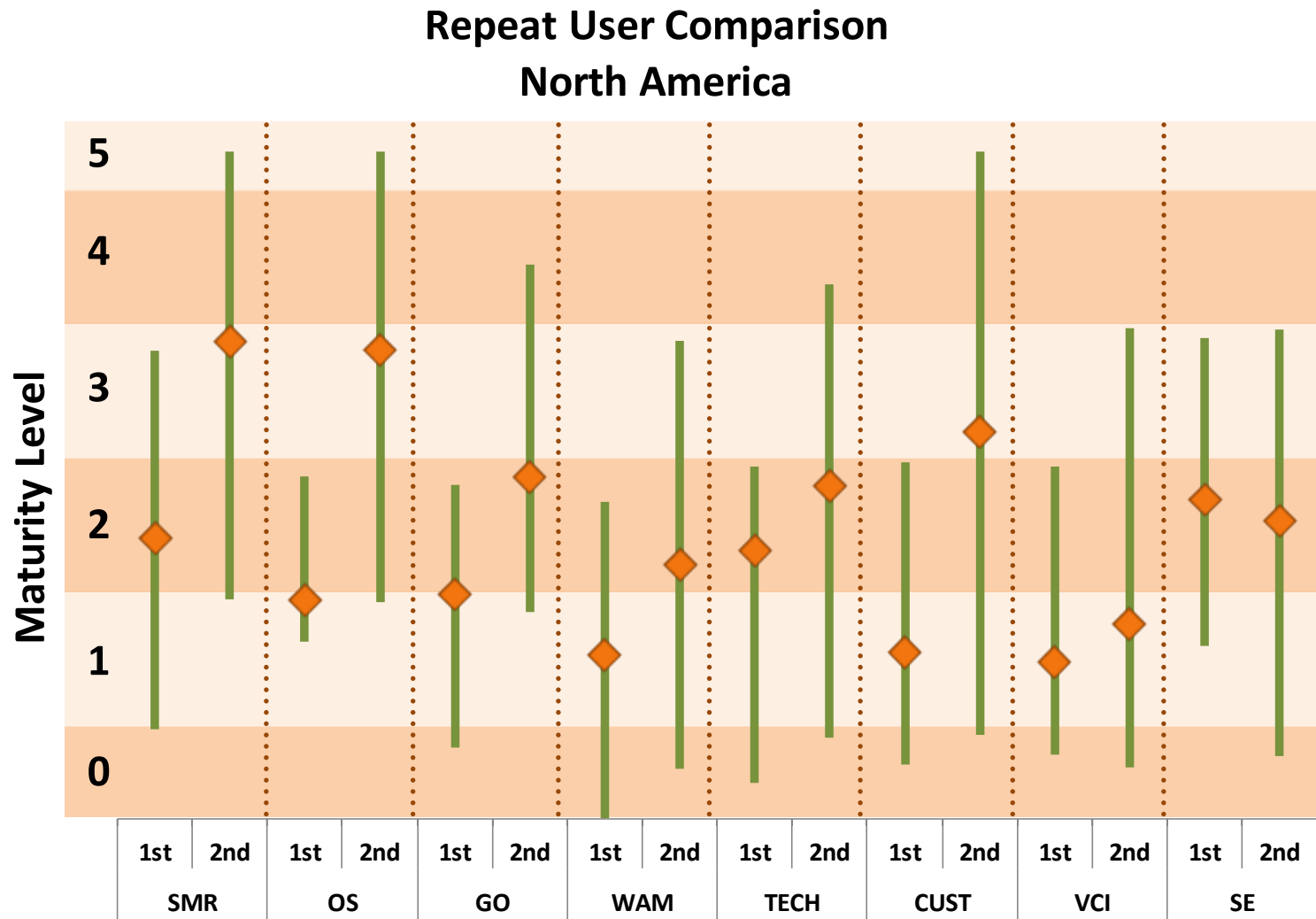
North American grid



International

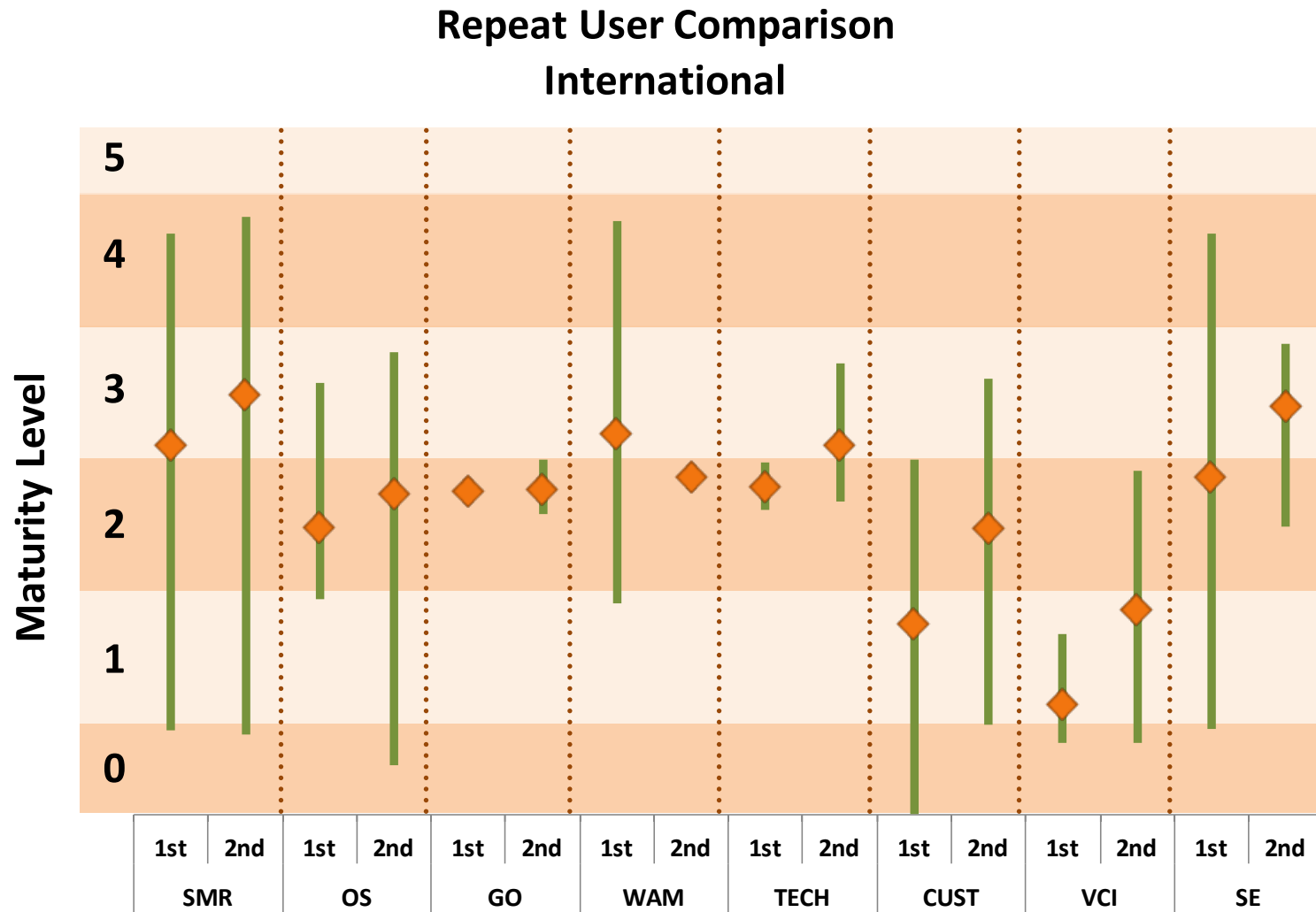


Before and after: North American grid



Average time between submissions: 31 months

Before and after: International



Average time between submissions: 31 months

Concluding thoughts

The SGMM is globally relevant.

- North American grid utilities are as varied as in the international community.
- Use of the SGMM outside the United States has been steady since the model's inception.

The SGMM provides benefits to the utilities that have used it.

The assistance of a certified Navigator is critical to

- ensuring that the characteristics are interpreted correctly
- analyzing the utility's results against the model and the community data
- facilitating a consensus view of grid modernization aspirations



**Plug in and Get Connected
to the SGMM**



@SGMM_Navigator



SEI|CMU



SGMM User Forum

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