

Smart. Focused. Done Right.

State of the Energy Industry: A Mid-Year Review

(or "I Feel the Earth Move under My Feet" - with apologies to Carole King)

August 22, 2014

Today's Agenda and Your Presenters



Stuart Pearman Partner and Energy Practice Leader



Cristin Lyons Partner and Transmission. Distribution, and Smart Grid Practice Leader

Welcome and Introduction



Todd Williams Partner and Fossil **Generation Practice Leader**

John Pang Partner



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- Ninth Inning for Some Units and the Perfect Storm Persists
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Greg Litra Partner and Energy, Clean Tech, and Sustainability Research Leader







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- Competitive Transmission: Why Is This So Hard?
 - Latest in Regional Competitive Processes under Order 1000



Stuart Pearman Partner and Energy Practice Leader

Stuart Pearman is a partner with ScottMadden and leads the firm's energy practice. As a management consultant for 19 years and a partner for 13, he has performed more than 170 projects for more than 50 clients. Stuart has expertise in energy utilities, related businesses, and several other industries. He is also a seasoned practitioner, with experience in both line and staff management roles. Stuart earned a B.A. in psychology from Williams College and an M.B.A. from the University of North Carolina Kenan-Flagler Business School, where he won the Best Industry Analysis Award and graduated at the top of his class. In addition to his full-time work at ScottMadden, Stuart is an adjunct assistant professor at Kenan-Flagler, teaching consulting and leadership.





Cristin Lyons Partner and Transmission, Distribution, and Smart Grid Practice Leader

Cristin Lyons is a partner with ScottMadden and leads the firm's transmission, distribution, and Smart Grid practice. She joined the firm in 1999 and has since consulted with myriad clients on issues ranging from merger integration to process and organizational redesign to project and program management. She is also a frequent speaker and panelist at conferences across the country. A graduate of the Cox School of Business at Southern Methodist University, Cristin earned a B.A. in political science and Spanish from Gettysburg College and is a member of Phi Beta Kappa.



In a New York State of Mind: The Empire State's "Reforming the Energy Vision" Initiative

On April 25, 2014, the New York Public Service Commission (NYPSC) commenced its Reforming the Energy Vision (REV) initiative. The public proceeding "aims to align electric utility practices and our regulatory paradigm with technological advances in information management and power generation and distribution"

- The order included a staff report challenging two traditional assumptions: (1) demand is inelastic and (2) economies of scale make centralized generation and bulk transmission invariably cost effective
- An NYPSC Staff report details a new business model in which the distribution utility initially functions as a Distributed System Platform Provider (DSPP); other stakeholders may serve in that role at a later time
- The proposed role of the DSPP is to actively coordinate distributed energy resources (DER) and provide a market in which customers can optimize their priorities while receiving compensation for providing system benefits
- The proposed model would address many of the operational, technical, and financial challenges cited in the EPRI concept paper*
- Utility-specific implementation plans are expected to follow stakeholder work groups evaluating energy reforms in two parallel tracks (see table below)

NYPSC's Policy Goals:

- Enhanced customer knowledge and tools that support effective management of their total energy bill
- 2. Market animation and leverage of ratepayer contributions
- 3. System-wide efficiency
- 4. Fuel and resource diversity
- 5. System reliability and resiliency
- 6. Reduction of carbon emissions

Track	Sample of Key Issues	Milestones					
Track 1: Distributed System Platform Provider	 Identify products and services the DSPP will purchase or sell to DER providers and customers Define, measure, and evaluate costs and benefits of products/services Identify strategies that maximize customer engagement 	 Aug. 2014: straw proposal Dec. 2014: generic policy determination 					
Track 2: Regulatory Changes and Ratemaking Issues	 Ensure rate design reflects bi-directional transactions between customers and DSPP as products and services become unbundled Revise existing performance mechanisms; consider additional incentives needed to encourage desired outcomes Define default service and ensure commitment to affordable universal service 	 July 2014: straw proposal Q1 2015: generic policy determination 					



NYPSC's Regulatory Track for Energy Reform

In a New York State of Mind (Cont'd): The Empire State's "Reforming the Energy Vision" Initiative

- Is this the revolution? Under the DSPP model, the distribution utility would expand its functions from primarily being a physical conduit for delivery of electricity to being a transactional platform for the distribution-level market. The anticipated responsibilities of DSPP include:
 - Plan traditional utility investments relating to transmission and distribution (T&D) assets
 - Plan customer-sited generation and demand response resources
 - Manage DER products and services in real time
 - Monetize value of DER products
 - Serve as the local balancing authority, forecasting load and dispatching resources in real time to meet customer needs and maintain reliability
- What is it worth? Value of benefits (see table at right) are expected to be influenced by location, resource, time of day, resource variability, predictability and visibility, price, and other factors
- Keeping up with the Joneses. The Massachusetts Department of Public Utilities issued grid modernization orders in June 2014. This plan focuses on combining realtime two-way communication from advanced meters with time-variable pricing. While both states emphasize technology platforms and customer engagement, New York's effort is more ambitious as it recasts stakeholder responsibilities
- What could possibly go wrong? Success will require significant infrastructure investment, diverse and autonomous utilities adopting a single business model, customer participation in a new and complex market, and alignment with other policy initiatives (i.e., NY Energy Plan and NY Energy Highway)

Potential F	Potential Products and Services To Be Purchased by the DSPP				
Market Sector	Product Example	Anticipated Benefits			
Base load modifications	 Local energy production/supply side increases Permanent load shift/reduction 	 Avoided or deferred T&D investments Reduced line losses Increased system flexibility Reduced operating costs Fuel diversity Emission reductions 			
Peak load modifications	Peak load modifications• Distributed energy resources offsetting generation• Improved factor• Demand response • Flexible capacity to address ramp rate• Improved • Improved 				
Non-bulk ancillary services	 Frequency response and regulation Spinning and non- spinning reserves Power factor correction Voltage support 	 Local optimization of services Improved power quality Improved efficiency Improved reactive support Additional revenue to offset operating expenses Reduced fuel consumption 			
Planning and contingency	 Resource adequacy Black start Emergency power islands 	 Improved resiliency Improved emergency response Improved system restoration Increased proliferation of DER, particularly clean Public health and safety benefits 			



Competitive Transmission: Why Is This So Hard?

Order 1000 is introducing competition to the transmission portion of the electrical grid and substantially changes the landscape for transmission development

- RTOs will have to manage open, transparent processes by which qualified bidders compete to build projects
- Transmission owners and developers will have to compete to build new transmission

The RTOs are developing by which various entities will compete to build transmission

- The entities proposing to plan and build the transmission system are now a very mixed group
- The RTOs have set very different thresholds for competitive projects; rules are evolving differently across the country
- As the RTOs are stakeholder driven, there is significant work to incorporate the perspectives of increasingly diverse stakeholders
- States have responded in dramatically different ways. Some have put in place their own ROFRs, and others are welcoming competition
- According to FERC, states' ROFRs need to be considered in the RTO planning processes

All of the potential competitors have to learn how to manage the new environment

- Incumbent utilities have to build new competencies to compete with new entrants. Internal organizational structures, governance, and affiliate rules can all stymie the development of necessary competencies
- New entrants have to learn the grid to compete against the incumbents; transmission planning capabilities will be key
- All parties have to learn the new "rules of the road"

Status of Competitive Processes									
ISO-NE NYISO MISO SPP PJM CAISO									
Published project evaluation criteria	0	0							
Published solicitation window									
Held solicitation									
Awarded project(s)									
= completed and posted = evaluation criteria included in FERC filing									

Notes: Projects in states with state ROFR can be considered earlier in the regional-planning process instead of at the evaluation stage per FERC Order on Rehearing and Compliance issued May 15, 2014, in dockets ER13-198, ER13-195, ER13-90; all public policy projects must be competition-eligible

Sources: SNL Financial; Gibson Dunn; Brattle Group; regional compliance filings



Latest in Regional Competitive Processes under Order 1000

	ISO-NE	NYISO	MISO	SPP	РЈМ	CAISO
Projects Eligible	 Projects more than 115 kV, reliability (with expected inservice date of more than three years), public policy, and economic projects Reliability projects needed within three years or for which incumbent is only party to submit a bid are exempt 	 Economic projects Reliability projects unless timeline hits "trigger date" to address reliability issues or less than three years in future, in which case "backstop" solution (in parallel with alternative solution) is enacted 	 Multi-value projects (public policy and/or reliability, economic 100 kV or above, >\$20M) Market efficiency projects (primarily 345 kV or above, >\$5M) Baseline reliability projects are exempt Upgrades are exempt (unless >50% of total cost is for new line sections and each section is ≥5 miles in length) 	 Projects more than 300 kV ("highway" projects) Projects between 100 to 300 kV ("byway projects") Projects with inservice dates within three years are exempt Reliability and local projects are exempt 	 Long-lead reliability projects (needed in five+ years) Short-term reliability projects (needed in four to five years) Immediate need reliability projects (needed in two to three years or less) may or may not be eligible for competition Market efficiency projects 	 All regional projects (all more than 200 kV, some less than 200 kV) Upgrades/additions to existing lines or on existing rights of way/substation are exempt
Recent Developments	 Submitted a revised regional compliance plan in November 2013 In the filing, requested an effective date of the "later" of May 1, 2014, or 60 days following the issuance of a Commission order addressing the revisions FERC responded in May; 120 days to respond 	 Along with NYTOs, made second joint compliance filing on October 15, 2013 In July 2014, FERC provided an order responding to the revised regional filing Commenced new reliability planning process January 1, 2014; will start public policy planning in 2014 Q4 Published solicitation on August 1, 2014 	 Posted pre- qualification application in January 2014 MTEP14 report including qualified projects posted on August 8, 2014; approval by year-end 2014 Developer bids open January 2015 for a six-month window; decisions made by year-end 2015 	 The first Qualified RFP Participants (QRP) process started in April 2014 Various detailed project proposals already submitted for 2015 projects RFPs will be published after January 1, 2015; 90- day response window Seeking industry experts to assess projects 	 Two solicitations completed to date; one project was recommended to the PJM board per the market efficiency process (\$8M project proposed by FirstEnergy); other solicitation still under consideration (Artificial Island) A third solicitation was issued in June 2014 	Two solicitations conducted to date; projects awarded to incumbents partnered with non- incumbents



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Notes: Projects in states with state ROFR can be considered earlier in the regional-planning process instead of at the evaluation stage per FERC Order on Rehearing and Compliance issued May 15, 2014, in dockets ER13-198, ER13-195, ER13-90; all public policy projects must be competition-eligible. NYTOs means New York transmission owners Sources: SNL Financial; Gibson Dunn; Brattle Group; regional compliance filings



Todd Williams Partner and Fossil Generation Practice Leader

Todd Williams is a partner with ScottMadden and co-leads the firm's fossil practice. He has extensive experience assisting large companies align their operations with their strategic vision. From operational performance improvement to organizational restructuring, Todd has designed and implemented large scale initiatives to help his clients succeed. He has experience working with companies that need to turn around, are planning a merger integration, or just want to drive performance improvement. Todd combines extensive project management skills with a large variety of previous engagements to bring creative solutions to his clients. Prior to joining ScottMadden, Todd founded and operated The Landmark Group, a real estate brokerage firm headquartered in Beijing, China. He earned an M.B.A. with honors from the Goizueta School of Business at Emory University, a B.A. in political science from the University of the South, and a certificate of honors in intensive Mandarin Chinese language study from Anhui Teachers University in Wuhu, Anhui Province, China.

Fossil-Fired Generation

Introduction

EPA Regulations Are the Single Most Important Strategic Driver in Fossil Generation Today



- **CSAPR:** The Cross-State Air Pollution Rule (CSAPR), requires some states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states
- MATS: The Mercury Air Toxics Standards (MATS) limits emissions of mercury and other air pollutants such as particulate matter and acid gases from coal and oil-fired power plants
- GHG NSPS and ESPS: The New Source Performance Standard (NSPS) sets limits on greenhouse gas (GHG) emissions for new fossil-fueled generators, while the Existing Source Performance Standard (ESPS) proposes limits on existing generators
- CWA: Though first enacted in 1972, several sections of the Clean Water Act (CWA) are in various stages of rulemaking and revisions, with potentially significant implications for fossil generators

Notes: CSAPR is The Cross-State Air Pollution Rule, MATS is Mercury and Air Toxics Standard, ESPS is Existing Source Performance Standard, NSPS is New Source Performance Standard, CWA is the Clean Water Act



Where Are We Headed and What's Happening Now?

Fuel Diversity of the Fleet – Yesterday, Today, and Tomorrow



Due to EPA Regulations, the Majority of Planned Capacity Consists of Renewables and Gas-Fired Combined Cycle (As Expected)



Notes: *EIA expects coal to be ~20% of total capacity into 2040. **Includes all capacity with applications filed, approved, site prep, under construction, and testing Sources: ScottMadden analysis; Ventyx, SNL Energy, EIA



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Ninth Inning for Some Units and the Perfect Storm Persists

The Litany of Coming EPA Regulations Has Led to Big Investments for Some – and Retirements for Others

CSAPR Resurrected

- The earlier vacatur of CSAPR was reversed by the Supreme Court
- EPA has moved to reinstate CSAPR Phase I beginning in 2015
 - Muted reaction from industry suggests that the decision was consistent with expectations
 - · Generators will need to establish compliance strategies, including trading

Wrestled to the MATS

- Upheld on appeals weeks before CSAPR verdict
- Major driver for coal retrofit/retirement plans (2015 initial deadline)
 - Slated for retirement (2014-2015): Approximately 25,000 to 50,000 MWs depending on the estimate
 - Potential retirements (2016-2024): Few formally announced retirements beyond one to two years, but > 60,000 MW is possible
 - Not prepared for compliance: Fewer than 100 units representing < 25,000 MWs

Life After Death

- Last winter, as gas prices spiked during the "polar vortex" and gas-fired generators experienced reliability issues, coal-fired generation proved critical for system reliability and some system operators are rethinking planned retirements
 - Gas pipeline capacity was tight, but many outages were not fuel-related; some combustion turbines failed to start
 - Coal stockpiles came in handy, and the fact that many coal generators were already running kept them out of trouble

Notes: *Selective Catalytic Reduction (SCR) with Flue-gas Desulfurization (FGD), Activated Carbon Injection (ACI), ACI with Fabric Filter (FF) or Electrostatic Precipitators (ESP) Sources: ScottMadden analysis; Ventyx, SNL Energy, Sanford C. Bernstein & Co



Ninth Inning for Some Units and the Perfect Storm Persists (Cont'd)

Some Regions Like the Midwest and the Northeast U.S. Face Larger Challenges Than Others



Sources: ScottMadden analysis; SNL Energy



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Proposed GHG Standards – A Nail in the Coffin?

New Source Performance Standards (NSPS) Serve as a Moratorium on New Coal Construction

- The limits proposed under Section 111 (b) of the Clean Air Act for "New, Modified, and Reconstructed Sources" have set the stage for a legal battle, with a major question around the EPA's ability to show that carbon capture and storage technology is a viable option for the power industry
- The Clean Air Act requires the EPA to show that the proposed standards are "achievable" and that required technology has been "adequately demonstrated"

"Achievable" and "Adequately Demonstrated" Are Open to Debate Based on Operational Technology in the U.S.

Large scale Power Plant CCS Projects Worldwide								
USA								
Project Name	Leader	Location	Feedstock	Size MW	Capture Process	CO2 Fate	Status	No large scale
Kemper County	Southern	Mississippi	Coal	582	Pre	EOR	Under Construction	power plant
HECA	SCS	California	Petcoke	405	Pre	EOR	Planning	projects
FutureGen	FutureGen Alliance	Illinois	Coal	200	Оху	Saline	Planning	are yet i service
TCEP	Summit Power	Texas	Coal	400	Pre	EOR	Planning	the U.S.
WA Parish	NRG Energy	Texas	Coal	250	Post	EOR	Planning	

Intended showcase of clean-coal future hits snags Washington Post (5/2014)

Kemper plant will not meet construction schedule

Mississippi Business Journal (10/2013)

Sources: ScottMadden analysis; MIT CCS Project Database

Miss. Power says more overruns likely at Kemper BloombergBusinessweek (7/2013)

Southern Co replaces executives in wake of Kemper cost overrun *Reuters (5/2013)*



Proposed GHG Standards – A Nail in the Coffin? (Cont'd)

The Incremental Impact of the EPA GHG Existing Source Performance Standards (ESPS) Remains to Be Seen

- The proposed best system of emission reduction (BSER) is based on a range of GHG abatement measures that fall into four "building blocks" which include inside the fence (e.g., heat rate improvements) as well as outside the fence (e.g., clean energy) measures
- While the proposed rule does not place any requirements on individual generators, target rates assigned to the states assume all four building blocks are applied across the board and states may place requirements on individual generators in state-level plans

The Top 50 CO₂ Emitting Plants Are Sizeable Plants Which Provide Baseload Generation for Nearly All Regions in the U.S.

Top 50 U.S. Utility "Inside the Fence" Power Plant CO₂ Emitters by Rate and by Region **Three-Year Avg. CO₂ Emissions** 1.30 (Tons/MWh) 1.10 1.02 1.02 1.02 (Three-Year Average 2011–2013) **NERC** Region Reduced rates inside the fence can be achieved by improving efficiency ERCOT FRCC **O**MRO • RFC SERC • SPP • WECC 1.00 Capacity (MW) 0.95 Maximum 2020–2029 Emission Rate* 2,500-3,000 1.750-2.500 Maximum 2030 Emission Rate* 0.90 Re-dispatch to lower-emitting plants may decrease capacity factors, increasing Fuels' \$/MWH and changing duty cycles and maintenance challenges 1,000-1,750 0.85 50 60 80 90 100 30 40 70 Three-Year Average Annual Capacity Factor (%) Coal & Gas Notes: *Maximum average interim state-level goal from 2020-2029 and maximum goal for 2030 and thereafter outlined in the EPA's "Clean Power Plan" (including all four "building blocks" inside the fence and outside the fence). **Plants with units fueled primarily by fuels other than coal are highlighted Copyright © 2014 by ScottMadden, Inc. All rights reserved. ScottMadden analysis; Ventyx, SNL Energy, Sanford C. Bernstein & Co Sources:

Water and Energy – A Persistent Concern

EPA Updates Effluent Rules

- Rulemaking to limit toxic metal discharges
- Updated limits targeting key waste streams
- Key battle: rules versus technology

Keeping Out of Hot Water

- Thermal limits can affect plant performance
- In July 2012, U.S. nuclear power production hit its lowest seasonal levels in nine years as heat and drought limited output

First Come, First Served

- In normally water-abundant east, water can be "reasonably" used by adjacent landowners without regard to downstream uses
- New power generating capacity and new uses (gas extraction) could increase both intra- and interstate battles over water

Freshwater Withdrawals in the U.S. as % of Available Precipitation (2005)



Key Waste Streams Encompassed in the Proposed Effluent Limitations Guidelines





Sources: EPA; DOE; Inside EPA; SNL Financial; U.S. Geological Service; EPRI; Bloomberg

Water and Energy – A Persistent Concern (Cont'd)

Thermal Discharge Limitations In CWA §301(a) May Cause Bigger Headaches Than Other Two Issues Combined for Some

- Heat as a pollutant
 - Heat is a unique type of pollutant; not toxic, can accumulate, and excessive heat upsets ecosystems
 - Hotter water holds less dissolved oxygen—this can create dead zones in water bodies
 - Heat is not included in the EPA list of priority pollutants (EPA 2013dc); however, EPA regulates thermal discharges through effluent temperature limits
- Regulation
 - The point source discharge of pollutants to a water of the United States is prohibited by CWA § 301(a), unless authorized by an NPDES permit issued under CWA § 402
 - Therefore, power plants that withdraw water and then release it back into the environment at an elevated temperature must comply with temperature limits under the NPDES program
- What's new?
 - The "BAT" bar (to demonstrate "best achievable technology") is rising
 - Increasing scrutiny of permitted variances
 - The EPA has increased scrutiny of existing variances during NPDES permit renewals
 - Some states have initiated a more aggressive review of existing 316(a) variances



Takeaways

Proposed and effective regulations are changing the profile of the U.S. generation fleet

- Many coal and oil-fired units have already been retired, and more units are expected to be retired in the next few years
- The future of coal will play out in the regulatory and legislative arenas
- Based on current trajectories, coal and oil are being replaced by renewables and gas-fired combined cycles
 - Mid-term increase in U.S. fleet diversity
 - · Long-term decrease in U.S. fleet diversity as coal plants reach end of life
- If passed, proposed GHG regulations will reinforce this trend by halting any future development of coal capacity and pushing states to rely even more heavily on gas-fired combined cycles for baseload generation
- Water regulations, on several different fronts, may play an increasing role in the fossil generation landscape





John Pang Partner

John Pang has more than 15 years of consulting experience working in the energy industry. John specializes in strategic planning and change management with a focus on business planning within electric utilities. Prior to joining ScottMadden, John was a consultant and country manager for AsiaWorks Corporate Division in Hong Kong, where he partnered with organizations to create personal growth and development strategies and implement high-impact change management solutions. John has facilitated leadership workshops and management development sessions around the world, in 15 countries for over 40 different multi-national companies and utilities. He has published academic research in international journals dealing with memory and cognition and human performance. John received a B.S. from the University of Guelph, an M.A. in experimental psychology from York University, and an M.B.A. from Duke University.



Renewables Development: More Steel (and Modules) "in the Ground," But Policy Uncertainty Remains a Barrier



Continued State RPS* Challenges	 After some "near death" experiences last year, state RPS's continue to face legislative challenges designed to reduce requirements and broaden eligible resources (e.g., large hydro) Ohio is the first state to approve a significant curtailment with passage of a law freezing renewable and efficiency standards in place for two years, pending review of RPS costs and benefits The EPA's Clean Power Plan may function as back door federal RPS as the policy will encourage states to consider maintaining or expanding current RPS requirements
Mid-Terms Derail Possible Bipartisan Policy Efforts	 With November mid-term elections approaching, Congress looks like it will be unable to enact even bipartisan energy bills In May, the bipartisan Shaheen-Portman energy efficiency bill, which sought to encourage deployment of "off-the-shelf" efficiency technologies, failed a vote in the Senate



 Notes:
 *RPS means renewable portfolio standard; PTC means production tax credit; ITC means investment tax credit; REIT means real estate investment trust; PACE means property assessed clean energy

 Sources:
 Industry news; Greentech Media; American Wind Energy Association

Renewables Development: More Steel (and Modules) "in the Ground" (Cont'd)



A Maturity Model Emerges for Renewable Energy

- As renewable energy continues to grow, utilities are faced with important decisions regarding how best to meet growing compliance requirements and customer expectations while continuing to operate within existing regulatory frameworks
- Industry conversations have centered largely on technology, regulatory frameworks, and utility business model; however, little attention has been paid to the effect that the integration of renewables has had on utilities' organizational models and staffing
- ScottMadden's Renewable Energy Organization Maturity Model, developed in conjunction with the Solar Electric Power Association, describes the general pathway utilities follow from initial renewable energy projects to fully integrated renewable resources

	Renewable Energy Organization Maturity Model					
	Stage 1: Cross-Functional Teams	Stage 2: Dedicated Renewable Energy Group(s)	Stage 3: Full Integration of Renewables			
	 Collateral accountabilities for staff 	 Core accountabilities for staff 	 Renewables are treated as a normal part of business operations 			
Market Profile	 Limited number of distributed interconnections Utility-scale renewables used to meet RPS policies 	 Critical mass and strong growth in distributed generation Utility-scale renewables used to meet RPS policies 	 Significant penetration of distributed generation Utility-scale renewables competitive with other sources of new generation 			
Typical Drivers	 Minimal distributed generation interconnection requests Limited utility-scale PPAs or capacity connected to the grid 	 Growing or strong potential for distributed generation Existence of a variety of utility-scale renewable energy PPAs and/or interconnections 	 A critical mass of distributed generation or utility-scale renewables is connected to the grid Renewables growth may begin to slow, allowing focus on operations 			
Utility Experience	 Secures and manages PPA contracts for utility-scale renewables Outsources O&M responsibilities 	 Leverages lessons from operational experience; include in strategic planning Owns and operates renewable assets 	 Explores opportunities to improve operations (e.g., O&M) of utility-owned assets 			
Renewables Organization	 Utility incorporates renewable functions into work flow of existing functional teams to reactively solve tactical needs 	 Utility establishes core teams dedicated to distributed and/or utility-scale renewables 	 Utility manages renewable capacity similar to other generation assets 			



A Maturity Model Emerges for Renewable Energy (Cont'd)

- A variety of motivations, which can change over time, drive a utility through the maturity model
 - Cross-functional teams are generally driven by compliance requirements or interest in customer service
 - Dedicated renewable groups often form within utilities seeking a strategic positioning, but may also arise from compliance, customer service, or economic motivations
 - Full integration is found in utilities engaging in renewables for strategic or economic purposes; the stage is characterized by a cultural shift within a utility, rather than a particular staffing design
- Expanding experience with renewable technologies (e.g., signing PPAs, owning renewable assets, etc.) plays a critical role in allowing utilities to refine operational and business models, thereby allowing them to advance to the next stage
- Regulatory complexity and rapid market growth are challenges that can prevent utilities from moving to full integration in the maturity model; these factors create significant uncertainty and/or a reactive environment for the utility

		Stage 1: Cross-Functional Teams	Stage 2: Dedicated Renewables Energy Group(s)	Stage 3: Full Integration of Renewables
↑	Economic Driven: Utilities procure and operate cost-competitive renewable generation in a manner similar to other generation			
	Strategic Driven: Utilities are proactive and intentional in addressing industry changes and long-term strategic planning			
MOUVAUO	Compliance or Customer Driven: Utilities address renewables for compliance requirements and/or customer-driven demand for distributed generation			

Integration





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Greg Litra is a partner with ScottMadden, with principal expertise in financial, economic, and regulatory analysis, strategic planning, corporate governance, risk management, and transaction support. He specializes in the energy and utilities business sectors. He also leads the firm's energy and sustainability research activities and spearheads publication of ScottMadden's semi-annual ENERGY INDUSTRY UPDATE. He is a member of the New York, Connecticut, and District of Columbia bar associations, as well as the Energy Bar Association and the American Bar Association's Public Utilities and Environment. Energy & Resources sections. Greg earned a J.D. from the University of South Carolina School of Law, where he was editor-in-chief of the SOUTH CAROLINA LAW REVIEW. He also earned an M.S. in Industrial Administration (MBA-equivalent) from Carnegie Mellon University, where his academic concentrations were in the areas of finance, accounting, and entrepreneurship. Greg holds a B.A. in economics and philosophy from Wofford College, magna cum laude.



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See the link below for the Summer 2014 Energy Industry Update http://www.scottmadden.com/insight/773/the-scottmadden-energy-industry-update-summer-2014.html

