



Grid Modernization Index (GMI) Overview

MADRI Working Group Meeting #45 – March 7, 2017
Washington, DC
Bryan Nicholson, GridWise Alliance

Presentation Outline

- About GridWise Alliance
- GMI-3 Findings and Feedback
- What's new for GMI-4
- GMI-4 Project Schedule
- Questions

About GridWise Alliance

Since 2003, the Alliance has been at the forefront of educating legislators and regulators about the critical need to modernize our nation's electricity system.



Who We Are:

Broad and diverse stakeholders that design, build and operate the electric grid.

- Electric utilities
- Information and communications technology equipment and service providers
- National Laboratories
- Academic institutions
- Regional Transmission Operators (RTOs), Independent System Operators (ISOs), and more.

What We Do:

Connecting the best and brightest influencers committed to modernizing the grid.

- Influence federal policies and R&D priorities by informing key stakeholders
- Influence state initiatives and emerging policies by informing key stakeholders
- Influence development and investment decisions by informing key stakeholders
- Provide continued thought leadership and guidance on industry best practices

2017 Priorities

Policy:

- Federal energy legislation
- Leveraging key policy positions
- State policy engagement plan
- Stakeholder education & outreach

Outreach:

- 4th Annual Grid Modernization Index (GMI)
- Thought leadership through Alliance Speakers Bureau
- Content to highlight leading industry practices
- Strategic partnerships with stakeholder groups

Technical:

- Topical Workshops, Forums, Webinars
- Whitepapers on emerging issues
- Engage with U.S. DOE Grid Modernization Initiative (GMI) & Grid Modernization Lab Consortium (GMLC)

Operations:

- Sustain membership engagement & growth
- Deliver Alliance branded collateral and strengthened communications channels
- Ensure organizational governance

Join Us in 2017

- Policies are made by the people who participate. The GridWise Alliance actively involves its members, allowing them to be a shaper of policy. Federal and state policy will continue to play a significant role in the way in which grid modernization is implemented across the U.S. – ***we need your input.***
- The impact of your membership dollars is multiplied many times over when combined with the contributions of the other Alliance members. Your investment in the Alliance will have a major impact on your business – ***invest today.***
- Policymakers view broad industry cooperation as beneficial. The Alliance's cross-industry composition and consensus view have made the GridWise Alliance a valued resource on Capitol Hill and with federal and state agencies; affording our members the opportunity to influence the future by educating the influencers – ***help amplify our message.***
- The convening power of the Alliance brings together the top experts from across the industry to work on special initiatives that will more fully inform the grid debate and advance grid modernization – ***share your success stories.***



Membership Benefits

Sharpen your expertise...

- *Network* with leading industry peers, exchange best practices, and advance thought leadership

Position your organization for success...

- *Receive* timely member updates and policy summaries
- *Participate* in strategic stakeholder education sessions, hill briefings, and legislative meetings
- *Gain* intelligence on state's leading grid modernization practices

Influence our energy future...

- *Engage* with industry stakeholders at workshops and other events to shape the changing energy ecosystem

Access member services and engagement opportunities...

- *Join* industry experts to explore technical and policy issues at workshops and webinars
- *Receive* timely updates about policy developments and Alliance activities



Grid Modernization Index (GMI) Overview

- Easy to understand state ranking of grid modernization progress
- Analyzes all 50 U.S. states and the District of Columbia
- Uses three categories: State Support, Customer Engagement, and Grid Operations
- Information gathered by a diverse project team consisting of 50+ representatives from utilities, consultants, and NGOs
- Information supplied by representatives from utilities, PUCs, SEOs and others closely tracking local markets

**STATE
SUPPORT**
30PTS

- Grid Modernization Policy/Plan
- RPS/EERS
- Cybersecurity Plan
- Education/Outreach/Measurement/Reporting Requirements
- EV/Storage Incentives/Mandates

**CUSTOMER
ENGAGEMENT**
34PTS

- Dynamic Tariffs/Rate Structures
- Communication with Customers
- Tariffs for EVs/Storage/PV
- Data Access/Sharing
- Customer Segmentation/Analytics

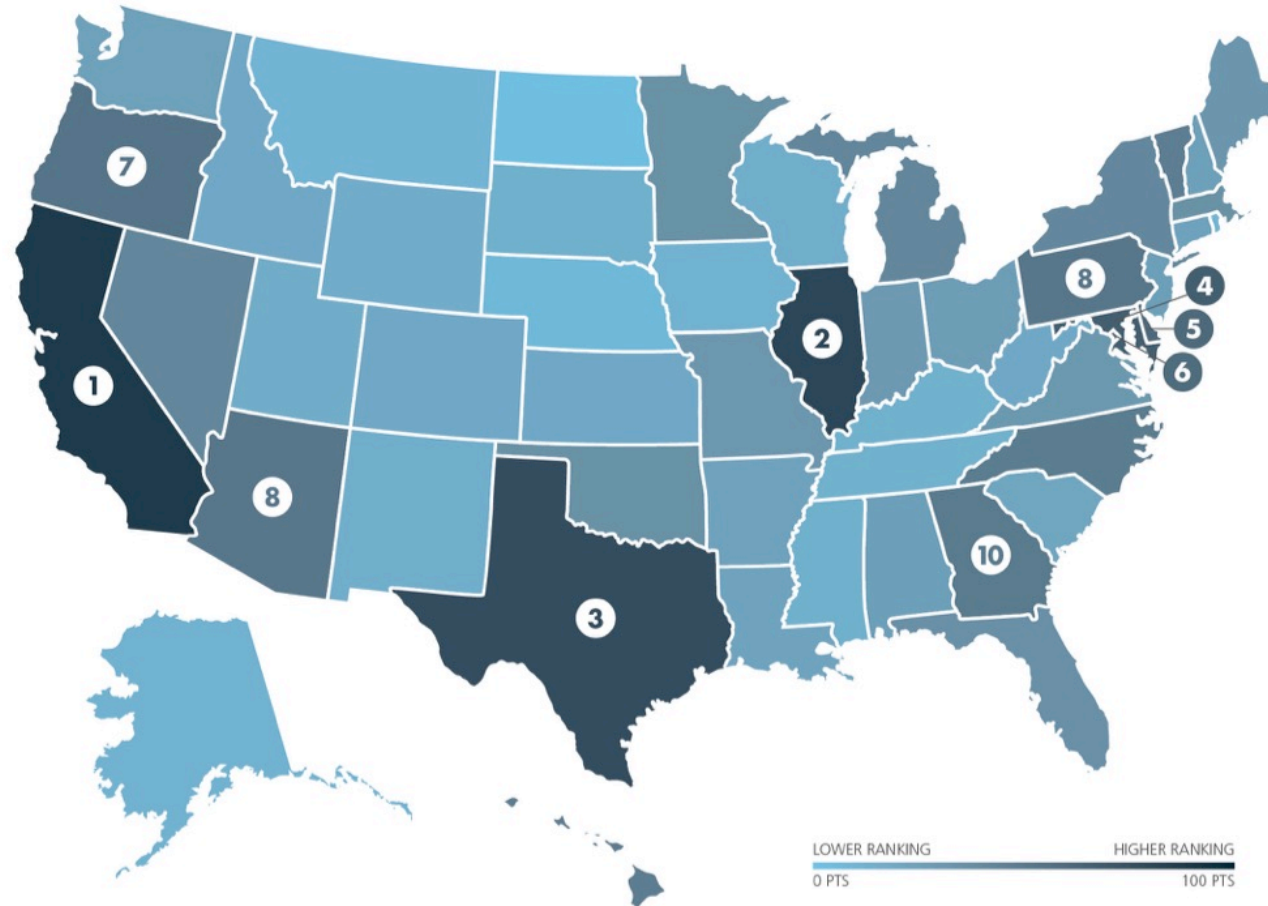
**GRID
OPERATIONS**
36PTS

- AMR/AMI Deployment
- Advanced Sensors for Transmission & Distribution
- Energy Storage & Microgrids
- Integration of AMI & Distribution Management Systems
- Probabilistic Planning
- Advanced GIS & Visualization

100 TOTAL POINTS

GMI-3 Overall Results

Total Out of 100 Available Points



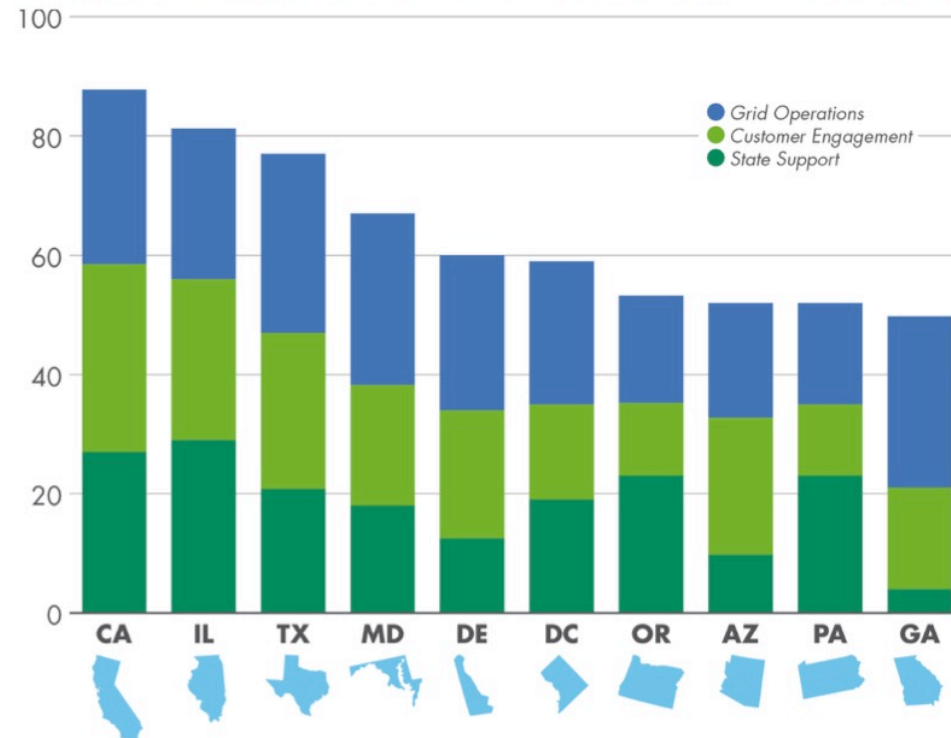
RANK	+/-	STATE	LEADERSHIP SCORE
1	1	California	87.8
2	1	Illinois	81.3
3	-2	Texas	77.0
4	1	Maryland	67.0
5	1	Delaware	60.0
6	2	Washington, DC	59.0
7	10	Oregon	53.3
8	1	Arizona	52.0
8	-4	Pennsylvania	52.0
10	3	Georgia	49.8
11	13	North Carolina	48.8
12	6	Hawaii	47.5
13	2	Vermont	47.3
14	-7	Nevada	41.8
15	-1	Michigan	41.5
16	7	New York	41.3
17	3	Florida	36.3
18	8	Minnesota	34.8
18	-6	Oklahoma	34.8
20	0	Massachusetts	34.5
21	-5	Maine	32.3
22	0	Missouri	31.0
23	-13	Virginia	29.5
24	5	Indiana	28.8
25	-6	Ohio	26.5
26	0	New Jersey	26.3
27	9	Alabama	25.5
28	11	New Hampshire	24.8
29	5	Washington	23.8
30	2	Arkansas	23.3
31	-6	Connecticut	22.8
32	14	Louisiana	21.5
33	-2	South Carolina	20.8
34	-2	Colorado	19.0
34	-23	Idaho	19.0
36	4	Kansas	18.8
37	7	West Virginia	18.5
38	-2	Utah	17.3
39	12	Wyoming	16.0
40	6	Wisconsin	15.0
41	4	New Mexico	14.8
42	-16	South Dakota	14.0
43	-2	Mississippi	13.8
44	-2	Kentucky	12.8
44	-9	Tennessee	12.8
46	-3	Iowa	12.3
47	-17	Alaska	12.0
48	-10	Montana	10.0
48	2	Rhode Island	10.0
50	-1	Nebraska	8.3
51	-3	North Dakota	3.3

GMI-3 Leaders

The 10 Highest-Scoring States

- CA, IL, and TX retain the top spots
- The spread between the top states and lower states remains significant
 - 28 point spread exists between leading California and 5th place Delaware
 - Top 10 states with an average score 23 points higher than the next 10 states
 - 9 states with a score higher than 50 (out of a possible 100)
- Neighboring mid-Atlantic states Maryland, Delaware, and Washington D.C. took spots 4 to 6
- Oregon and Georgia each joined the top 10

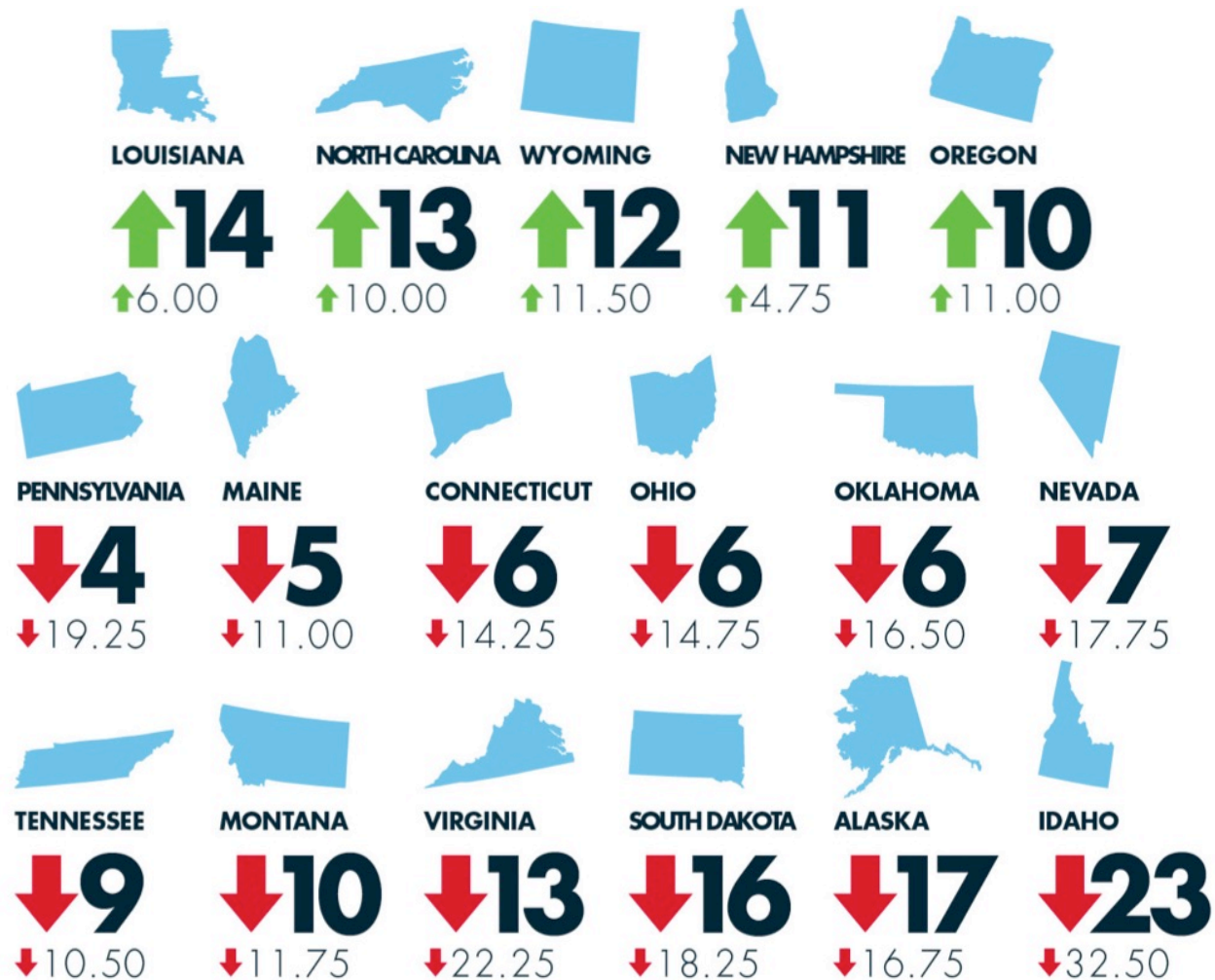
FIGURE 1: 3RD ANNUAL GRID MODERNIZATION INDEX: TOP 10 STATES



Source: GridWise Alliance and Clean Edge.

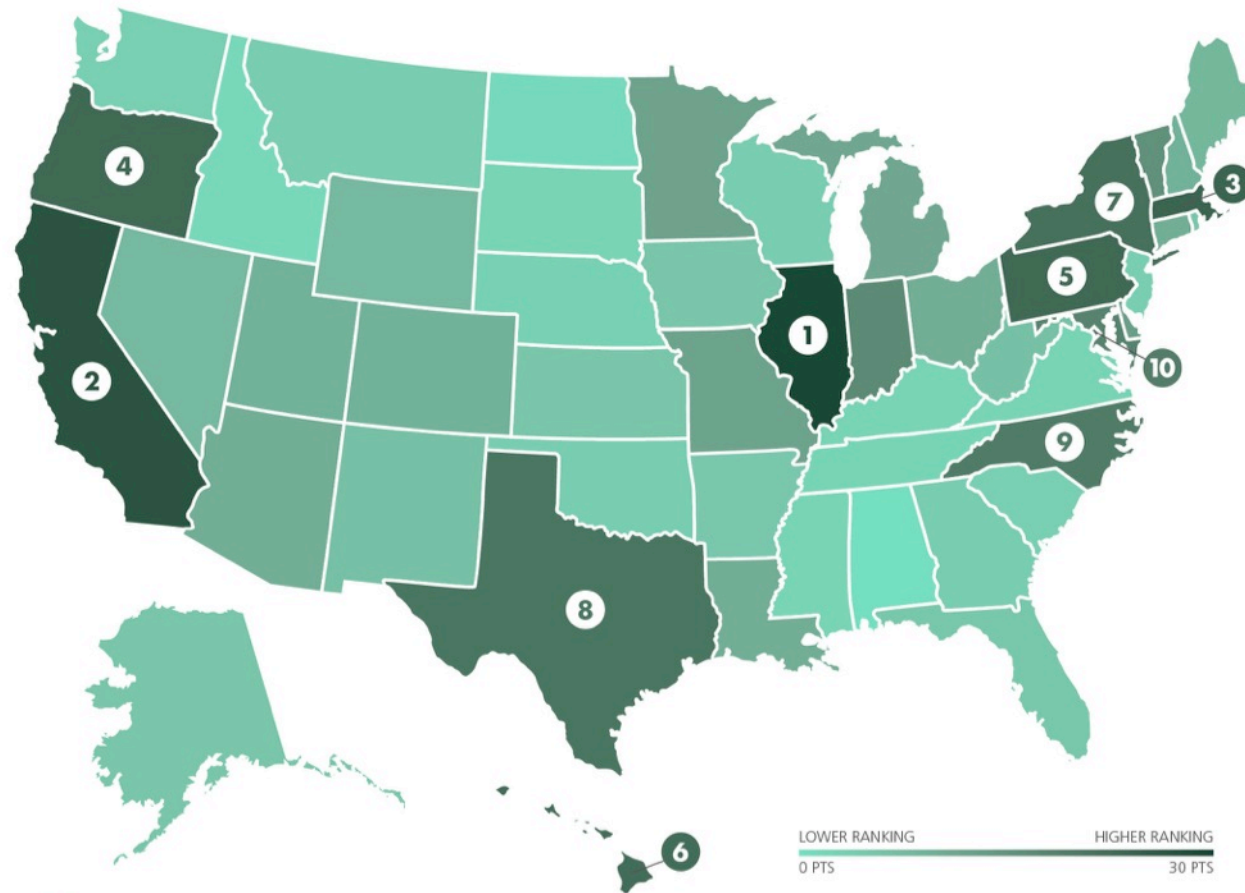
Risers and Fallers

States That Rose or Fell by 10 Points or 10 Ranking Places



State Support Results

Total Out of 30 Available Points



RANK	+/-	STATE	LEADERSHIP SCORE
1	0	Illinois	29.0
2	1	California	27.0
3	8	Massachusetts	24.0
4	5	Oregon	23.0
4	0	Pennsylvania	23.0
6	10	Hawaii	22.5
7	3	New York	21.5
8	-6	Texas	20.8
9	6	North Carolina	19.5
10	-2	Washington, DC	19.0
11	-5	Maryland	18.0
12	10	Indiana	16.8
13	-6	Vermont	15.5
14	-9	Delaware	12.5
15	14	Minnesota	12.0
16	12	Missouri	11.8
17	-3	Michigan	11.0
18	3	Connecticut	10.0
19	-3	Arizona	9.8
19	3	Ohio	9.8
19	19	Louisiana	9.8
22	15	New Hampshire	9.0
22	3	Colorado	9.0
22	7	Utah	9.0
25	-12	Maine	8.0
26	-2	Nevada	7.5
26	25	Wyoming	7.5
28	19	New Mexico	6.3
29	15	West Virginia	6.0
30	19	Kansas	5.0
30	-4	Iowa	5.0
30	-18	Alaska	5.0
30	18	Rhode Island	5.0
34	-16	Florida	4.8
35	-3	Arkansas	4.5
36	-10	Georgia	4.0
36	9	Wisconsin	4.0
36	-5	Montana	4.0
39	-19	Oklahoma	3.5
40	-5	New Jersey	3.3
41	-9	Washington	3.0
41	2	South Carolina	3.0
43	2	Nebraska	2.8
44	-8	Virginia	2.5
44	-5	South Dakota	2.5
44	-2	Mississippi	2.5
44	-10	Kentucky	2.5
48	2	Tennessee	2.0
49	-30	Idaho	1.3
50	-11	North Dakota	0.8
51	-12	Alabama	0.0



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State Support Leaders

Top 10 States: Performance in Select Indicators

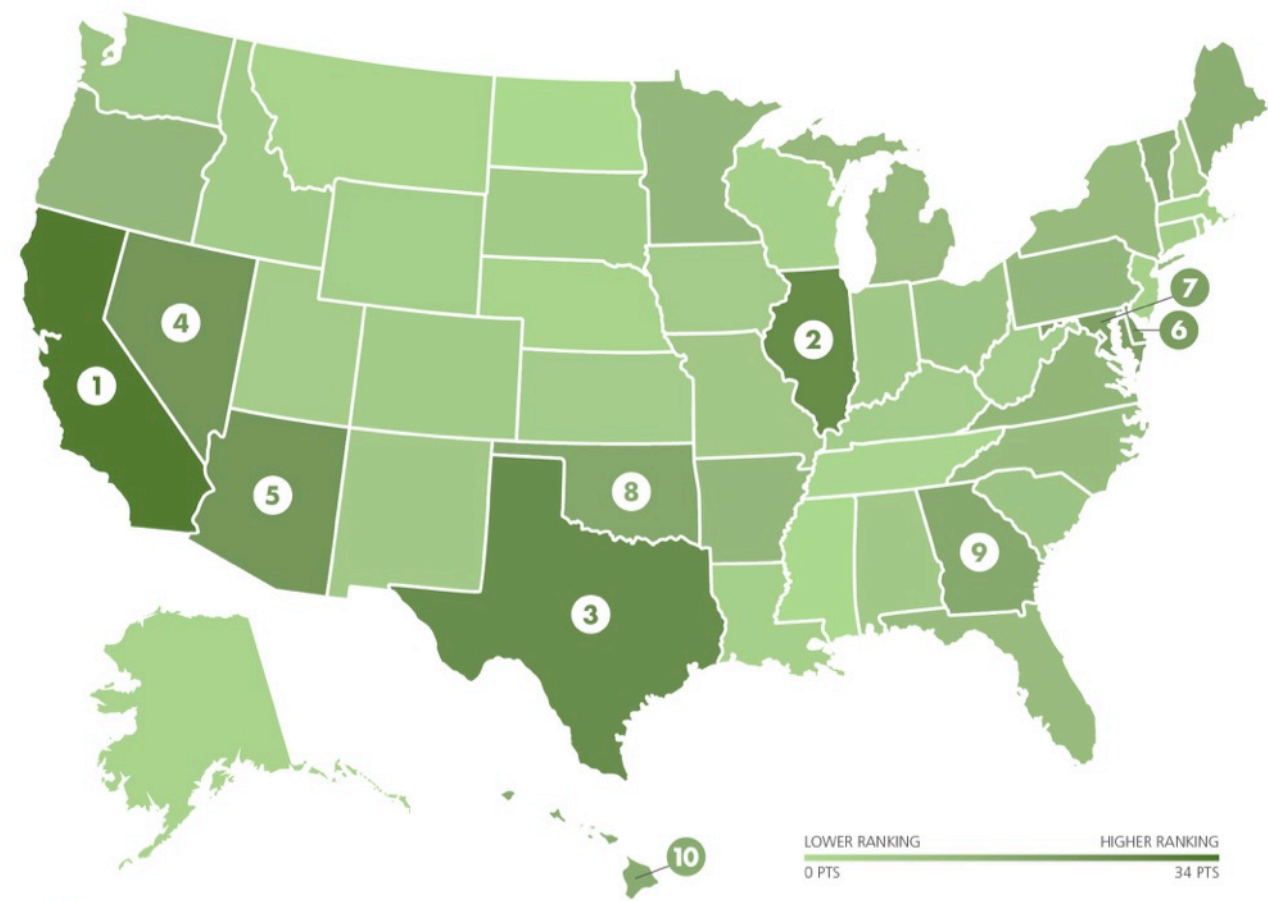


- Grid Modernization Policy/Strategy
- RPS/EERS/CO2 Emissions Reduction Goals
- Consumer Education/Outreach
- Grid Modernization Metrics
- Incentives/Mandates: EVs
- Incentives/Mandates: Energy Storage
- Incentives/Mandates: Renewable DG

NOTE: Dials represent state scores on a 1-5 scale for each of seven select indicators or indicator groups. These indicators represent 50% of the weighted points available in the State Support category. Each tick mark represents one point on that 1-5 scale.

Customer Engagement Results

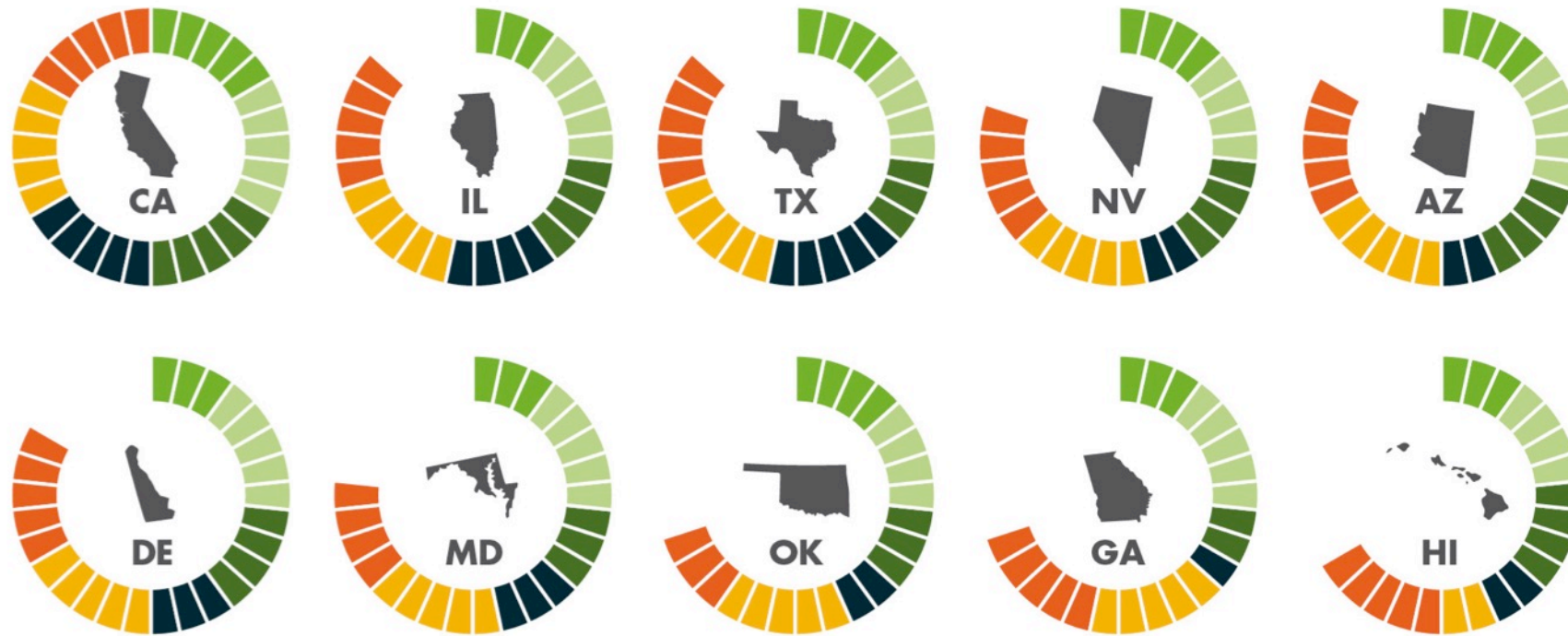
Total Out of 30 Available Points



RANK +/- STATE			LEADERSHIP SCORE
1	0	California	31.5
2	3	Illinois	27.0
3	-1	Texas	26.3
4	0	Nevada	23.3
5	1	Arizona	23.0
6	1	Delaware	21.5
7	0	Maryland	20.3
8	1	Oklahoma	18.0
9	15	Georgia	17.0
10	0	Hawaii	16.5
11	2	Washington, DC	16.0
12	2	Vermont	15.5
12	3	Maine	15.5
14	-2	Virginia	13.0
15	8	Oregon	12.3
16	-13	Pennsylvania	12.0
16	6	Minnesota	12.0
18	7	Arkansas	11.8
19	2	Michigan	11.5
20	11	New York	10.8
20	14	Florida	10.8
22	14	North Carolina	10.3
23	-13	Ohio	7.8
23	15	South Carolina	7.8
25	6	Washington	7.5
26	-8	Missouri	7.3
27	18	New Hampshire	6.8
28	5	Indiana	6.5
29	9	Alabama	6.0
29	6	New Mexico	6.0
31	17	Iowa	5.8
32	-12	Colorado	5.5
32	-3	Idaho	5.5
32	-15	South Dakota	5.5
35	1	Kentucky	5.3
36	-11	Kansas	5.0
36	11	West Virginia	5.0
38	0	Utah	4.3
39	-20	Connecticut	4.0
39	11	Wyoming	4.0
41	-26	Massachusetts	3.8
42	0	Louisiana	3.5
43	-15	New Jersey	3.0
43	-2	Wisconsin	3.0
45	5	Rhode Island	2.5
45	4	Nebraska	2.5
47	-2	Alaska	2.0
47	-3	Montana	2.0
49	-24	Tennessee	1.3
50	-21	Mississippi	0.0
50	-8	North Dakota	0.0

Customer Engagement Leaders

Top 10 States: Performance in Select Indicators

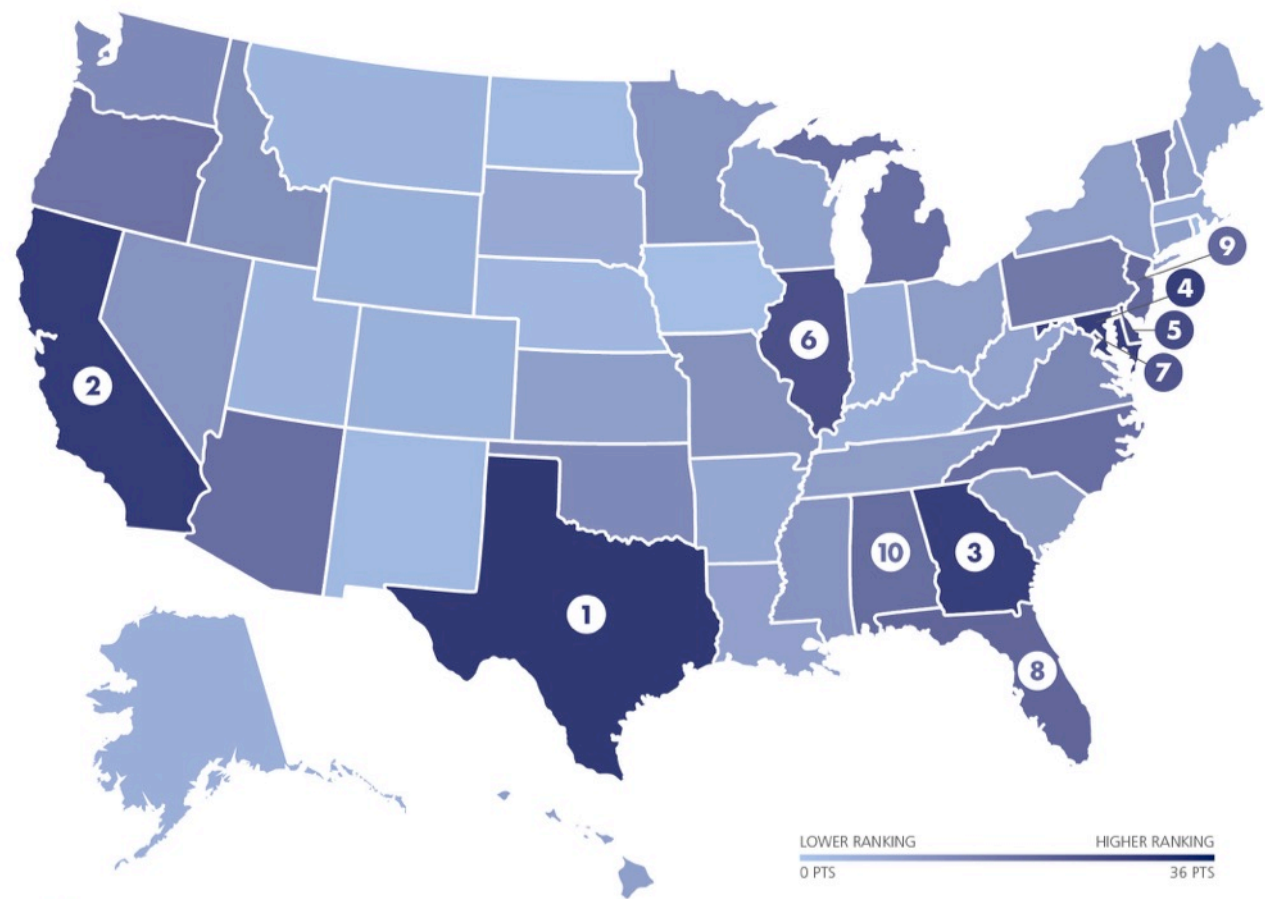


- Dynamic Pricing & Programs (TOU, CPP, DR, RTP)
- Communication with Customers (Text, E-mail, Twitter, Phone)
- Mass-Market Tariff for DERs (Solar, Storage, EVs, Other)
- Customer Data Accessibility
- Customer Outreach/Education
- Data Segmentation & Analytics

NOTE: Dials represent state scores on a 1-5 scale for each of six select indicators or indicator groups. These indicators represent 85% of the weighted points available in the Customer Engagement category. Each tick mark represents one point on that 1-5 scale.

Grid Operations Results

Total Out of 36 Available Points



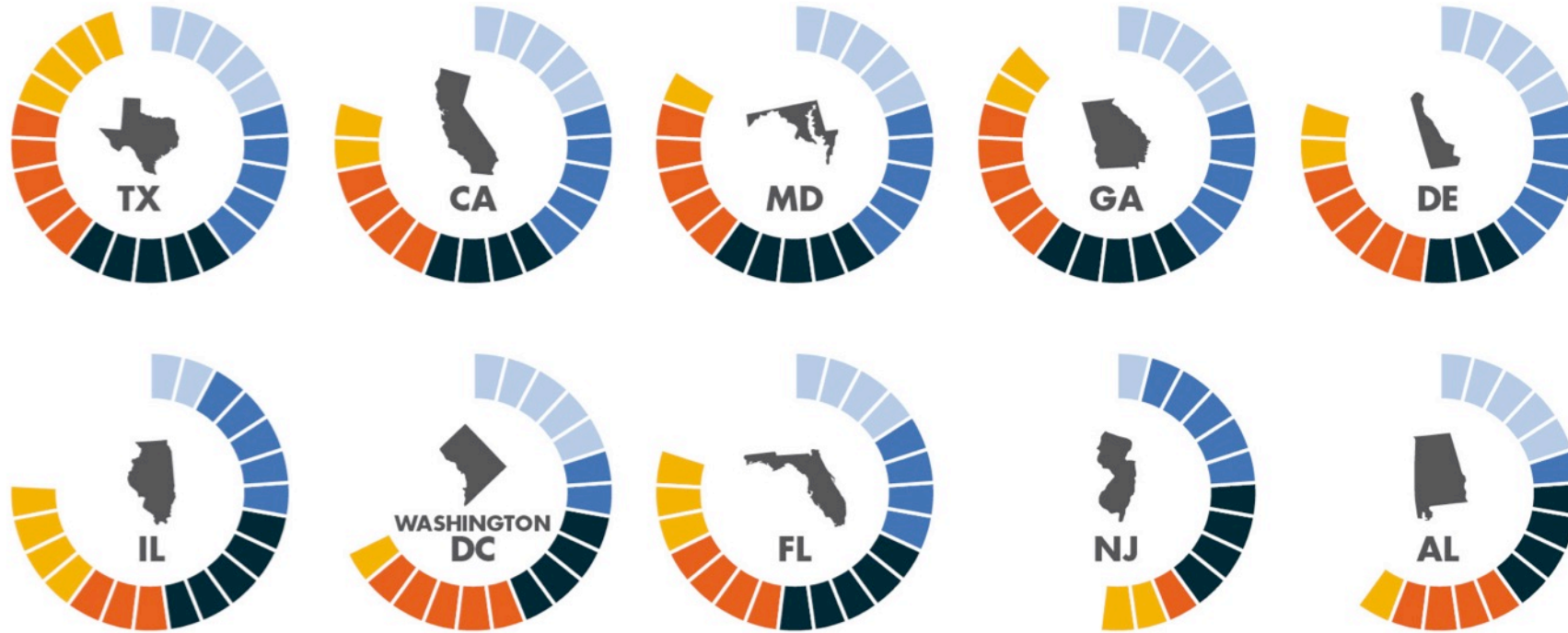
RANK +/-		STATE	LEADERSHIP SCORE
1	2	Texas	30.0
2	3	California	29.3
3	-1	Georgia	28.8
3	4	Maryland	28.8
5	6	Delaware	26.0
6	1	Illinois	25.3
7	2	Washington, DC	24.0
8	6	Florida	20.8
9	10	New Jersey	20.0
10	21	Alabama	19.5
11	2	Arizona	19.3
12	0	Michigan	19.0
12	4	North Carolina	19.0
14	11	Oregon	18.0
15	-5	Pennsylvania	17.0
16	12	Vermont	16.3
17	-16	Virginia	14.0
18	-3	Oklahoma	13.3
18	20	Washington	13.3
20	-16	Idaho	12.3
21	-5	Missouri	12.0
22	21	Mississippi	11.3
23	-17	Nevada	11.0
24	4	Minnesota	10.8
25	-7	South Carolina	10.0
26	-4	Tennessee	9.5
27	-7	Ohio	9.0
27	-3	New York	9.0
27	6	New Hampshire	9.0
30	-7	Maine	8.8
30	-4	Connecticut	8.8
30	3	Kansas	8.8
33	-7	Hawaii	8.5
34	10	Louisiana	8.3
35	3	Wisconsin	8.0
36	-1	West Virginia	7.5
37	0	Arkansas	7.0
38	-6	Massachusetts	6.8
39	-19	South Dakota	6.0
40	-12	Indiana	5.5
41	-3	Alaska	5.0
41	6	Kentucky	5.0
43	5	Colorado	4.5
43	5	Wyoming	4.5
45	-9	Montana	4.0
45	-3	Utah	4.0
47	1	Nebraska	3.0
48	-7	New Mexico	2.5
48	-2	Rhode Island	2.5
48	3	North Dakota	2.5
51	-6	Iowa	1.5



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Grid Operations Leaders

Top 10 States: Performance in Select Indicators

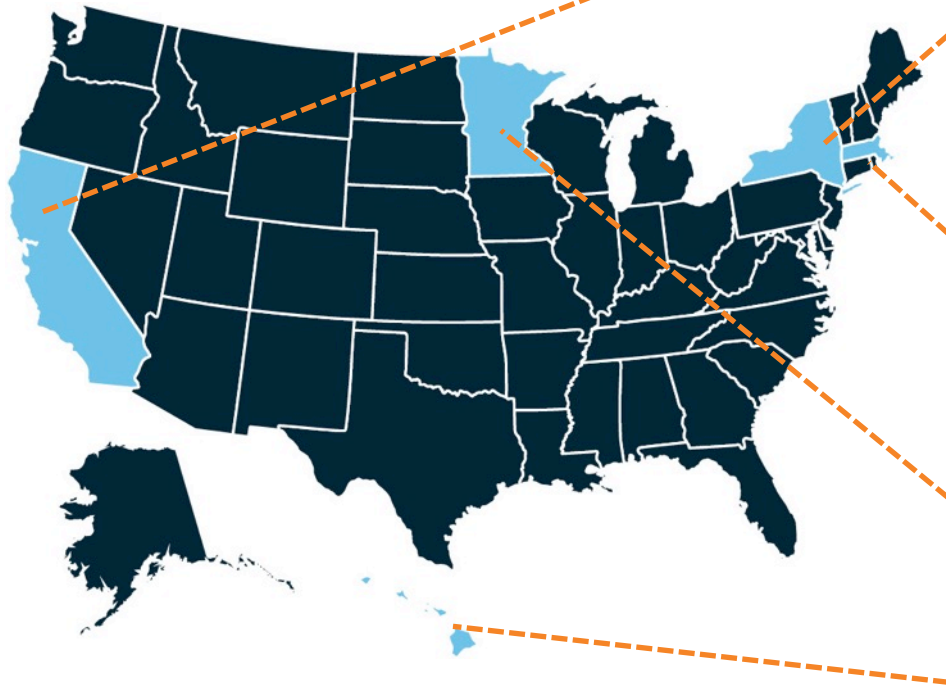


- AMI Penetration
- Transmission Advanced Automation Devices
- Distribution Advanced Automation Devices
- Integration of AMI for Outage Management and Analytics
- Integration of Distribution Management Systems

NOTE: Dials represent state scores on a 1-5 scale for each of five select indicators or indicator groups. These indicators represent 67% of the weighted points available in the Grid Operations category. Each tick mark represents one point on that 1-5 scale.

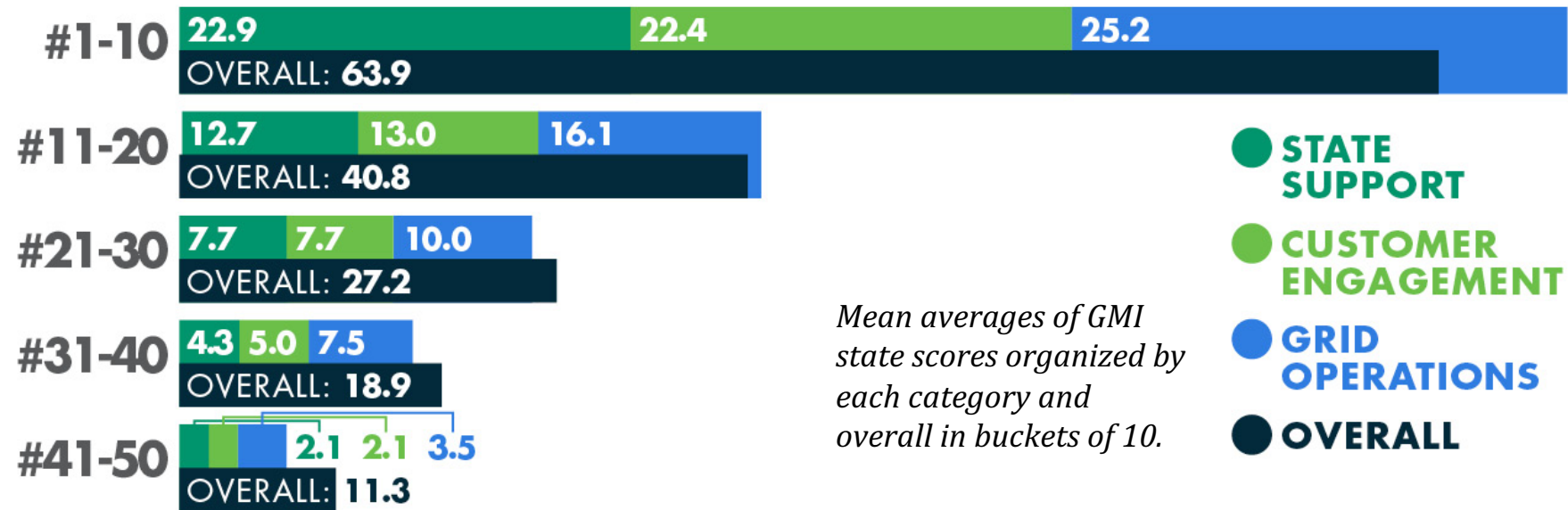
Grid Modernization Major Developments

States Taking Innovative Action



- **CALIFORNIA** now requires its major investor owned utilities to submit distributed resource plans
- **NEW YORK's** landmark REV proceeding recognizes the need for advanced metering functionality as it works to update its energy sector
- **MASSACHUSETTS** required its utilities to submit grid modernization plans - proposals include smart meters, time of use pricing, and DER management systems.
- **MINNESOTA** has finished Phase I of its e21 Initiative, which aims to help utilities recognize the new role that customers play.
- **HAWAII** increased its RPS to 100% by 2045. Its utilities have struggled to integrate more solar PV (as well as storage and other DERs).

Key Themes in the GMI-3



- Wide gap in grid modernization progress between states
- Drivers for grid modernization differ from place to place
- Funding continues to be a challenge
- Growth of DERs to increase significantly
- Smart DSM programs will help utilities monetize value
- More customer outreach and education needed

4th Grid Modernization Index (GMI)

Advisory Committee Participants

- American Public Power Association (APPA)
- Edison Electric Institute (EEI)
- National Association of Regulatory Utility Commissioners (NARUC)
- National Association of State Energy Officials (NASEO)
- National Conference of State Legislatures (NCSL)
- National Governors Association (NGA)
- National Rural Electric Cooperative Association (NRECA)
- North Carolina Clean Energy Technology Center

4th Grid Modernization Index (GMI-4): Addressing GMI-3 Feedback

Feedback on GMI-3 Process

- Research instrument: too large, covering too many areas of expertise
- Difficult to find and engage the right respondents in some cases

Key refinements to research instrument for GMI-4 include:

- Refined, clarified and re-organized research questions
 - Separated Grid Ops questions into three sections to better target distinct respondents: AMI, Distribution, and Transmission
 - Mapped assets in Distribution and Transmission sections to the functionality enabled rather keep them as stand-alone questions
 - Created clear and discrete levels for extent of system coverage (i.e., 1-9%, 10-49%, 50-89%, 90-100%) by smart grid functionality rather than open-ended data field
- Allow respondents to self-select question areas based on expertise
- Implement GMI Data Collection Portal: web-based platform to improve data collection

4th Grid Modernization Index (GMI)

The GMI Data Collection Portal and our Project Team

The GMI Data Collection Portal was developed to facilitate data collection:

- Quickly broaden out the GMI respondent pool
- Allow parallel completion of research questions within an organization rather than sequentially
- Facilitate tracking of progress and identification of gaps before deadlines expire

Alliance members play a critical role to making the portal-based approach a success:

- Coordinate with respondents (or respondent organizations' points of contact) and communicate web link and provide the companion Excel reference document
- Help Alliance staff team review data received from each State and aggregate results
- Help fill in the gaps by conducting follow-up calls with respondents or through research using DSIRE, EIA, AEE, and other resources (including State-specific websites).

4th Grid Modernization Index (GMI-4)

Project Plan Schedule

Task	2016					2017					
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
MAJOR MILESTONES						Prepare and Release Initial Findings at NARUC Winter Meeting			Release Report 4/30	Promo Webinar 5/15	Promote at NARUC Reg. Events
Task 1 – Develop Streamlined Approach											
Task 2 – Manage Project											
Task 3 – Collect Information											
Task 4 – Finalize Data Inputs and Scoring											
Task 5 – Perform Statistical Analysis											
Task 6 – Write and Lay Out Final Report											
Task 7 – Market and Publicize GMI											
Proposed Meetings With Project Team				<i>Bi-monthly Project Team Calls beginning in November through June</i>							

4th Grid Modernization Index (GMI)

Next Steps

- Work with designated state representatives to fill in data gaps and finalize portal responses - March 17 target completion date
- Deliver data to Accenture to execute statistical analysis
- Deliver all necessary data and findings to Clean Edge for report production
- Communicate launch plan and provide marketing collateral to Alliance members and Advisory Committee members
- GMI-4 Final Report Launch – April 30 target completion date
- Findings reporting provided at NARUC Regional Meetings

Questions?

Thank You

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