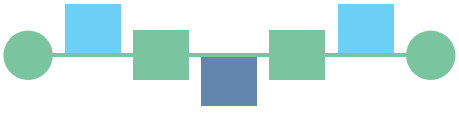
City of Glendale Water & Power

Your Trusted Community Utility

GWP Strategic Plan

Directions Report
FY 2011 – 2016



City of Glendale Water & Power

Your Trusted Community Utility

A Message from Glenn Steiger – Strategic Plan, 2011 – 2016

This is an updated Directions Report to the Glendale Water & Power Strategic Plan that went into effect in January 2009. Since then our utility has made excellent progress in reaching many of our stated goals. Many of the initiatives have been completed, and others have progressed to an operational (ongoing) status.

We have always envisioned the Strategic Plan to be a living document, expecting to make annual course corrections to it. However, with the downturn of the economy, and with the rapid advancements in technology that we have begun implementing, we decided to perform a thorough review and updating of our Strategic Plan.

The updated direction report builds on the progress made to date, emphasizes work in areas to support the vision for smart metering and the Smart Grid, and de-emphasizes some of the areas that are currently less supported by the downturn in the economy.

The review included changes to our vision and values statements as well. The vision statement was modified to make it more succinct and easier to remember. Although fewer words, the sentiment of the earlier vision statement still applies.

The values were also changed. A new value, integrity, was added. It was always an underlying value, but we decided to state it explicitly. And, the intention of the two values “Do it right,” and “Continuous improvement” were combined into a new value “Commitment to quality and excellence.”

This updated directions report is intended to chart our course for the next five years. However, we will continue to review the plan each year and make adjustments to meet the needs of GWP and the City of Glendale.

Glenn O. Steiger
General Manager, Glendale Water & Power

GWP DIRECTIONS REPORT

INTRODUCTION

This report describes the philosophy and plans that GWP will implement during 2011-2016. These Department's strategies are "evergreen" and will be updated annually to meet changes in future business conditions.

This report explains seven areas of GWP's plans for the future.

MISSION. A one sentence statement that summarizes the aspirations or purpose of GWP over next five years.

VISION. A rich description of positive expectations about the successes GWP will have achieved in five years.

VALUES. The principles and beliefs that are the bedrock for GWP's existence.

KEY RESULT AREAS. The performance areas where GWP must achieve excellence over the next five years.

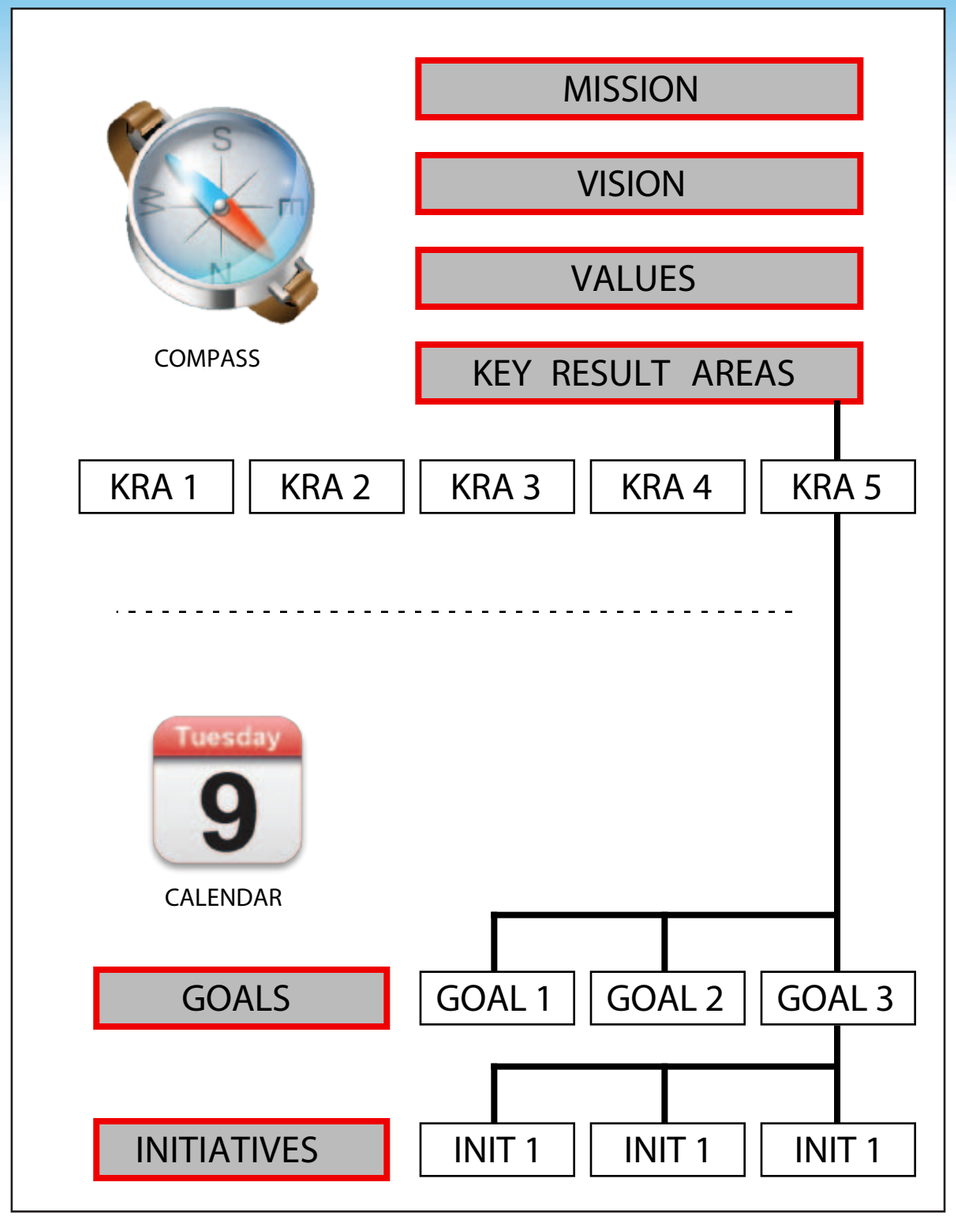
GOALS. The measurable targets that describe the measures of excellence in each GWP key result area.

INITIATIVES. Organized actions that intend to achieve one or more goals.

SCOREBOARD. A high-level stewardship tool that monitors GWP's performance towards its goals.

As the chart on the following page shows, the first four elements (mission, vision, values, and key result areas) are the compass. Like a compass, they provide the overall direction for GWP's success over the next five years. They contain the business philosophies for GWP's leaders can use to inspire employees and other stakeholders in the future of the Department. They describe the common grounds for collaboration and teamwork.

The next two elements (goals and initiatives) are the calendar. They show what results GWP will achieve and when they are either implemented or due over the next five years.



As the chart above illustrates, there is a necessary vertical alignment between KRAs, Goals, and Initiatives. Specific goals support the achievement of each key result area. Specific initiatives support the achievement of each goal.

MISSION

A mission is a one sentence statement that summarizes the aspirations or purpose of GWP over next five years. It states GWP's destiny. It is the guiding star on the horizon that summarizes what GWP does or its primary reason for being.

GWP MISSION

To be your trusted community utility

VISION

A vision is a description of positive expectations about 1) the successes GWP will have achieved and/or 2) what stakeholders will be saying about GWP in the future. A vision can express the point-of-view of any stakeholder, including customers, employees, and other City departments.

GWP VISION

GWP Vision Statement:
Providing customers with reliable and sustainable water and power services that are cost effective and innovative.

VALUES

Values are the principles and beliefs that provide 1) the bedrock for GWP's existence and 2) the decision criteria for major programs, policies, and expenditures. They are the foundation for GWP's culture and the positive behaviors of its employees towards all customers, vendors, and other stakeholders. Values are the ethical standards and underlying principles for setting GWP priorities, making decisions, and resolving problems. They are the uncompromisable rules of the game that, when violated, can stop all action.

GWP VALUES

- Commitment to quality and excellence
- Dedication to customer service
- Trustworthy and respectful
- Integrity
- Ownership
- Teamwork

KEY RESULT AREAS

Key Result Areas (KRAs) state the performance areas where GWP must achieve excellence over the next five years. KRAs reflect priorities identified in the GWP's Future Outlook Report. KRAs provide the top level for organizing GWP's goals and initiatives within the strategic plan.

GWP KEY RESULT AREAS

- Water Supply
- Power Supply
- Customer Service
- Rates
- Water Infrastructure
- Power Infrastructure
- Workforce
- Systems
- City of Glendale
- Legislation & Regulation

GOALS

Goals are statements that describe the scope of excellence within each GWP Key Result Area. A goal describes a measurable end result. It contains a due date for the goal to be attained or implemented. A goal does not describe the work plan or how the goal will be achieved.

GWP GOALS (for each KRA)

WATER SUPPLY (KRA)
- Produce 3,856 AFY from Verdugo Basin
- Serve 2,500 AFY recycled water
- Institute a 2.5% PBC-like charge to fund water conservation measures
- Reduce water usage by 20 percent by 2020

POWER SUPPLY (KRA)
- Reduce electrical usage by 7%
- Increase GPP efficiency to <10,000 heat rate
- Reduce GHG emissions to 1990 levels
- Achieve a balanced energy portfolio
- Operate Energy Management Resources Group under defined metrics
- External Transmission Review

CUSTOMER SERVICE (KRA)
- Consistently achieve above average customer satisfaction scores from the CMUA survey
- Ensure that all affected customers and public are consistently notified of all GWP activities
- Restore minor power outages within 10 minutes and major outages within 20 minutes

RATES (KRA)
- Establish water rates at or below 80% of the average rates in the area
- Reduce electrical rates to 35% below SCE
- Increase annual electrical wholesale net income to $10M
- Reduce electrical system losses to <10%

WATER INFRASTRUCTURE (KRA)
- Reduce unaccounted-for water to 5%
- Replace/rehabilitate 25 miles of pipe
- Implement effective asset management

POWER INFRASTRUCTURE (KRA)
- Reduce number of preventable outages to less than 25 per year
- Upgrade transmission system to 69 kV
- Convert distribution feeders from 4 kV to 12 kV
- Replace all electromechanical relays with state-of-the-art relays
- Implement effective asset management

WORKFORCE (KRA)
- Continually improve job satisfaction of our employees
- Have <5% vacancy rate
- Achieve annual utility average OSHA incident rate of 2.0 or less
- Have zero preventable vehicle accidents each year

SYSTEMS (KRA)
- Implement Smart Grid Maturity Model
- Operate GWP within a city-wide GIS
- Implement new Dept of Finance processes for GWP transactions
- Create a GWP system integration that assures no redundant data entry
- Launch profitable new business ventures

CITY OF GLENDALE (KRA)
- Improve communications with customers, City Council, and City Departments
- Develop optimum transfer level for mutual benefit
- Implement communication vehicles to improve GWP's public image
- Develop a Comprehensive Outreach Plan
- Implement new collaborative ventures with City departments

LEGISLATION & REGULATION (KRA)
- Establish and continue on-going relationships with state and federal legislators and regulators
- Develop specific GWP legislative strategy and initiatives
- Provide quarterly reports on compliance, strategies, relationships and major activities

INITIATIVES

An initiative is a planned set of activities that intend to achieve a goal in the strategic plan. Initiatives can be projects, policies, or programs. They provide the structure for mobilizing GWP resources to work towards achieving goals. Each initiative has milestone dates that fit within the time line of the goal that it supports. Each initiative has one person who is held accountable for its performance.

GWP INITIATIVES

GWP has many initiatives to execute over the life of this strategic plan. On the next four pages is a list of the initiatives that will be in effect with this version of the plan. It is expected that, annually, many initiatives will be modified and others will be added.

Use this key to read the charts on the next few pages:
- Blue = Key result areas
- Yellow = Goals that support key result areas
- Green = Initiatives that support goals
- The person who is accountable for a goal or initiative is listed
- Goals and initiatives show start and/or stop milestone dates
- Initiatives show major activities

GWP Strategic Plan Schedule

KEY RESULT AREAS. The performance areas where GWP must achieve excellence over the next five years.

GOALS. The measurable targets that describe the measures of excellence in each GWP Key Result Area.

INITIATIVES. Organized actions that intend to achieve one or more Goals.

BLUE = Key result areas

YELLOW = Goals that support key result areas
= The person who is accountable for a goal is listed
= GOALS show start and completion dates

GREEN = Initiatives that support goals
= The person who is accountable for an initiative is listed
= Initiatives show milestone dates and major activities
= Initiatives show major activities

KRA	1	WATER SUPPLY				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	1.1	Produce 3,856 AFY from Verdugo Basin		Kavounas							Dec		
INITIATIVE		1.1.1	Mo' wells	Takidin	Completed	Foothill well in-service	Dec						
						Rockhaven well in-service			Dec				
INITIATIVE		1.1.2	BAM Better Asset Management)	Kavounas		In house training						Jun	
						Create asset register		Jun					
					Completed	CIP validation		Mar					
						Maintenance procedures/automation			Jun				
						Operations manual/documentation		Dec					
GOAL	1.2	Serve 2,500 AFY recycled water		Kavounas									19-20
INITIATIVE		1.2.1	RW to the max	Takidin		Design and build projects						Jan	
GOAL	1.3	Institute a 2.5% PBC-like charge to fund water conservation measures		Fox									
INITIATIVE		1.3.1	Support legislation	Haddad	Ongoing		Sept						
						Ordinance modification							
GOAL	1.4	Reduce water usage by 20 percent by 2020		Bassin	Completed						Dec		
INITIATIVE		1.4.1	Water Is Life, Don't Waste It	Kuennen	Meeting Goal	Market water programs	Jun	Jun	Jun	Jun	Jun	Jun	Jun
					Meeting Goal	Enhance/modify water savings programs to improve savings	Dec	Dec	Dec	Dec	Dec	Dec	Dec

KRA	2	POWER SUPPLY				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	2.1	Reduce electrical usage by 7%		Bassin							Dec		
INITIATIVE		2.1.1	Save a Little, Save a Lot	Kuennen	Meeting Goal	Market energy efficiency programs to save 1% per year	Jun	Jun	Jun	Jun	Jun		
					Meeting Goal	Enhance/modify EE programs to improve savings	Dec	Dec	Dec	Dec	Dec		
GOAL	2.2	Increase GPP efficiency to <10,000 heat rate		Lins				Jan					Jan
INITIATIVE		2.2.1	Project Modernize	Lins		Develop resource model		Aug					
						Develop portfolio metrics analysis		Oct					
						Decision on new units		Jan					
						Implement resource option							Jan

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KRA	2	POWER SUPPLY *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	2.3	Reduce GHG emissions to 1990 levels		Lins									19-20
INITIATIVE		2.3.1	Project RPS	Lins		Develop resource model		Aug					
						Develop portfolio metrics analysis		Oct					
						Technology portfolio decision			Jan				
						Project acquisition					Jul		
GOAL	2.4	Achieve a balanced energy portfolio		Lins									19-20
INITIATIVE		2.4.1	Project Zen Balance	Lins		Develop resource model		Aug					
						Develop portfolio metrics analysis		Oct					
						Portfolio fuel mix decision					Jul		
						Supply resource acquisition							Jan
GOAL	2.5	Operate Energy Management Resources Group under defined metrics		Lins				Jul					
INITIATIVE		2.5.1	Project Trading Metrics	Lins	Completed	Define scope of measurement	Mar						
					Completed	Retain consultant	Mar						
						Develop model		Dec					
						Measure trading performance			Jul	Jul	Jul	Jul	Jul
GOAL	2.6	External Transmission Review		Lins				July					
INITIATIVE		2.6.1	Transmission Review	Lins	Completed	Phase I: Ballpark review	Aug						
						Phase II: Detailed Review		Mar					

KRA	3	CUSTOMER SERVICE				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	3.1	Consistently achieve above average customer satisfaction scores from the CMUA survey		Vallier			Dec						
INITIATIVE		3.1.1	Customer Contact Surveys	Benson	Meeting Goal	Conduct quarterly customer contact survey	Dec						
INITIATIVE		3.1.2	GWP Customer Surveys	Kuennen	Meeting Goal	Conduct GWP annual customer surveys	Oct	Oct	Oct	Oct	Oct	Oct	Oct
INITIATIVE		3.1.3	Customer Service Training	Akopyan		Provide 4-6 hours customer focused training / year	Dec	Dec	Dec	Dec	Dec	Dec	Dec
GOAL	3.2	Ensure that all affected customers and public are consistently notified of all GWP activities		Bassin					Jun				
INITIATIVE		3.2.1	Mass Notification System	Vallier		Arrange for notification of unplanned outages and est. time of restoration			Jun				
GOAL	3.3	Restore minor power outages within 10 minutes and major outages within 20 minutes		Abueg							Dec		
INITIATIVE		3.3.1	SCADA System	Germond	Completed	Site Acceptance Test / Implementation	Aug						
INITIATIVE		3.3.2	Fuse Coordination on Feeders	Abrari	Completed	No. 7 Columbus	Jun						
					Completed	No. 2 Western		Jun					
					Completed	No. 9 Tropico		Jun					
						2 Feeders per year			Jun	Jun	Jun	Jun	
INITIATIVE		3.3.3	Glorietta Substation Upgrade	Abrari	Completed	Operate upgraded substation	May						
INITIATIVE		3.3.4	Grandview Substation Upgrade	Abrari		Start design		Sep					

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KRA	3	CUSTOMER SERVICE *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
						Complete studies and specifications		Jun					
						Construction			Oct				
						Operate upgraded substation				Jun			
INITIATIVE		3.3.5	Disturbance Monitors Installation	Abrari	Completed	Operate upgraded Kellogg	July						
INITIATIVE		3.3.6	Outage Management System	Abueg		Prepare specifications		Jul					
						Vendor selection		Dec					
						Delivery and installation		Jun					
						Implementation			Jun				

KRA	4	RATES				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	4.1	Establish water rates at or below 80% of the average rates in the area		Kavounas							Dec		
INITIATIVE		4.1.1	Redoing Water Rates	Fox	Completed	Financial analysis	Jun			Jun			
						Develop new rate structure due to conservation efforts		Sep					
						Ordinance modification		Dec			Dec		
GOAL	4.2	Reduce electrical rates to 35% below SCE		Steiger							Dec		
INITIATIVE		4.2.1	Renegotiate Scholl Canyon Gas	Steiger	Completed								
INITIATIVE		4.2.2	Alternative Use for Landfill	Steiger		Initiate feasibility study		Aug					
						Create political/community support			Aug				
						Implement trash to energy project				Nov			
						Retire associated Grayson units				Jun			
INITIATIVE		4.2.3	Transfer Stabilization at 2008 Levels	Steiger		Implement public education programs							
INITIATIVE		4.2.4	GWP Revenue Increase	Steiger		Finalize portfolio study		Aug					
						Operate trading group with new metrics		Oct					
		4.2.5	Redoing Electric Rates	Fox		Financial analysis		Nov					
						Examine rate structure		Jan					
						Ordinance modification		Mar					
GOAL	4.3	Increase annual electrical wholesale net income to $10M		Lins			Jan				Jun		
INITIATIVE		4.3.1	Project Optimize	Lins		Review historical performance		Jun					
						Catalogue all historical and known trading strategies		Jun					
						Input all strategies into metrics model			Jul				
						Decision on wholesale vs. retail allocation			Jul				
						Acquire all necessary trading tools and staff			Jul				
					Not met	Wholesale net trading income $3 Million	Jan						
						Wholesale net trading income $5 Million			Jun				
						Wholesale net trading income $10 Million					Jun		
GOAL	4.4	Reduce electrical system losses to <10%		Abueg									19-20

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KRA	4	RATES *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
INITIATIVE		4.4.1	Distribution System Loss Reduction	Abrari		Convert 4 kV to 12 kV distribution feeders							Dec
INITIATIVE		4.4.2	Metering	Abrari	Completed	Identify unmetered loads	Jun						
					Completed	Install check meters	Jun						
						Install metering instruments at substations			Sept				
INITIATIVE		4.4.3	Theft of Service	Vallier	Ongoing	Identify theft and recover							
						Assess level of theft	Jun	Jun	Jun	Jun	Jun	Jun	Jun

KRA	5	WATER INFRASTRUCTURE				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	5.1	Reduce unaccounted-for water to 5%		Kavounas								Jun	
INITIATIVE		5.1.1	Fix the Pipes	Hayes		Design and build projects						Jun	
GOAL	5.2	Replace/rehabilitate 25 miles of pipe		Kavounas								Jun	
INITIATIVE		5.2.1	Fix the Pipes	Hayes		Design and build projects						Jun	
GOAL	5.3	Implement effective asset management		Kavounas						Dec			
					Completed	Award RFP contract to populate GIS with GWP system	Dec						
						Implement full GIS use				Dec			

KRA	6	POWER INFRASTRUCTURE				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	6.1	Reduce number of preventable outages to less than 25 per year		Abueg						Jun			
INITIATIVE		6.1.1	SCADA System	Germond	Completed	Site Acceptance Test / Implementation	Aug						
INITIATIVE		6.1.2	Fuse Coordination on Feeders	Abrari		Reference Initiative 3.3.2							
			Reference Initiative 3.3.2										
INITIATIVE		6.1.3	Glorietta Substation Upgrade	Abrari		Reference Initiative 3.3.3							
			Reference Initiative 3.3.3										
INITIATIVE		6.1.4	Grandview Substation Upgrade	Abrari		Reference Initiative 3.3.4							
			Reference Initiative 3.3.4										
INITIATIVE		6.1.5	Disturbance Monitors Installation	Abrari		Reference Initiative 3.3.5							
			Reference Initiative 3.3.5										
INITIATIVE		6.1.6	Outage Management System	Abueg		Reference Initiative 3.3.6							
			Reference Initiative 3.3.6										
GOAL	6.2	Upgrade transmission system to 69 kV		Abueg									22-23
INITIATIVE		6.2.1	Transmission Conversion to 69 kV	Abueg	Completed	Create three-way transmission (Rossmoyne-Montrose-Glorietta)	May						
GOAL	6.3	Convert distribution feeders from 4 kV to 12 kV		Abueg									26-27
INITIATIVE		6.3.1	Stations Upgrade to 12 kV	Abrari		Complete Grandview conversions - transfer of loads		Oct					
						Upgrade Grandview Substation to 69kV/12kV			Jun				

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KRA	6	POWER INFRASTRUCTURE *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
INITIATIVE		6.3.2	Distribution Feeders Upgrade to 12 kV	Abrari	Completed	Reconstruct Bel Aire service area				Oct			
					Ongoing	Upgrade 1-2 feeders per year							Dec
GOAL	6.4	Replace all electromechanical relays with state-of-the-art relays		Abueg									17-18
INITIATIVE		6.4.1	Disturbance Monitors Installation	Abrari	Completed	Operate upgraded Kellogg	July						
					Completed	Operate upgraded Rossmoyne	July						
INITIATIVE		6.4.2	New Design and Replace Relays	Abrari	Completed	Glendale - Howard Transmission Line	May						
					Completed	Rossmoyne - Howard Transmission Line	Aug						
						Glendale - Fremont Transmission Line			May				
						Rossmoyne - Scholl Transmission Line				May			
						Tropico - Scholl Transmission Line					May		
						Tropico - Acacia Transmission Line						May	
						One Station Internal Relays per Year			May	May	May	May	
GOAL	6.5	Implement effective asset management		Abueg							Dec		
INITIATIVE		6.5.1	Electric Asset Management System	Abueg		Prepare cost-benefit analysis			May				
						Evaluate options (joint system or separate)			May				
						Implement plan				July			
						Integrate with GIS, AMI and SCADA					Dec		
INITIATIVE		6.5.2	City-wide GIS	Herman	Completed	Award RFP contract to populate GIS with GWP System	Dec						
						Implement full GIS use				Dec			

KRA	7	WORKFORCE				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	7.1	Continually improve job satisfaction of our employees		Steiger	Ongoing								
INITIATIVE		7.1.1	Staffing Levels	Steiger	Ongoing	Re-evaluate long-term resource needs							
					Ongoing	Create ongoing partnership with Human Resources							
INITIATIVE		7.1.2	Competitive Salaries	Akopyan		Review and update job classifications		June		June			
						Complete competitive salary study			Jan		Jan		
						Implement educational program for City Council			Jan				
INITIATIVE		7.1.3	Internal Communications	Kuennen		Develop internal communications plan		Dec					
						Implement communications plan		Jan	Dec				
INITIATIVE		7.1.4	Continuous Training	Akopyan		Perform assessment of current and desirable skills for jobs		June		Jan			
						Develop a utility focused Management/ Leadership Education Program		June					
						Assess effectiveness of training programs			Dec	Dec	Dec	Dec	Dec
GOAL	7.2	Have <5% vacancy rate		Bassin					Jun				
INITIATIVE		7.2.1	Fill the voids	Akopyan	Ongoing	Report / prompt hiring on a monthly basis							

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KRA	7	WORKFORCE *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	7.3	Achieve annual utility average OSHA incident rate of 2.0 or less		Bassin			Dec						
INITIATIVE		7.3.1	Safety is No Accident	Doyle		Provide annual recommendations for improvement	Dec	Dec	Dec	Dec	Dec	Dec	Dec
						Implement programs	Jan	Jan	Jan	Jan	Jan	Jan	Jan
GOAL	7.4	Have zero preventable vehicle accidents each year		Bassin				Jun					
INITIATIVE		7.4.1	Driving for Safety	Bassin		Implement discipline policy for avoidable vehicle accidents		Jun					

KRA	8	SYSTEMS				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	8.1	Implement Smart Grid Maturity Model		Kuennen									
INITIATIVE		8.1.1	Strategy, Management, and Regulatory (SMR)	Steiger		Acheive SGMM Level 4 (See Appendix A)			Jun				
						Incorporate smart grid vision into organization vision		Jun					
						Establish smart grid governance model		Jun					
						Smart grid leadership established		Jun					
						Smart grid investments authorized		Jun					
						Acheive SGMM Level 5 (See Appendix A)					Jun		
INITIATIVE		8.1.2	Organization and Structure (OS)	Steiger		Acheive SGMM Level 3 (See Appendix A)			Jun				
						Organization has aligned operations to leverage smart grid		Jun					
						Smart grid implementation teams from all impacted business sections		Jun					
						Education and training in smart grid in place		Jun					
						Acheive SGMM Level 4 (See Appendix A)					Jun		
INITIATIVE		8.1.3	Technology (TECH)	Herman		Acheive SGMM Level 3 (See Appendix A)			Jun				
						IT investments are aligned to enterprise IT architecture		Jun					
						Enertprise architecture modified to enable samrt grid		Jun					
						IT architecture standards selected to support smart grid strastegy		Jun					
						Formal process in place for common technology evaluation and selection		Jun					
						Data communication strategy documented		Jun					
						Business unit applications pilotd underway		Jun					
						100% of smart grid inititives have information security built in		Jun					
						Acheive SGMM Level 4 (See Appendix A)					Jun		
INITIATIVE		8.1.4	Societal and Environmental (SE)	Bassin/Lins		Acheive SGMM Level 4 (See Appendix A)			Jun				
						Smart Grid work plans address societal and environmental issues		Jun					

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KRA	8	SYSTEMS *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
						Established energy efficiency programs for all customers		Jun					
						Consider social, environmental and financial performance measures		Jun					
						Perform environmental proof of concept projects		Jun					
						Make available daily consumption data to customers		Jun					
						Acheive SGMM Level 5 (See Appendix A)					Jun		
INITIATIVE		8.1.5	Grid Operations Electric (GOE)	Abueg		Acheive SGMM Level 2 (See Appendix A)			Jun				
						70% distribution to substation automation			Jun				
						20% of grid has advanced outage restoration schemes in place			Jun				
						pilots for remote asset monitoring to support manual decision making have been deployed			Jun				
						80% of grid suppported by expanded data communications			Jun				
						Acheive SGMM Level 3 (See Appendix A)					Jun		
INITIATIVE		8.1.6	Grid Operations Water (GOW)	Kavounas		Acheive SGMM Level 2 (See Appendix A)			Jun				
						Acheive SGMM Level 3 (See Appendix A)					Jun		
INITIATIVE		8.1.7	Work and Asset Management (WAM)	Bassin		Acheive SGMM Level 2 (See Appendix A)			Jun				
						Approach to track, inventory, maintain event histories is complete			Jun				
						Integrated view of GIS is asset monitoring has been completed			Jun				
						Organization wide mobile workforce strategy has been completed			Jun				
						Acheive SGMM Level 3 (See Appendix A)					Jun		
INITIATIVE		8.1.8	Value Chain Integration (VCI)	Bassin/Lins		Acheive SGMM Level 3 (See Appendix A)			Jun				
						40% of customers are provided support for home energy management systems		Jun					
						Redefined value chain		Jun					
						Completed pilots to support a diverse resource portfolio		Jun					
						Completed pilots to ensure secure interaction with expanded portfolio of value chain partners		Jun					
						Acheive SGMM Level 4 (See Appendix A)					Jun		
INITIATIVE		8.1.9	Customer (CUST)	Bassin		Acheive SGMM Level 4 (See Appendix A)			Jun				
						Deployed AMI to residential customers		Jun					
						Collect residential customer usage more often that monthly and use in analytics		Jun					
						Modeling reliability of grid equipment for multiple asset classes		Jun					

(Continued on next page)

KRA	8	SYSTEMS *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
						Deployed remote disconnect/connect for residential customers		Jun					
						Assessed impact of HAN and other programs		Jun					
						100% od smart grid pilots and RFPs specify security and privacy		Jun					
						Acheive SGMM Level 5 (See Appendix A)					Jun		
GOAL	8.2	Operate GWP within a city-wide GIS		Bassin						Dec			
INITIATIVE		8.2.1	City-wide GIS	Herman	Completed	Award RFP Contract to Populate GIS w/ GWP System	Dec						
						Implement full GIS use				Dec			
GOAL	8.3	Implement new Dept of Finance processes for GWP transactions		Fox			Dec						
INITIATIVE		8.3.1	AGM Finance On Board	Steiger	Completed	Provide education to new AGM	Jan						
INITIATIVE		8.3.2	Office Links	Fox		RMI survey		Oct					
						Evaluate trading system software		Jun					
INITIATIVE		8.3.3	Streamlined Purchasing and Contracts	Fox	On going	Review ande update							
INITIATIVE		8.3.4	Obtain Bond Financing for Water and Electric	Fox	Completed	Develop relationships with bond financers	Mar		Apr				
						Develop bonding requirements		Aug					
						Obtain council approval for bonding		Sept					
						Hire Bond Counsel and Financial Advisor		Oct					
						Manage and develop financing documents		Nov					
						Obtain bond funds through bond financings		Dec					
GOAL	8.4	Create a GWP system integration that assures no redundant data entry		Bassin						Dec			
INITIATIVE		8.4.1	No Redundant Data	Herman		Identify redundant data bases		Dec					
						Eliminate redundant data bases	Jan			Dec			
INITIATIVE		8.4.2	Migration of Trouble Orders to CIS	Herman		Implement new system	Jan		Jun				
						Conduct training on new system	Jan		Jun				
GOAL	8.5	Launch profitable new business ventures		Steiger					Jan				
INITIATIVE		8.5.1	New Business Ventures	Steiger		Assess feasibility of new ventures		Jul					
						Implement expanded fiber-optics system				Jul			
						Extend AMI to other utilities				Dec			
INITIATIVE		8.5.2	Expanding Water Initiatives	Kavounas		Assess feasibility of expanding water initiatives		Jul					
						Sell recycled water outside of Glendale				Dec			

KRA	9	CITY OF GLENDALE				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	9.1	Improve communications with customers, City Council, and City Departments		Steiger									
INITIATIVE		9.1.1	City Council Communications	Steiger		Create regularly scheduled workshops		Jul					
						Initiate periodic meetings with CC members		Jul					

(Continued on next page)

KRA	9	CITY OF GLENDALE *(Continued)*				FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
INITIATIVE		9.1.2	Public Communications	Steiger	Completed	Implement appropriate social media	Jan						
					Completed	Implement mass notification system							
						Implement GTV6 TV show specific to GWP		Jan					
INITIATIVE		9.1.3	City Department Communications	Steiger		Implement periodic update meetings with City departments		Jul					
						Implement citywide scoreboard display for GWP goal results		Jul					
GOAL	9.2	Develop optimum transfer level for mutual benefit		Steiger			Jan				Dec		
INITIATIVE		9.2.1	Create Awareness	Bassin	Completed	Prepare educational material	Jan						
INITIATIVE		9.2.2	New Revenue Sources	Steiger		Initatives 8.5.1, 8.5.2, 4.4.3, 4.3.1			Jan				
		9.2.3	Assure accurate internal allocations and total transfer	Fox	Ongoing	Recalculate metrics on a yearly basis		Jul	Jul	Jul	Jul	Jul	Jul
GOAL	9.3	Implement communication vehicles to improve GWP's public image		Bassin				Dec					
INITIATIVE		9.3.1	Project Outreach	Kuennen		Evaluate and develop communication vehicles to improve GWP Image		Dec					
					Ongoing	Implement a methodology for identifying issues related to image							
						Implement plan to inform customers and improve image		Jan					
GOAL	9.4	Develop a Comprehensive Outreach Plan		Kuennen				Jun					
INITIATIVE		9.4.1	How We Communicate	Kuennen	Completed	Develop Communication Plan and procedures	Jun						
						Develop checklists for project outreach		Dec					
GOAL	9.5	Implement new collaborative ventures with City departments						Dec					
INITIATIVE		9.5.1	Joint Ventures	Steiger		Identify opportunities of mutual interest		Jun					
						Develop budget and other implementation requirements			Jun				
						Implement inter-departmental collaborations			Dec				

KRA	10	LEGISLATIVE & REGULATORY POLICY		FISCAL YEAR	10-11	11-12	12-13	13-14	14-15	15-16	16-17
GOAL	10.1	Establish and continue on-going relationships with state and federal legislators and regulators	Lins	Ongoing	Jan						
GOAL	10.2	Develop specific GWP legislative strategy and initiatives	Lins	Ongoing	Jan						
GOAL	10.3	Provide quarterly reports on compliance, strategies, relationships and major activities	Lins	Ongoing	Jan						

GWP STRATEGY SCOREBOARD

The scoreboard is a high-level stewardship tool that GWP uses routinely to report on performance towards goals. The scoreboard uses a simple methodology. Each goal receives a score that rolls up the aggregate performance of all the initiatives assigned to that goal. GWP's scoreboard uses colors to indicate the "score" for each goal during that reporting period. In general, green means "ahead of schedule," yellow means "on schedule," and red means "behind schedule." Any goal that receives a red score requires an action plan to bring the goal into yellow or green.

- Green = Goal is ahead of schedule or is exceeding expectations
- Yellow = Goal is on schedule or is meeting expectations
- Red = Goal is behind schedule or is below expectations

	KRA & GOALS	DATE	R	REPORTING PERIODS			
				Sept 30, 2011	Dec. 31, 2011	Mar 31, 2012	June 30, 2012
1. WATER SUPPLY							
1.1	Produce 3,856 AFY from Verdugo Basin	Dec 2014	Kavounas				
1.2	Serve 2,500 AFY recycled water	Dec 2019	Kavounas				
1.3	Institute a 2.5% PBC-like charge to fund water conservation measures	Ongoing	Fox				
1.4	Reduce water usage by 7 percent over 2006 base year	Ongoing	Bassin				
2. POWER SUPPLY							
2.1	Reduce electrical usage by 7%	Dec 2014	Bassin				
2.2	Increase GPP efficiency to <10,000 heat rate	Dec 2016	Lins				
2.3	Reduce GHG emissions to 1990 levels	Jan 2020	Lins				
2.4	Achieve a balanced energy portfolio	Jan 2020	Lins				
2.5	Operate Energy Management Resources Group under defined metrics	Jul 2011	Lins				
2.6	External Transmission Review	Jul 2011	Lins				
3. CUSTOMER SERVICE							
3.1	Consistently achieve above average customer satisfaction scores from the CMUA survey	Ongoing	Vallier				
3.2	Ensure that all affected customers and public are consistently notified of all GWP activities	Jun 2013	Bassin				
3.3	Restore minor power outages within 10 minutes and major outages within 20 minutes	Dec 2014	Abueg				

GLENDALE WATER & POWER

SMART GRID MATURITY MODEL

IMPLEMENTATION PLAN

DRAFT

May 27, 2011

Strategy, Management, and Regulatory (SMR)

DOMAIN OWNER: ***Glenn Steiger, General Manager, Glendale Water & Power***

DOMAIN DEFINITION

The Strategy, Management, and Regulatory (SMR) domain represents the capabilities and characteristics that enable an organization to successfully develop a smart grid vision and strategy, establish internal governance and management processes, and promote collaborative relationships with stakeholders to implement that strategy and vision. The integration, communication, and management of the mission, vision, and strategy will guide the way through a successful smart grid transformation.

As the organization matures, the management processes across lines of business will increasingly reflect the smart grid vision and strategy. Smart grid leadership will have sufficient explicit authority within the organization and with external stakeholders, including regulators, to implement the vision. Smart grid modernization will drive organizational strategy and direction, and new business opportunities will emerge that capitalize on the smart grid as a platform for the introduction of new services and product offerings.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

Smart grid modernization is a core component of the business strategy and provides opportunities for enhanced business models and synergistic external relationships. There is increased information sharing and collaboration within the organization and with external stakeholders.

Expected Characteristics

- Smart grid vision and strategy drive the organization's strategy and direction at the highest level (i.e., enterprise or corporate level). *This would include investments, design of operations and services, collaboration with key external stakeholders, and evaluation and incorporation of new technologies. Method of governance is reevaluated to address unique investment requirements of the smart grid (strategic investments that will be significant in magnitude/impact, long lived, and subject to upgrade as technologies mature). Costs and benefits of investments are measured and managed.*
- Smart grid is a core competency throughout the organization. *When smart grid becomes a core competency throughout an organization, it becomes fundamental to the way in which everyone in the organization works. It is an organizational expertise.*
- Smart grid strategy is shared and revised collaboratively with external stakeholders, excluding some sensitive aspects.

Informative Characteristics

- The organization is willing to explore, engage, and invest in new business arrangements such as joint ventures and intellectual property sharing to execute smart grid strategy.
- Opportunities are enabled for enhanced market-driven funding and innovative regulatory funding schemes possibly including knowledge sharing on investment priorities, regulatory strategies, and pooling of resources to support consultations that will benefit the larger group.
- New external business partnerships emerge to improve intra-company optimization.
- Processes for mergers and acquisitions that include more favorable regulatory treatment are developed.
- The opportunities for taking advantage of scale to reduce the per capita cost of smart grid investments are identified.
- The organization is engaged in exploring new business ventures or co-investments with other stakeholders to optimize strategy for operating a modern grid.

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

All stakeholders, internal and external, are involved in all relevant aspects of the business and have a goal of innovation.

Expected Characteristics

- Smart grid strategy capitalizes on smart grid as a foundation for the introduction of new services and product offerings. *The overall strategy is built to act on insights gained through smart grid deployment and operational experience.*
- Smart grid business activities provide sufficient financial resources to enable continued investment in smart grid sustainment and expansion. *In general, this means that there is investment funding available through either positive ROI on smart grid applications themselves, or through cost recovery or other business or financial justification. For example, optimized rate design can ensure costs are recovered or a regulatory policy can result in beneficial treatment for investments made and risks taken.*
- New business model opportunities are implemented as a result of smart grid capabilities. *The organization is able to propose and take advantage of new business opportunities that emerge based on smart grid capabilities. Examples of new business models could include new revenue streams from new areas such as providing cable or phone services through BPL (broadband over power line) or offering building management services.*

FIRST YEAR MILESTONES –YEAR ENDING JUNE 30, 2011

SMR-1.1 Our organization developed a smart grid vision that addresses operational improvement across the organization (encompasses and is communicated across all functions in the organization).

SMR-1.2 Significant experimental implementations of smart grid concepts are under way with strong support organizational support.

SMR-1.3 Extensive discussions with regulators on our smart grid vision have been held.

SMR-2.1 An initial smart grid strategy and business plan been formally approved by executive management.

SMR-2.2 A common smart grid vision accepted across all functions and/or lines of business in our organization.

SMR-2.3 Operational investments have been significantly and explicitly aligned to the smart grid strategy and business plan.

SMR-2.4 Extensive (>70%) budgets have been established specifically for funding the implementation of the smart grid.

SMR-2.5 Our organization is collaborating with both stakeholders and regulators about our smart grid vision and strategy.

SMR-2.6 Formal funding and support for is being provided for conducting significant smart grid proof-of-concept projects (e.g., AMI, DG).

SECOND YEAR MILESTONES – YEAR ENDING JUNE 30, 2012

SMR-3.1 Our smart grid vision, strategy, and business case been completely incorporated into our organization's vision and strategy.

SMR-3.2 A smart grid governance model for smart grid management and decision-making roles, processes, and tools has been established.

SMR-3.3 One or more smart grid leaders with explicit authority across functions and lines of business to ensure proper implementation of smart grid strategy is in place.

SMR-3.4 Authorizations for smart grid investments been explicitly and completely secured from stakeholders (e.g., regulators, stockholders, tax payers)

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2013

SMR-4.1 Our smart grid vision and strategy drive strategy and direction at the highest level (e.g., enterprise or corporate level).

SMR-4.2 Smart grid is a core competency across the entire organization and drives future competency.

SMR-4.3 Our smart grid strategy is communicated and revised collaboratively with all stakeholders, excluding some sensitive aspects.

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

SMR-5.1 Our organization capitalizes extensively on smart grid as a foundation for the introduction of new services and product offerings.

SMR-5.2 Our smart grid business activities provide sufficient financial resources to enable continued investment in smart grid sustainment and expansion.

SMR-5.3 We have implemented multiple new business models as a result of smart grid capabilities.

Organization and Structure (OS)

DOMAIN OWNER: ***Glenn Steiger, General Manager, Glendale Water & Power***

DOMAIN DEFINITION

The Organization and Structure (OS) domain represents the organizational capabilities and characteristics that enable an organization to align and operate as required to achieve its desired smart grid transformation. The domain focuses on changes in communications, culture, structure, training and education, and knowledge management within the organization. For grid modernization efforts to be successful, the organizational structure must promote and reward cross-functional planning, design, and operations. The organization must align its structure to take advantage of opportunities that a smart grid will provide.

Maturity within this domain reflects an increasing capability for the organization to move beyond reactive and compartmentalized decision making to planned, fact-based, and nimble decision making to achieve its smart grid goals. It also reflects an organizational workforce whose competencies and skill sets are aligned with achieving the organization's smart grid vision.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

The smart grid vision is being integrated into the organization's structure, and functions and LOBs are aligned. The smart grid vision affects the strategic priorities and fundamental aspects of the organization, such as culture, structure, role definition, performance evaluation, and compensation.

Expected Characteristics

- The smart grid vision and strategy is driving change across multiple lines of business and/or functions. Emphasis should be placed on using smart grid capabilities to rethink service delivery as a tool to address concerns such as the adequacy of workforce competencies.
- Smart grid measures are incorporated into the organization's measurement system. This can be accomplished via a balanced scorecard system. As the smart grid vision is realized, there is often investment in the redesign of processes that are able to take advantage of the smart grid capabilities. Measures and metrics should be developed and included on the balanced scorecard to ensure that redesigned processes align with operational goals and are reported in a similar fashion.
- Performance evaluation and/or compensation are linked to smart grid success. Collaborative successes should be rewarded. Enterprise and cross-LOB accountability may need to be more valued than individual LOB and unit performance. Performance measures should address organizational behavior such

as the satisfaction of team building requirements and the continued development of a smart grid workforce competency.

- Leadership is consistent in both its communication about and actions toward achieving its smart grid vision and strategy.
- A matrix or overlay structure to support smart grid goals is being evaluated, and steps toward changes are being documented or implemented. It may be the case that a matrix or overlay structure is unnecessary for a given organization. Smart grid will introduce new cross-LOB interaction and interdependencies that take advantage of increased observability and control. Organizational structures will need to adapt to properly take advantage of the new capabilities. Examples of an overlay structure could be a steering committee, a cross-functional team, or interlocking governance structures.
- Education and training programs are aligned to exploit smart grid capabilities.

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

The organization is structured to achieve its smart grid vision. Operational visibility extends across the organization, enabling the desired cultural and organizational transformation.

Expected Characteristics

- Management systems and organizational structure are capable of taking wide-spread advantage of the increased visibility and control capabilities provided through smart grid.
- Organization has end-to-end grid observability that can be leveraged by internal and external stakeholders. This includes increased data sharing between internal lines of business and external stakeholders, which opens opportunities for organizational collaboration. Knowledge flows easily across the enterprise. Data and knowledge flows across the organization have been defined and refined, and they are now leveraged as part of cross-LOB business processes.
- As a result of an efficient organizational structure and the increased availability of information due to smart grid, decision making occurs at the closest point of need. Decentralized real-time decision-making, real-time corrections, and other capabilities are now available. Roles, responsibilities, and well-defined work processes are in place to guide daily activities across LOBs. The authority for decisions is clear and required interactions for coordination are documented and followed. With automation and control enhancements, decision making will occur at the lowest empowered level, thus reducing the overall length of the command structure and allowing for greater efficiencies.

FIRST YEAR MILESTONES – YEAR ENDING JUNE 30, 2011

OS-1.1 Our organization has extensively (communication has occurred throughout the organization) articulated (communicated) its need to build smart grid competencies in its workforce.

OS-1.2 Leadership has taken actions, such as assigning resources and budget, which demonstrate a commitment to change the organization in support of achieving smart grid.

OS-1.3 Awareness efforts within the workforce been initiated to support your smart grid activities across all functions and/or lines of business.

OS-2.1 Our smart grid vision begun to drive change and affect related priorities (e.g., addressing the need for an adequately skilled workforce) across all functions and/or lines of business.

SECOND YEAR MILESTONES – YEAR ENDING JUNE 30, 2012

OS-2.2 To a great extent (most or all), our organization has aligned operations around end-to-end processes to leverage smart grid capabilities

OS-2.3 To a great extent (>80%) smart grid implementation and deployment teams include participants from all impacted functions and lines of business.

OS-2.4 Education and training activities are in place across multiple functions and/or lines of business to develop smart grid competencies been identified and made available.

OS-2.5 Performance and compensation plans are linked to the achievement of smart grid strategy milestones.

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2013

OS-3.1 Our smart grid vision and strategy is driving organizational change (e.g., roles, interactions, compensation, hiring criteria) across all functions and/or lines of business

OS-3.2 Our organization's measurement system incorporates smart grid measures (e.g., on balanced scorecard) across all functions and/or lines of business.

OS-3.3 Performance evaluation and/or compensation linked to smart grid success (i.e., tangible benefits resulting from smart grid deployment or application) for all smart grid workers (leaders and staff).

OS-3.4 To a great extent (> 80%), our leadership provides a consistent smart grid vision and strategy in both actions and communications.

OS-3.5 Our organization has completed an evaluation and changes have been implemented through a matrix or overlay structure to support smart grid activities.

OS-3.6 Education and training programs are aligned to exploit smart grid capabilities across all functions and/or lines of business.

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

OS-4.1 Management systems and organizational structures capable of taking widespread advantage of the increased visibility and control capabilities provided through smart grid.

OS-4.2 Greater than 90% of our organization has end-to-end grid observability that can be leveraged by both internal and external stakeholders.

OS-4.3 Decision making is occurring at the closest point of need as a result of an efficient organizational structure and the increased availability of information due to smart grid.

Societal and Environmental (SE)

DOMAIN OWNER: ***Ned Bassin, AGM Customer & Support Services***
Steve Lins, AGM Power Supply

DOMAIN DEFINITION

The Societal and Environmental (SE) domain represents the organizational capabilities and characteristics that enable an organization to contribute to achieving societal goals regarding the reliability, safety, and security of our electric power infrastructure, the quantity and sources of the energy we use, and the impact of the infrastructure and our energy use on the environment and our quality of life. Societal and environmental issues compose a major focus of smart grid initiatives. A smarter grid can provide the ability for a utility and society to make better informed choices and leverage energy alternatives while improving environmental impacts. Utilities can promote conservation and green initiatives to mitigate capacity needs while developing the ability to integrate alternative and distributed energy sources. Effective implementation of these programs can enhance the organization's reputation and strengthen relationships with its customers, regulators, and the public at large.

Increased efficiencies in production and consumption made possible through a smarter grid not only reduce environmental impacts but can also sustain profitability. Organizations participating in smart grid deployments and operations can effectively address society's critical infrastructure protection concerns by incorporating security and resiliency solutions early on. The prevention, mitigation, and remediation of security risks and events will be an ongoing requirement for the utility and all participants of the smart grid.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

The organization has implemented business processes that deliver an environmentally friendly energy network while minimizing costs and sustaining profitability. Collaboration with industry stakeholders in addressing societal and environmental issues is a key element of these processes.

Expected Characteristics

- The organization collaborates with external stakeholders to address environmental and societal issues. *Collaboration with a diverse set of external stakeholders (including environmental groups, investment community, etc.) is part of the organization's standard business processes).*
- The organization maintains a public environmental and societal scorecard.
- Programs are in place to shave peak demand (e.g., demand response programs, dynamic pricing signals, and managed control of devices).

- End-user energy usage and devices are actively managed through the utility's network, where appropriate.
- The organization fulfills its critical infrastructure assurance goals for resiliency, and contributes to those of the region and the nation.

Informative Characteristics

- The utility has established load management programs to reduce its carbon footprint.
- The utility has the ability to scale distributed generation units as needed.
- Environmentally driven investments are aligned with the smart grid strategy.
- The organization provides leadership on relevant utility issues through public interaction and participation in industry associations.

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

The organization extends and integrates technology, business processes, and assets to the regional and national grids to maximize societal value and environmental benefits.

Expected Characteristics

- Triple-bottom-line goals align with local, regional, and national objectives. Solutions for societal and environmental issues previously resolved at the organizational level now extend to a regional or national scale. Major societal and environmental issues require large-scale collaboration and information sharing.
- Customers (commercial, industrial, and residential) control their energy-based environmental footprint through automatic optimization of their end-to-end energy supply and usage level (energy source and mix) based on their selected preferences. A potential scenario would be customers who choose to purchase half of their electricity from solar generation and half from wind generation. If no wind generated power is available, then selected high energy devices in the home are automatically turned off.
- The organization is a leader in developing and promoting industry-wide resilience best practices and/or technologies for protection of the national critical infrastructure.

FIRST YEAR MILESTONES – YEAR ENDING JUNE 30, 2011

Level 1: Initiating

SE-1.1 Our smart grid strategy or vision acknowledges our organization's role in societal and environmental issues and details our strategy to reach those goals.

SE-1.2 We have directly and indirectly publicly promoted the environmental benefits of your smart grid vision or strategy.

SE-1.3 Our compliance record with environmental regulations is made available for public inspection and is actively publicized.

SE-1.4 Our smart grid vision or strategy acknowledges our role in protecting the nation's critical infrastructure, establishes goals, and details our strategy to reach those goals.

Level 2: Enabling

SE-2.1 Our smart grid strategies and work plans extensively (address a broad range of issues) societal and environmental issues (cost increases, global warming, pollution, hazardous materials, spill control, "not in my backyard," and other public concerns).

SE-2.2 We have established energy efficiency programs for all customers.

SE-2.3 Our organization consider a "triple bottom line" view when making decisions (considering social, environmental, and financial performance measures) across all functions and/or lines of business.

SE-2.4 Environmental proof-of-concept projects (e.g., solar or wind generation) to demonstrate smart grid benefits to the public and the environment have been completed.

SE-2.5 Daily or better consumption data available is available to customers (including residential).

SECOND YEAR MILESTONES – YEAR ENDING JUNE 30, 2012

Level 3: Integrating

SE-3.1 Our societal and environmental programs within our smart grid strategy are measured and meeting or exceeding targeted performance.

SE-3.2 At least 80% of our customers (including commercial, industrial, and residential) have access to segmented and tailored information that includes environmental and societal benefits and costs.

SE-3.3 At least 80% of our customers have access to established programs to encourage off-peak usage.

SE-3.4 Our organization regularly reports on the sustainability and the societal and environmental impacts of its smart grid programs and technologies and makes available and actively publicizes those report.

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2013

Level 4: Optimizing

SE-4.1 Organization collaborates with all outside stakeholders to address societal and environmental issues.

SE-4.2 Our organization maintains a complete public environmental and societal scorecard.

SE-4.3 Greater than 90% of our customers have access to smart grid (e.g., demand response programs, dynamic pricing signals, and managed control of devices) to shave peak demand.

SE-4.4 We can actively manage end-user usage and devices and therefore consumption, where appropriate, through your network for 76 to 100% of our customers.

SE-4.5 Compelling evidence exists of comprehensive goal fulfillment and of contributions critical infrastructure assurance goals for the region and the nation as a whole.

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

Level 5: Pioneering

SE-5.1 Our organization's triple-bottom-line goals align with local, regional, and national objectives and we are meeting or exceeding those goals.

SE-5.2 76 to 100% of customers are enabled to control their energy-based environmental footprint through automatic optimization of their end-to-

	end energy supply and usage level (energy source and mix) based on customer-selected preferences.
SE-5.3	Our organization a leader in developing and promoting industry-wide resilience best practices and/or technologies for protection of the national critical infrastructure; We pioneer and promote best practices, methods, and/or technologies for smart grid resilience

Work and Asset Management (WAM)

DOMAIN OWNER: ***Ned Bassin, AGM Customer & Support Services***

DOMAIN DEFINITION

The Work and Asset Management (WAM) domain represents the organizational capabilities and characteristics that support the optimal management of assets and workforce resources (i.e., people and equipment) that are central to meeting smart grid goals. Increasing levels of maturity for this domain reflect an increasing capability of an organization to utilize information made available from the deployment of smart grid technologies

- track causes of failures to reduce unnecessary maintenance and downtime
- diagnose faults and recommend corrective actions
- detect failure conditions in advance of actual failure
- reduce time between problem identification and resolution
- more efficiently deploy workforce resources
- improve capacity planning performance

For example, a utility that is mature in WAM bases its equipment operation and maintenance decisions on up-to-date, fact-based performance data instead of on generic industry best practices or broad, nonspecific, historical precedents. Increasing maturity within this domain also reflects an evolution from preventative and reactive usage and deployment of resources to predictive and planned management. This supports not only the goals of increasing grid reliability, security, efficiency, and safety but also enhances the organization's operational efficiency.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

The organization is making investments in technologies to support asset monitoring and workforce deployment and has started piloting activities. It also continues to refine its work and asset management strategies.

Expected Characteristics

- An approach for using smart grid capabilities to create inventories, maintain event histories, and track assets is in development. *The development of asset histories includes asset trend and profile information that is based on real asset data.*
- An integrated view of GIS and asset monitoring for increased operational visibility based on location, status, and interconnectivity has been developed. Pilot activities are taking place. *This might include using radio-frequency identification (RFID) technology to link assets to an inventory database that connects GIS and other asset management information.*

- An organization-wide mobile workforce strategy is in development. *This implies that the organization has recognized the need to optimally deploy mobile workforce assets and has identified specific performance objectives to be achieved by a corresponding strategy. Ideally the mobile workforce strategy would be connected to the smart grid strategy, but establishing that connection is not required at this level of maturity. Other activities related to this characteristic might include conducting pilots for enhancements to crew scheduling.*

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

The organization is now connecting its smart grid technologies and its workforce and asset management systems to take advantage of the wealth of available information. The interconnected systems are being used to support work and asset management processes. Optimization opportunities are beginning to be exploited to achieve efficiencies in asset maintenance and workforce deployments.

Expected Characteristics

- Performance, trend analysis, and event audit data are available for individual components of the organization's cyber and physical systems. *The systems in this case are both the cyber (e.g., SCADA and remote terminal units [RTUs]) and physical systems (e.g. switches and transformers) that support the generation, transmission, and distribution of energy. Examples of components could include switches, transformers, and meters.*
- Condition-based maintenance (CBM) programs for key components are in place. *CBM uses real data from the organization's remote asset monitoring capability to drive maintenance and replacement decisions. One of the efficiency gains that the CBM program might realize is the ability to begin to predictively repair or retire equipment. Examples could include systems to monitor transformers, breakers, and other substation or high value equipment.*
- Remote asset monitoring capabilities are integrated with asset management for at least one asset class. *An example asset class could be transformers.*
- The integration of remote asset monitoring with mobile workforce systems to automate work order creation is underway and in place for at least one asset class. *This might include skill-based routing of work tasks. An example could be when a monitored switch issue would trigger a work order with switch characteristics and list of recommended parts needed for repair*
- An integrated view of GIS and asset monitoring for increased operational visibility is in place for at least one asset class. *The monitoring is based on location, status, and interconnectivity. This might also include the development of a proximity awareness capability for mobile assets and their interrelation to one another and to fixed assets*
- Asset inventory is tracked using automation from sourcing to utilization. *An example of sourcing to utilization is from supplier to installed location. Tracking includes location information for an asset (i.e., whether put into use, pulled from use, in staging, warehoused, etc.). Automation might include workers entering the data via keyboard or barcode reader at the warehouse, or something more advanced like using RFID tags.*

- Modeling of asset investments for key components is underway. The asset performance and management modeling is based on real smart grid data.

FIRST YEAR MILESTONES – YEAR ENDING JUNE 30, 2011

Level 1: Initiating

WAM-1.1 A functional-level business case for work and asset management enhancements via smart has been approved and is being executed.

WAM-1.2 An evaluation of potential uses of remote asset monitoring has been completed.

WAM-1.3 We are evaluating or have evaluated asset and workforce management equipment and systems for potential alignment to the smart grid vision and smart grid business case.

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2013

Level 2: Enabling

WAM-2.1 An established approach to track, inventory, and maintain event histories of assets using smart grid capabilities is completed

WAM-2.2 An integrated view of GIS (Geographical Information Systems) for asset monitoring based upon location, status and interconnectivity (nodal) has been completed

WAM-2.3 An organization-wide mobile workforce strategy been completed.

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

Level 3: Integrating

WAM-3.1 76 to 100% of individual components in our cyber and physical systems has performance, trend analysis, and event audit data available.

WAM-3.2 76 to 100% of key components have implemented condition-based maintenance.

WAM-3.3 An integrated remote asset monitoring with asset management has been completed for greater than 80% of asset classes.

WAM-3.4 Integrated remote asset monitoring capabilities with mobile workforce systems to automate work order creation has been completed for greater that 80% of asset classes.

WAM-3.5 An integrated view of GIS and asset monitoring based upon location, status, and interconnectivity has been completed for greater that 80% of asset classes.

WAM-3.6 76 to 100% percent of our asset inventory is tracked using some level of automation from source to utilization (e.g., from supplier to installed location).

WAM-3.7 Modeling asset investments for key components based upon smart grid data has been completed for greater than 80% of components.

Customer (CUST)

DOMAIN OWNER: ***Ned Bassin, AGM Customer and Support Services***

DOMAIN DEFINITION

The Customer (CUST) domain represents the organizational capabilities and characteristics that enable customer participation toward achieving the benefits of the smart grid transformation. Customer participation may be passive (e.g., allowing the utility to manage customer load and the selection of energy sources) or active (e.g., giving customers the advanced visibility and control needed to automatically manage their own load and choose among alternative energy sources, in response to pricing signals and available market options).

Utilities that demonstrate high levels of maturity in the CUST domain fully empower their customers to make and execute their own choices regarding the use, source, and cost of energy, while protecting the security of the grid and customer privacy. At the same time, a high level of maturity in the CUST domain demonstrates organizational capabilities and characteristics that would help an organization to meet utility, regional, and national goals with respect to grid stability and resiliency, energy efficiency, reduction of peak load, conservation, increased use of green energy sources via distributed generation, and reduced reliance on foreign energy sources (e.g., through innovative uses of the smart grid such as providing a customer management infrastructure and interface for plug-in electric vehicles).

THREE YEAR GOAL - YEAR ENDING JUNE 30, 2013

Integrated business systems and processes increase efficiency and interaction to improve customer satisfaction and provide new services that enhance customer participation.

Expected Characteristics

- The organization tailors programs to specific customer segments. *The organization understands its residential customers well enough to identify, and take actions based on, a high degree of customer segmentation (e.g., price conscious customers versus customers for whom the cost of green power is no object). For all defined segments of residential customers, the organization has associated action plans to leverage products and services to these segments.*
- Two-way meter communication has been deployed for a significant number of customers.
- A remote connect and disconnect capability has been deployed for a significant number of customers.
- Demand response and/or remote load control is available to residential customers.
- There is automatic outage detection at the substation level. *Instead of being notified of outages by calls or online communications initiated by their customers,*

the utility receives reports of outages from smart meters or other power system devices that detect and report the outage (e.g., to an energy control center and provide data that can be analyzed to determine the probable cause of the outage.

- Residential customers have on-demand access to daily usage data. *Fine-grained and timely usage data enables customers to understand how their consumption patterns (e.g., time-of-day) affect their electricity costs. The data availability could be more frequent than daily.*
- A common experience has been implemented across two or more residential customer interface channels. *Common customer experience means a common look and feel along with a consistency of message to the consumer. Examples of customer interface channels could be customer support phone systems, internet information, and mailings.*
- The organization provides customer education on how to use smart grid services to curtail peak usage.
- Customer products and services have built-in security and privacy controls that follow industry and government standards. *Security and privacy controls are built in from the outset rather than "bolted on" later. For example, security and privacy controls may be based on guidance and recommendations provided by the UCA International Users Group (UCAIug) Smart Grid Security Working Group and the NIST Smart Grid Interoperability Panel Cyber Security Working Group.*

Informative Characteristics

- There are new interactive products and service offerings for pricing, control, conservation, customization, efficiency, etc.
- The customer experiences information-rich interactions with their utility. For example, the customer can receive (planned) outage notifications (including back-in-service estimations), detailed information on usage, new products and services, etc., through multiple channels.
- The utility may be piloting home device control via home area networks.

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

The organization's products and services can be specifically and extensively tailored at a fine grained level to individual customer profiles and desires.

Expected Characteristics

- Customers can manage their end-to-end energy supply and usage level (i.e., energy sources and mix). *This means being able to at least specify their preferences profile and, at the extreme, would allow for active management*.
- There is automatic outage detection at the premise or device level. *This assumes capability for monitoring individual devices (e.g., appliances) has been deployed*.
- Plug-and-play customer-based generation (e.g., wind and solar) is supported. *This includes the necessary infrastructure, such as metering equipment that supports net billing. A good example of "plug and play" would be when a device is plugged into a computer; the operating system detects what it is and makes the necessary updates. Customers should be able to add any device (e.g., wind or solar) to the grid, and it should respond appropriately.*

- The organization is able to assure security and privacy for all customer data stored, transmitted, or processed on the grid. *The organization provides compelling evidence of assurance, which may include design reviews, penetration test results, third-party certifications, certifications of programmer training in secure coding, code reviews, third-party reviews of security and privacy policies, etc.*
- The organization plays a leadership role in industry-wide information sharing and standards development efforts for smart grid. *Information sharing and standards development efforts should consider customer security and privacy while also promoting customer choice and control. For example, employees of the organization are among the recognized leaders in government, industry, and/or professional society working groups that develop standards and best practices for smart grid security, privacy, and information sharing. The organization pioneers innovative programs to extend customer choice and control, which become widely adopted throughout the industry*.

Informative Characteristics

- Innovative customer products may be available, such as appliance failure prediction and preventive maintenance programs.
- Consumption level by device is available, as are price-based time-of-use recommendations. This assumes capability for monitoring individual devices has been deployed. Green mobility (support for electric vehicles) and carbon emission programs may be available, including buying, selling, or trading carbon credits.

YEAR ONE MILESTONES – YEAR ENDING JUNE 30, 2011

Level 1: Initiating

CUST-1.1 We are continuously conducting research on how to use smart grid technologies to enhance your customers' experience, benefits, and participation as part of our normal process.

CUST-1.2 We are continuously investigating the security and privacy implications of the new technologies and business functions that enable customer participation in the smart grid as part of our normal process.

CUST-1.3 We are directly communicating and explaining our vision of the future grid to our customers (e.g., by explaining smart grid benefits and describing potential use case scenarios).

CUST-1.4 We extensively collaborate as part of normal business processes with our public utility commissions and/or other government organizations regarding the impact on customers of your smart grid strategies and anticipated implementation schedule.

YEAR TWO MILESTONES – YEAR ENDING JUNE 30, 2012

Level 2: Enabling

CUST-2.1 We have deployed an Advanced Metering Infrastructure (AMI) and /or Automated Meter Reading (AMR) to residential customers.

CUST-2.2 We collect residential customer usage data more frequently than monthly for use in operational analytics and planning for greater than 40% of our customers.

CUST-2.3 We are modeling reliability of grid equipment for multiple asset classes.

CUST-2.4 We have deployed remote disconnect/connect technologies for residential customers.

CUST-2.5 We have completed an assessment of the impact on customers of new services and delivery processes such as Home Area Networks (HAN), smart meter installs, dynamic pricing, and/or turning power on/off remotely.

CUST-2.6 100% of smart grid-related pilots and Requests for Proposals (RFPs) specify security and privacy requirements for customer protection.

YEAR THREE MILESTONES – YEAR ENDING JUNE 30, 2013

Level 3: Integrating

CUST-3.1 We have highly segmented (ability to segment based upon combinations of criteria) our residential customers to enable more tailored customer programs.

CUST-3.2 100% of our residential customer meters have two-way communication capabilities (e.g., an advanced metering infrastructure).

CUST-3.3 100% of our residential customers have enabled remote connect/disconnect capability.

CUST-3.4 76-100% of our residential customers have you enabled demand response or remote load control.

CUST-3.5 76 to 100% of our substations are equipped with automated outage detection.

CUST-3.6 76 to 100% of our residential customers have on-demand access to daily (or more frequent) usage data.

CUST-3.7 We have implemented a common customer experience (e.g., look and feel, consistency of message, available information) across at least two residential customer interface channels (e.g., web, voice response, hand-held).

CUST-3.8 We have active, direct, and targeted customer education on how to use smart grid services to curtail peak usage.

CUST-3.9 100% of customer products and services have built-in security and privacy controls that meet relevant industry and government standards.

YEAR FOUR MILESTONES – YEAR ENDING JUNE 30, 2014

Level 4: Optimizing

CUST-4.1 Greater than 90% of our customers are provided support help them analyze and compare their actual usage against all available pricing programs.

CUST-4.2 76 to 100% of circuits are equipped with automatic outage detection and proactive notification.

CUST-4.3 76 to 100% of our customers have on-demand access to near real-time (up to the minute) usage data.

CUST-4.4 76 to 100% of our customers participate in demand response or remote load control programs.

CUST-4.5 76 to 100% of residential customers are provided with the capability for automated response to pricing signals for major energy consumption devices in their premise.

CUST-4.6 76 to 100% of customers are in-home net billing programs available (i.e., credit/payment for solar panels, wind, and electric vehicle battery to grid).

CUST-4.7 We have integrated a common experience across all residential customer interfaces for all services provided (e.g., leveraging common data sources) across all channels.

YEAR FIVE MILESTONES – YEAR ENDING JUNE 30, 2015

Level 5: Pioneering

CUST-5.1 76 to 100% of customers can manage their end-to-end energy supply and usage levels (energy source and mix).

CUST-5.2 76 to 100% of customers (including residential) have automatic outage detection at the premise or device level.

CUST-5.3	76 to 100% of customers is supported by plug-and-play customer-based generation (including necessary support infrastructure such as net billing, control, etc.).
CUST-5.4	Compelling evidence of assurance of both the security and privacy of customer data stored, transmitted or processed on the grid is available.
CUST-5.5	We play a leadership role in both industry-wide information sharing and standards development efforts for smart grid.

Grid Operations - Electric (GO-E)

DOMAIN OWNER: ***Ramon Abueg, AGM, Electric Services***

DOMAIN DEFINITION

The Grid Operations –Electric (GO-E) domain represents the organizational capabilities and characteristics that support the reliable, secure, safe, and efficient operation of the electrical grid. Increasing maturity within this domain reflects an evolution from relatively inflexible, manually intensive operations with limited visibility into the health of the grid to automated operations with significant flexibility and a high degree of situational awareness at local, regional, and national levels. Organizations that have achieved a high level of maturity within this domain have an increased capability to utilize automation and information available from the deployment of smart grid technologies. They have the capability to manage power flows so that power losses are minimized and the usage of lowest-cost generation resources are maximized. They have increased levels of automation and the ability to see key aspects of _the whole grid, decreased response times for communications and control, and a reduced likelihood of cascading system failures. These capabilities support not only the goals of increasing grid reliability, security, efficiency, and safety but also broader grid modernization objectives such as delivering high-quality power, supporting multiple generation options, optimizing usage of grid assets, and operating efficiently.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

The organization starts to deploy initial grid monitoring and control features that are tied to the smart grid vision. There is an emphasis on communications in support of grid automation.

Expected Characteristics

- Initial distribution to substation automation project is underway. *Distribution to substation automation is bi-directional and includes capabilities such as advanced disturbance and event recording to aid in detailed electrical fault analyses, remote switching and advanced supervisory control over the power network, and advanced automation functions such as intelligent load shedding.*
- Advanced outage restoration schemes are being implemented, which automatically resolve (self-heal) or reduce the magnitude of unplanned outages. *An example of an "advanced outage restoration scheme" is ASR (Automated Sectional Restoration). By "advanced," we mean employing the use of sensing resources to know what is happening and data analytics for automatically making corrections, or providing recommendations regarding corrections that can be made by an operator.*

- Aside from SCADA, piloting of remote asset monitoring of key grid assets to support manual decision making is underway. *Data collection drives asset modeling and allows for more informed manual planning and maintenance decisions. Transformer monitoring is an example. Two way communications and monitoring by a systems application, rather than an operator, are some of the differentiating factors from normal SCADA.*
- Investment in and expansion of data communications networks in support of grid operations is underway. *Examples of "expanded data communications" can include internet protocol (IP) networks over fiber, communications on a public carrier, or broadband over power lines. Security requirements are understood and are taken into account as part of the investment and expansion decision making process. Digital communications may be necessary to support the full capability of smart grid operations, but a blend of analog and digital communications will most likely be in place. Rural areas may lag behind urban in moving to digital.*

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

Analytics, automation, and control operate across multiple systems and organizational functions.

Expected Characteristics

- Enabled by the deployment of smart grid capabilities, information to support analysis and decision making for grid operations is available across multiple systems and organizational functions. *Examples of "smart grid information" can include customer usage data, outage, or load information and transformer monitoring. This may lead to new processes being defined due to increased automation and observability and should reduce information latency across functions within the organization.*
- Control analytics have been implemented and are used to improve cross-LOB decision making. *This means that a critical mass of data, equipment, and technologies are integrated with analytics for improved decision support. An example of this might be the integration of real time weather information into grid planning activities. Examples of "cross line of business" can include transmission to distribution, or engineering to customer support. An example of control analytics can include actions taken by ASR systems*
- Grid operations' planning is now fact-based planning using grid data made available by deployed smart grid capabilities. *The remote asset monitoring capabilities piloted at Level 2 enable this. Through increased data availability, the organization transitions from scheduled-based to condition-based maintenance.*
- Smart meters are important grid management sensors within the organization's network. *This requires timely availability of meter data at the grid control level and the ability to retrieve, analyze, and incorporate the data in grid management decisions.*
- Grid data is used by an organization's physical and cyber security functions to support situational awareness and diagnostic activities. *An example could be a*

smart meter that can send a signal that it is being tampered with or having the capability to correlate anomalous grid activities with anomalous network and device activities.

- There is automated decision making within protection schemes (i.e., leveraging increased analytic capabilities and context). *Real data supports real-time modeling and simulations.*

FIRST YEAR MILESTONES – YEAR ENDING JUNE 30, 2011

GO-E 1.1 A business case for new equipment and systems related to smart grid for at least one business function (e.g., AMI, remote disconnect, PMUs, etc.) has been approved and is being executed.

GO-E 1.2 To a great extent (i.e., numerous evaluations underway or completed) we are evaluating new sensors, switches and communications technologies for grid monitoring and control.

GO-E 1.3 To a great extent (i.e., numerous evaluations underway or completed) we have proof-of-concept projects and/or component testing for grid monitoring and control underway.

GO-E 1.4 To a great extent (i.e., numerous evaluations underway or completed) we are you evaluating outage and distribution management systems linked to substation automation (beyond SCADA).

GO-E 1.5 Safety and security (physical and cyber) requirements considered in 100% of grid operation initiatives

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2013

GO-E 2.1 A minimum 70% of system has distribution to substation automation.

GO-E 2.2 Greater than 20% of the grid has advanced outage restoration schemes in place to automatically resolve (self-heal) or reduce the magnitude of unplanned outages.

GO-E 2.3 Aside from SCADA, pilots for remote asset monitoring of key grid assets to support manual decision making have been completed and technology is being deployed.

GO-E 2.4 Greater that 80% of the grid is supported by expanded data communications networks in support of grid operations

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

GO-E 3.1 Smart grid information made available across most functions and systems.

GO-E 3.2 Implementation of new control analytics has improved decision making across most or all line-of-business.

GO-E 3.3 Greater than 90% of grid operations planning has transitioned from estimation to fact-based using grid data made available from smart grid deployment.

GO-E 3.4 To great extent (≥40%) smart meters become important grid management sensors within our network.

GO-E 3.5 Grid data is being used to support physical and cyber security through situational awareness and diagnostic activities comprehensively across grid.

GO-E 3.6 Numerous analytics-based decision types are being automatically executed to support automated decision-making within protection schemes (i.e., leveraging increased analytic capabilities and context).

Grid Operations Water (GO-W)

DOMAIN OWNER: ***Peter Kavounas, AGM, Water Services***

DOMAIN DEFINITION

The Grid Operations –Water (GO-W) domain represents the organizational capabilities and characteristics that support the reliable, secure, safe, and efficient operation of the water system. Increasing maturity within this domain reflects an evolution from relatively inflexible, manually intensive operations with limited visibility into the health of the system to automated operations with significant flexibility and a high degree of situational awareness at local, regional, and national levels. Organizations that have achieved a high level of maturity within this domain have an increased capability to utilize automation and information available from the deployment of smart grid technologies. They have increased levels of automation and the ability to see key aspects of _the whole system, decreased response times for communications and control, and a reduced likelihood of cascading system failures. These capabilities support not only the goals of increasing grid reliability, security, efficiency, and safety but also broader grid modernization objectives for the system as a whole.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

The organization starts to deploy initial grid monitoring and control features that are tied to the smart grid vision. There is an emphasis on communications in support of grid automation.

Expected Characteristics

- Aside from SCADA, piloting of remote asset monitoring of key grid assets to support manual decision making is underway. *Data collection drives asset modeling and allows for more informed manual planning and maintenance decisions. Two way communications and monitoring by a systems application, rather than an operator, are some of the differentiating factors from normal SCADA.*
- Investment in and expansion of data communications networks in support of system operations is underway. *Examples of "expanded data communications" can include internet protocol (IP) networks over fiber, communications on a public carrier, or broadband over power lines. Security requirements are understood and are taken into account as part of the investment and expansion decision making process. Digital communications may be necessary to support the full capability of smart grid operations, but a blend of analog and digital communications will most likely be in place. Rural areas may lag behind urban in moving to digital.*

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

Analytics, automation, and control operate across multiple systems and organizational functions.

Expected Characteristics

- Enabled by the deployment of smart grid capabilities, information to support analysis and decision making for system operations is available across multiple systems and organizational functions.
- Control analytics have been implemented and are used to improve cross-LOB decision making. *This means that a critical mass of data, equipment, and technologies are integrated with analytics for improved decision support. An example of this might be the integration of real time weather information into system planning activities*
- System operations' planning is now fact-based planning using grid data made available by deployed smart grid capabilities. *The remote asset monitoring capabilities piloted at Level 2 enable this. Through increased data availability, the organization transitions from scheduled-based to condition-based maintenance.*
- Smart meters are important system management sensors within the organization's network. *This requires timely availability of meter data at the grid control level and the ability to retrieve, analyze, and incorporate the data in grid management decisions.*
- System data is used by an organization's physical and cyber security functions to support situational awareness and diagnostic activities.
- There is automated decision making within protection schemes (i.e., leveraging increased analytic capabilities and context). *Real data supports real-time modeling and simulations.*

FIRST YEAR MILESTONES – YEAR ENDING JUNE 30, 2011

GO-W 1.1 A business case for new equipment and systems related to smart grid for at least one business function has been approved and is being executed.

GO-W 1.2 To a great extent (i.e., numerous evaluations underway or completed) we are evaluating new sensors, switches and communications technologies for system monitoring and control.

GO-W 1.3 To a great extent (i.e., numerous evaluations underway or completed) we have proof-of-concept projects and/or component testing for system monitoring and control underway.

GO-W 1.4 To a great extent (i.e., numerous evaluations underway or completed) we are you evaluating new management systems beyond SCADA.

GO-W 1.5 Safety and security (physical and cyber) requirements considered in 100% of grid operation initiatives

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2013

GO-W 2.1 A minimum 70% of system has distribution to substation automation.

GO-W 2.2 Greater than 20% of the grid has advanced outage restoration schemes in place to automatically resolve (self-heal) or reduce the magnitude of unplanned outages.

GO-W 2.3 Aside from SCADA, pilots for remote asset monitoring of key grid assets to support manual decision making have been completed and technology is being deployed.

GO-W 2.4 Greater that 80% of the grid is supported by expanded data communications networks in support of grid operations

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

GO-W 3.1 Smart grid information made available across most functions and systems.

GO-W 3.2 Implementation of new control analytics has improved decision making across most or all line-of-business.

GO-W 3.3 Greater than 90% of grid operations planning has transitioned from estimation to fact-based using grid data made available from smart grid deployment.

GO-W 3.4 To great extent (≥40%) smart meters become important system management sensors within our network.

GO-W 3.5 System data is being used to support physical and cyber security through situational awareness and diagnostic activities comprehensively across grid.

GO-W 3.6 Numerous analytics-based decision types are being automatically executed to support automated decision-making within protection schemes (i.e., leveraging increased analytic capabilities and context).

Value Chain Integration (VCI)

DOMAIN OWNER: ***Ned Bassin, AGM Customer & Support Services***
Steve Lins, AGM Power Supply

DOMAIN DEFINITION

The Value Chain Integration (VCI) domain represents the organizational capabilities and characteristics that underlie an electric utility's ability to achieve its smart grid goals by successfully managing the utility's organizational interdependencies with both the supply chain for the production of electricity and the demand chain for its delivery. VCI enables dynamic supply and demand management based on near real-time information. Traditionally, electric utility companies were vertically integrated organizations typified by centralized decision making and bounded by political geography. Market pressures and regulatory changes transformed many utilities into new chains of organizations to produce and deliver electricity whereas in the past, one company monopolized the local market. As a result of environmental concerns and the need for increased efficiencies, market forces and regulatory bodies will again force the industry to change, providing new opportunities for organizations with smart grid competence and causing new value chains to emerge. Automation will extend beyond traditional boundaries and across the entire value chain to provide opportunities for innovation and efficiencies in load management, distributed generation, and market structure. As a utility matures, the cooperative planning, implementation, and management of electricity from sources of production to end-use consumption will optimize profitability and improve performance of the utility's value chain. Networked information technology and data sharing, aligned with value chain business units' requirements, are critical for success.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

The organization's business systems are aligned and interconnected to promote dynamic management and profitability through network interaction with the value chain.

Expected Characteristics

- An integrated resource plan is in place and includes new targeted resources and technologies (e.g., demand response, distributed generation, Volt/Volt-Ampere Reactive (VAR) management systems, etc.). The integrated resource plan is a plan that seeks to establish an efficient balance among different types of generation and an efficient balance of supply and demand. Several major system components in distribution can affect the management of volts and VARs. These components include load tap changing (LTC) transformers, LTC line regulators, and capacitor bank controls (pole-top and substation step-bank), all of which can lend themselves to networked automation. Evaluation of a Volt/VAR management system requires all of these components to be considered individually and collectively to ascertain the most efficient, viable method of dynamic control.

- Customer (commercial, industrial, and residential) premise energy management solutions with market and usage information are enabled. The organization provides a secure information network to allow market and consumption information to be used by customer energy management systems (e.g., integrated smart thermostats communicate with AMI systems). Demand-side management (DSM) programs require utilities to plan, implement, and monitor activities that are designed to encourage consumers to modify their level and pattern of electricity usage.
- Additional resources (e.g., PHVs, storage, DR) are available and deployed to provide substitutes for market products to support reliability or other objectives.
- Security management and monitoring processes are deployed to protect the interactions with an expanded portfolio of value chain partners.

Informative Characteristics

- The organization participates in programs and associations to support value chain partners for load management and distributed generation (e.g., Rural Electric Associations, Retail Electric Providers, etc.).
- The organization adopts new models for trading energy efficiently given new sourcing capacity from customer-based management and distributed generation, new transmission and distribution connectivity and control, and innovative rate and pricing options. Deployment of energy trading mechanisms that leverage some of these features is underway.

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

The organization's business processes support the dynamic capture and utilization of information relevant to distributed generation and related load management activities.

Expected Characteristics

- The organization's energy resources (including Volt/VAR, DG, and DR) are dispatchable and tradable. Distributed generation and load management can be used to sell extra power. Another example is if an adjoining utility needs more power, the organization could use demand response to lower usage and assist in supplying power to the other utility.
- The organization has implemented portfolio optimization models that encompass available resources and real-time markets. Portfolio optimization models should encompass all available resources and real-time markets. Optimization models enable rapid response to dynamic market/supply conditions.
- The organization provides secure two-way communications with Home Area Networks (HANs).
- The organization has integrated visibility and potential control of residential customer's large-demand appliances (e.g., air conditioners, water heaters) to balance demand and supply.

Informative Characteristics

- The utility realizes opportunities for a value shift from generators to other organizations in the value chain so that they can share the gains from ancillary services (e.g., power on demand).
- The organization utilizes modeling of the entire generation and load management potential in real time, including the ability to scale distributed generation resources as needed.

FIRST YEAR MILESTONES – YEAR ENDING JUNE 30, 2011

Level 1: Initiating

VCI-1.1 We have completed our identification of the assets and programs needed to facilitate load management.

VCI-1.2 We have completed our identification of distributed generation sources and the capabilities needed to support our load management programs.

VCI-1.3 We have identified energy storage options and the capabilities needed to support our load management programs.

VCI-1.4 We have an approved strategy for developing, enabling, and managing a diverse resource portfolio (e.g., integration of new resources such as DR, DG) and it is being executed.

VCI-1.5 We have completed our identification of security requirements to enable interaction with an expanded portfolio of value chain partners.

SECOND YEAR MILESTONES – YEAR ENDING JUNE 30, 2012

Level 2: Enabling

VCI-2.1 Greater than 40% of our customers are provided support for home energy management systems (e.g., via customer portals or in-home displays).

VCI-2.2 We have completed a redefinition of the value chain based upon smart grid capabilities (including DG, micro-generation, energy storage, and other new customers and suppliers).

VCI-2.3 We have completed pilots to support a diverse resource portfolio (e.g., distributed generation, demand-side management, demand response, storage) and deployment is in progress.

VCI-2.4 We have completed pilots to ensure secure interaction with an expanded portfolio of value chain partners and deployment is in process.

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2013

Level 3: Integrating

VCI-3.1 A completely integrated resource plan is in place that includes new targeted resources and technologies (e.g., Volt/Volt-Ampere Reactive (VAR) management systems, demand response, distributed generation).

VCI-3.2 Greater than 70% of customers (including commercial, industrial, and residential) have enabled premise energy management solutions with market and usage information.

VCI-3.3 A continuous identification and enablement process is in place for additional resources (e.g., PHVs, storage, DR) to be enabled or deployed to provide substitutes for market products to support reliability or other objectives.

VCI-3.4 Collaborative security processes are in place across our value chain to ensure deployment of security management and monitoring processes to protect the interactions with our expanded portfolio of value chain partners.

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

Level 4: Optimizing

VCI-4.1 Our energy resources (including resources such as Volt/Var, DR, DG) dispatchable and tradeable for all available resources

VCI-4.2 Portfolio optimization models that encompass available resources and real-time markets (e.g., to enable response to dynamic market/supply conditions) are in place for all available resources.

VCI-4.3 76 to 100% of residential customers have secure two-way communication via Home Area Networks (HAN).

VCI-4.4 76 to 100% of residential customers have visibility and control of large-demand appliances (e.g., air conditioners, pool pumps).

Technology (TECH)

DOMAIN OWNER: Craig Herman, GWP IT Administrator

DOMAIN DEFINITION

The Technology (TECH) domain represents the organizational capabilities and characteristics that enable effective strategic technology planning for smart grid capabilities and the establishment of rigorous engineering and business processes for the evaluation, acquisition, integration, and testing of new smart grid technology. The engineering and business processes should be based on the quality attributes necessary for achieving success and reducing risk (e.g., interoperability, upgradability, security, safety, cost, and performance). Organizational capabilities and characteristics in the Technology domain also reflect adherence to relevant industry and government standards, and integration throughout the enterprise of optimized, data-rich smart grid applications and analytics (with extensive data sharing across lines of business and among industry partners). Use of the organization's smart grid IT infrastructure as a platform for the creation and support of innovative business services not only contributes to the success of the organization but can also open new markets for the industry as a whole.

Achieving the organizational and national benefits of a smart grid transformation involves far more than having vendors produce and utilities (and their customers) acquire advanced smart grid technology. Technology can either contribute to or detract from an organization's ability to meet smart grid goals for itself and for society at large. Smart grid technology supports two-way digital communications, wide-area situational awareness (based on advanced sensor networks), and fine grained control (e.g., of customer load using smart meters and smart-grid-aware appliances). Nonetheless a cohesive technology strategy, based on sound engineering principles and judicious enterprise-wide business management, is necessary to connect and support the innumerable data sources (including sensors), control elements, and users that make up a smart grid, today and into the future.

THREE YEAR GOAL – YEAR ENDING JUNE 30, 2013

The organization implements its technology strategy for smart grid and integrates its organizational systems.

Expected Characteristics

- Smart-grid-impacted business processes are aligned with the organization's enterprise IT architecture across LOBs. The organization has a robust concept of a portfolio of smart grid services and a clear direction in implementing strategic applications capable of supporting the smart grid portfolio.
- The organization's systems adhere to an enterprise IT architectural framework for smart grid. For example, IEC 61850 (a standard for substation automation), Security Profile for Advanced Metering Infrastructure Version 1.0 (recommended security controls and guidance for protecting AMI systems), and CIM (the

Common Information Model) may be used across smart grid functions and LOBs. The National Institute of Standards and Technology (NIST) Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0 (January 2010), identifies approximately 80 existing standards that can be applied to smart grid design and implementation efforts, and also identifies gap areas where further standards development is needed. The enterprise IT architectural framework can also be defined internally.

- Smart-grid-specific technology has been implemented to improve cross-LOB performance. For example, smart-grid-specific technology can improve peak demand management, fault detection, and integrated Volt/VAR optimization (VVO). The organization may be evaluating further enterprise-wide opportunities for improvement.
- The use of advanced distributed intelligence and analytical capabilities are enabled through smart grid technology. An example of distributed intelligence would be decentralized deployment of ASR systems.
- The organization has an advanced sensor plan. Advanced sensor plans could focus on situational awareness or near real-time control and include the use of phasor measurement units (PMUs) or other sophisticated sensors. Effective assessment of the dynamic performance of power systems requires wide-area situational awareness based on information from properly distributed PMUs.
- The organization has a detailed data communication strategy and corresponding tactics in place that cross functions and LOBs. A detailed data communications strategy includes decisions on types of physical communications infrastructure (e.g., broadband over power line or wireless), protocol(s) (e.g., IP), and data or other standards (e.g., for security or interoperability) that will be used. Corresponding tactics in place that cross functions and LOBs could include a means of governance for selecting interconnections, thus allowing all systems to operate together, regardless of the origin or final destination of the data.

Informative Characteristic

- The technology strategy includes the application of open standards and the use of evolving off the-shelf technologies.

FIVE YEAR GOAL – YEAR ENDING JUNE 30, 2015

Organizational systems are interconnected through a strategic, enterprise-wide IT architecture that has been optimized for the support of smart grid services. Visibility extends across lines of business and business functions throughout the organization. Security, privacy, and performance issues have been considered and addressed in the IT implementations across the enterprise.

Expected Characteristics

- Data flows end to end, for example from customer to generation. This applies where permitted by security, privacy, and performance requirements. An example could be a residential customer having the ability to review cost fluctuations affecting the electricity supplier so that informed decisions could be made with regard to the selection of generation sources.

- Business processes are optimized by leveraging the organization's enterprise IT architecture. Performance improvement techniques (e.g., lean six sigma) are applied to cross-LOB processes to achieve the greater efficiencies possible with increased observability and control across the enterprise IT architecture. These optimizations are applied throughout the organization's suite of strategic applications that support the portfolio of smart grid services.
- Systems have sufficient wide area situational awareness to enable real-time monitoring/control/mitigation in response to complex events (e.g., natural disasters, severe weather, extreme demand fluctuations, etc.). World-aware systems drive complex event processing, monitoring, and control.
- Predictive modeling and/or near real-time simulation are used to optimize support processes. For example, analytics drive optimization of decision support processes for power management and equipment maintenance. The application of new analytic capabilities is folded into cross-LOB business processes to enable increased efficiencies based upon real data and business rules. An example could be an Outage Management System (OMS) enhanced by predictive modeling.
- Performance is improved by using sophisticated systems that are informed by smart grid data (e.g., business intelligence and knowledge management systems).
- Security strategy and tactics continually evolve based on changes in the operational environment and lessons learned.

Informative Characteristic

- The organization works with vendors to develop new and innovative technology solutions to meet the organization's smart grid needs.

FIRST YEAR MILESTONES – YEAR ENDING JUNE 30, 2011

Level 1: Initiating

TECH-1.1 Enterprise IT architecture is under development

TECH-1.2 We have formally evaluated our existing or proposed enterprise IT architecture for the quality attributes that would support smart grid applications.

TECH-1.3 A formal change control process (e.g., configuration management, patch updates) for applications and IT infrastructure has been deployed for all classes and elements.

TECH-1.4 We have identified where technology can improve the performance of functional departments (e.g., reduce cost, improve workflow, simplify, automate, reduce risk, and improve flexibility/adaptability).

TECH-1.5 A formal process is in place to evaluate and select technologies in alignment with your smart grid vision and/or strategy for most or all functions and/or lines of business.

SECOND YEAR MILESTONES – YEAR ENDING JUNE 30, 2012

Level 2: Enabling

TECH-2.1 Tactical IT investments are aligned to our enterprise IT architecture across all functions and/or lines of business.

TECH-2.2 Changes to our enterprise IT architecture to enable smart grid are being deployed across all functions and/or lines of business

TECH-2.3 Most or all needed standards have been selected to support our smart grid strategy within our enterprise IT architecture.

TECH-2.4 There is a formal process in place for most or all functions/lines of business within our organization that adheres to a common technology evaluation and selection process for all smart grid activities, including vendor and external source selection.

TECH-2.5 A data communications strategy for our grid is documented and is being executed.

TECH-2.6 Pilots are underway for business unit applications based on connectivity to intelligent electronic devices (IED) (e.g., remote processors).

TECH-2.7 100% of smart grid initiatives have information security considerations built in from the outset.

THIRD YEAR MILESTONES – YEAR ENDING JUNE 30, 2014

Level 3: Integrating

TECH-3.1 Greater than 70% of our smart grid-impacted business processes are aligned with our enterprise IT architecture across lines of business.

TECH-3.2 76 to 100% of our systems adhere to our enterprise IT architectural framework for smart grid.

TECH-3.3 We have implemented integrated smart grid-specific technology to improve cross-lines of business performance (e.g., peak demand management, fault detection, integrated VVO) across all functions and lines of business.

TECH-3.4 Distributed intelligence and analytical capabilities that are enabled through smart grid technologies are integrated across all functions and/or lines of business.

TECH-3.5 An advanced sensor plan (e.g., for situational awareness, for near real-time control, using phasor measurement units or other sophisticated sensors) has been adopted that support all functions and/or lines of business.

TECH-3.6 A detailed data communications strategy and corresponding tactics is in place across all functions and/or lines of business.

FIFTH YEAR MILESTONES – YEAR ENDING JUNE 30, 2015

Level 4: Optimizing

TECH-4.1 Greater than 80% of our customers have end-to-end data flow from customer to generation (where permitted by security, privacy, and other requirements).

TECH-4.2 76 to 100% of our business processes are optimized by leveraging your enterprise IT architecture.

TECH-4.3 76 to 100% of our systems have sufficient wide-area situational awareness to enable real-time monitoring/control/mitigation in response to complex events (e.g., natural disasters, severe weather, extreme demand fluctuations, etc.).

TECH-4.4 76 to 100% of processes use predictive modeling and/or near real-time simulation to optimize support processes (e.g., for maintenance, power management, call center, decision support).

TECH-4.5 To a great extent, our organization's performance is being improved by using sophisticated systems that are informed by smart grid data (e.g., business intelligence or knowledge management systems).

TECH-4.6 Our security strategy and tactics continually evolve based on changes in the operational environment and lessons learned as part of a continuous process.

Glossary

Advanced Metering Infrastructure (AMI)

Advanced Metering Infrastructure refers to systems that measure, collect, and analyze energy usage, from advanced devices such as electricity meters, gas meters, and/or water meters, through various communication media on request or on a pre-defined schedule.

Advanced outage restoration schemes

Advanced capabilities to restore power after an unplanned outage - in this context, advanced means employing the use of sensing resources to know what is happening and data analytics for automatically making corrections, or providing recommendations regarding corrections that can be made by an operator. An example of an advanced outage restoration scheme is Automated Sectional Restoration.

Analytics-based control

Analytics-based control employs the use of sensing and other resources to gather data on situational awareness. Then the results of analysis or modeling based on that data are used to automatically make control decisions, or to provide recommendations regarding control actions that can be made by an operator.

Automated Meter Reading (AMR)

Automated Meter Reading is the technology of automatically collecting consumption data from metering devices (water, gas, or electric) and transferring that data to a central database for billing, troubleshooting, and analyzing. AMR is generally considered less sophisticated than Advanced Metering Infrastructure (AMI). A common form of AMR used today is drive-by meter reading.

Automated outage detection

In contrast to being notified of outages by calls or online communications initiated by their customers, the utility receives reports of outages from smart meters or other power system devices that detect and report the outage (e.g., to an energy control center) and provide data that can be analyzed to determine the probable cause of the outage.

Circuit level

The last stage (i.e., the lowest level) of distribution before electricity is delivered to a meter. For residential customers, circuit level represents distribution down to the transformer that delivers electricity to a group of residences. In the U.S. a final transformer typically supplies eight houses, whereas in Europe the number is typically 25 houses per transformer.

Condition-based maintenance

-Performing maintenance on equipment when measures of the health of the equipment indicate that maintenance activities should be carried out. To support condition-based maintenance, equipment may be instrumented to provide data for health analysis and modeling. Alternatively, or as a supplementary activity, periodic maintenance inspections may be performed to collect health data using a variety of tools and technologies. Condition-based maintenance is also known as *predictive maintenance* since the goal to predict when maintenance activities will be most cost effective based on the projected condition of the equipment over time. In contrast, see _Schedule-based maintenance.

Core competency

-The combination of technology and production skills that creates an organization's products and services and provides its competitive advantage in the marketplace. One or more workforce competencies must be present in the workforce so that they can execute a core competency of the organization. A workforce competency is a cluster of knowledge, skills, and process abilities that an individual should develop to perform a particular type of work in the organization

Customer

-A residential, commercial, or industrial end user of electric power supplied by a utility.

Customer (CUST) domain

The Customer domain represents the organizational capabilities and characteristics that enable customer participation toward achieving the benefits of the smart grid transformation. Customer participation may be passive (e.g., allowing the utility to manage customer load and the selection of energy sources) or active (e.g., giving customers the advanced visibility and control needed to automatically manage their own load and choose among alternative energy sources, in response to pricing signals and available market options).

Default level

The default level of a domain (Level 0) is indicative of an organization that has not sufficiently exhibited the expected characteristics of Level 1.

Distributed Generation (DG)

In contrast to large-scale central generation facilities, distributed generation refers to decentralized, typically small-scale, energy sources that are located relatively close to (often on the premises of) the consumers of the electricity being provided. These energy sources include photovoltaic cells, fuel cells, wind turbines, micro-turbines, gas turbines, reciprocating engines, and diesel fired generators, and can be owned by the consumer or the utility. Distributed generation can be used to supplement (or partially replace) the power provided by a central generation facility (e.g., by generating the extra power needed to meet peak loads) or in some cases could be used to meet all of a consumer's electricity needs, as well as feed excess power back to the grid.

Domain

A domain is a logical grouping of smart-grid-related capabilities and characteristics.

Domain-specific question

A domain-specific question is a question that is used to assess an organization's level rating in some domain. There is exactly one domain-specific question for every expected characteristic in the model.

End-to-end grid observability

This term can be defined from both an organizational perspective and from a grid-wide perspective. End-to-end observability within an organization means that grid operations information is made available to all functions and lines of business. End-to-end observability across the grid means end-to-end data flow from generation to customer and from customer to generation, where permitted by security, privacy, and other requirements. An example could be a residential customer having the ability to go online and review cost fluctuations affecting the electricity supplier so that informed decisions could be made with regard to the selection of generation sources.

End-to-end process

-A structured set of automated and/or manual activities and tasks that fulfills some aspect of an organization's mission and encompasses a business flow extending from the provider of a service to the consumer of that service.

Energy network troughs

-Periods of particularly low off-peak energy usage. Utilities can create a more balanced load profile by encouraging customer usage during such periods through time-differentiated pricing (based on expected load profiles for different times of day) or by using pricing signals to offer lower prices in an automated, dynamic fashion based on near-real-time recognition of low-load conditions.

Enterprise

-The largest (i.e., highest level) organizational entity to which the organization participating in the SGMM Compass belongs. For some participants, the organization taking the compass is the enterprise itself. The organization is the focus of the SGMM and is assessed against the model to determine their current state of smart grid deployment and capability. See _Organization.

Enterprise IT architecture

The architecture of a set of IT systems deployed throughout the enterprise. An enterprise IT architecture defines the hardware, software, network, and data elements of an IT system, their properties, and the relationships among them. An enterprise IT architecture is often described in terms of multiple, related views of the system (e.g., a communications architecture, a process architecture, and an information architecture). Note: This should not be confused with enterprise architecture, which is a broader concept that also includes enterprise goals and business processes.

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 beat the initial estimates of restoration time provided to customers.

External stakeholders

-Individuals and groups external to a utility that can be affected by or can affect the utility's business behavior. External stakeholders include customers, voters, financial institutions, environmental groups, taxpayers, and regulatory bodies.

Expected Characteristic

An expected characteristic describes a specific implementation feature that an organization is expected to exhibit at a given level of a domain.

Field visit

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

Formal process

-A documented, repeatable, structured set of automated and/or manual activities and tasks that fulfills some aspect of an organization's mission.

Grid Operations (GO) domain

The Grid Operations domain in the Smart Grid Maturity Model represents the organizational capabilities and characteristics that support the reliable, secure, safe, and efficient operation of the electrical grid. Increasing maturity within this domain reflects an evolution from relatively inflexible, manually-intensive operations with limited visibility into the health of the grid to automated operations with significant flexibility and a high degree of situational awareness at local, regional, and national levels.

Informative characteristic

An informative characteristic describes implementation features that an organization may exhibit at a given level of a domain, but informative characteristics are not required by the model.

Interruptible rate

_The lower rate offered to a customer (generally a large industrial or commercial entity) who agrees to have electric service interrupted, usually during a high demand period.

Load

_Any consumer of electrical energy; also, the amount of power (demand) used by a utility system, electrical device or consumer. Load can be manually or automatically curtailed or shed temporarily during times of high usage (customers have agreed beforehand to such actions) or managed to ensure a reliable electricity supply.

Load management

_In contrast to conservation strategies to reduce energy usage generally, load management tries to shift demand from peak generating periods to off peak times. Many utilities encourage load management by offering customers a choice of service options with various price incentives. See interruptible rates.

Line losses

-Energy waste (through heat and corona effects) resulting from the transmission of electrical energy across power lines.

Line of business (LOB)

A well-defined area of commercial activity focused on providing a particular type of product or service. A line of business typically corresponds to a specific organizational entity that is responsible for carrying out the related activity, often as part of a larger commercial enterprise. Examples of differing lines of business are generation vs. distribution, and power delivery vs. building automation services.

Maturity profile

A maturity profile is the set of scores that result from an organization taking an SGMM Compass, and comprises the organization's ratings (0-5) for each of the eight model domains. An organization is rated independently in each domain of the model. Higher ratings in a domain reflect a growing extent of smart grid implementation in an organization with respect to the subject of that domain. The organization's ratings can be used to compare the organization to itself over time (e.g., to understand the effectiveness and impact of ongoing improvement efforts or planning exercises in the context of the SGMM).

Net billing

Allows a customer to receive credit for customer-owned generation (e.g., wind or solar) that is fed onto the electricity grid. The customer's bill for electricity service from the utility is reduced by the price of the electricity the customer supplies to the grid. It is even possible for a customer to receive a net payment from the utility. If the metering equipment can keep a record of the separate electricity flows (rather than just the net amount of electricity used by the customer beyond the amount the customer generates), customer-supplied electricity may be valued at a different rate than electricity supplied by the utility.

Net metering

_Consumers of electricity can deduct the amount of electricity that they supply to the grid (via solar panels for example) with the use of a net metering device. The consumer receives a credit for the electricity conveyed on to the electricity grid.

Nonspecific question

A nonspecific question is a question that is no used to assess an organization's level rating in any domain and instead captures demographic and performance information.

Organization

For the purposes of the SGMM, an organization is an electric utility or a subset of such a utility that uses the model to understand their current state of smart grid deployment and capability. The organization is the focus of the SGMM and is assessed against the model to determine a set of level ratings, one rating per domain.

Organization and Structure (OS) domain

The Organization and Structure domain in the Smart Grid Maturity Model represents the organizational capabilities and characteristics that enable an organization to align and operate as required to achieve its desired smart grid transformation. The domain focuses on changes in communications, culture, structure, training and education, and knowledge management within the organization.

Outage duration

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

Outage frequency

Total number of customer interruptions divided by the total number of customers (typically for the period of a year). This reliability measure is also known as the _System Average Interruption Frequency Index (SAIFI). This measure and other key measures used to quantify reliability are defined in IEEE Standard 1366-2003: *IEEE Guide for Electric Power Distribution Reliability Indices*. http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=1300984

Plug-and-play customer-based generation

-Physical and logical support that simplifies the initial connection of customer-based generation equipment to the grid (e.g., by automating equipment discovery and configuration). This plug and play capability relies on a standards-based interoperable design specification for distribution grid interfaces and customer-based generation equipment.

Predictive maintenance

See condition-based maintenance.

Price elasticity model

-An abstract representation of how the demand for electricity would change in response to changes in price and how that would affect a utility's revenue.

Rate design

The type of prices used to signal consumers and recover costs. For example, these can involve block pricing, multipart prices, seasonal rates, time of use rates, and bundled services.

Remote connect/disconnect

-The ability to connect or disconnect service to a customer without sending a technician to the physical location.

Revenue

Total annual revenue is net proceeds generated from the sale of products or services. This should reflect the selling price less any allowances such as quantity, discounts, rebates, and returns. (Note: Business entity revenue needs to only include inter-company business segment revenue when the transactions between those business segments are intended to reflect an arm's length transfer price and would therefore meet the regulatory requirements for external revenue reporting.)

Schedule-based maintenance

Performing maintenance based on the average expected lifetime and service intervals for a given piece of equipment (based on factors such as its class, manufacturer's recommendations/repair data, and level of use). In contrast, see _Condition-based maintenance.

Self-healing capability

-The ability to automatically anticipate and/or sense and recognize power system disturbances and automatically respond with the appropriate corrective action.

Situational awareness

Situational awareness denotes having a sufficiently accurate and up-to-date understanding of the past, current, and projected future state of a system, in the context of its environment, to support effective decision making with respect to activities that depend on and/or affect how well a system functions. It involves the collection of data (e.g., via sensor networks), data fusion, and data analysis (which may include modeling and simulation) to support automated and/or human decision making (for example, concerning smart grid control functions). Situational awareness also involves the presentation of the results of the data analysis in a form (e.g., using data visualization techniques, appropriate use of alarms) that allows human operators or other human decision makers to quickly grasp the key elements needed for good decision making.

Smart grid plan

A formal, detailed written technical and business plan for implementing an organization's smart grid strategy.

Smart grid strategy

A high-level description of the technical and business steps that will be taken to achieve the organization's smart grid vision, including the roles and responsibilities of the individuals and entities needed to carry out those steps. Progress toward achieving the organization's smart grid vision should be periodically assessed and the smart grid strategy should be adjusted accordingly.

Smart grid vision

-A high-level description of an envisioned future state of the organization in which a set of desired goals of the organization and its stakeholders are being fulfilled through the implementation of smart grid technology.

Societal and Environmental (SE) domain

The Societal and Environmental domain in the Smart Grid Maturity Model represents the organizational capabilities and characteristics that enable an organization to contribute to achieving societal goals regarding the reliability, safety, security, and affordability of our electric power infrastructure, the quantity and sources of the energy we use, and the impact of the infrastructure and our energy use on the environment and our quality of life. Societal and environmental issues comprise a major focus of smart grid initiatives.

Strategy, Management, and Regulatory (SMR) domain

The Strategy, Management, and Regulatory (SMR) domain in the Smart Grid Maturity Model represents the capabilities and characteristics that enable an organization to successfully develop a smart grid vision and strategy, establish internal governance and management processes, and promote collaborative relationships with stakeholders to implement that strategy and vision. The integration, communication, and management of the mission, vision, and strategy is guiding the way through a successful smart grid transformation.

Substation automation

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 intelligent electronic devices (IED0/relay configuration ports, waveforms, event data, diagnostic information, video for security or equipment status assessment, metering, switching, volt/VAR management, and others to maintain uninterrupted power services to the end users.

Sustainability

-The concept that economic development must take full account of the environmental consequences of economic activity. Sustainability of the environment is achieved through using resources so that they can be replaced or renewed and therefore are not depleted.

Technology (TECH) domain

The Technology domain in the Smart Grid Maturity Model represents the organizational capabilities and characteristics that enable effective strategic technology planning for smart grid capabilities and the establishment of rigorous engineering and business processes for the evaluation, acquisition, integration, and testing of new smart grid technology. The engineering and business processes should be based on the quality attributes necessary for achieving success and reducing risk (e.g., interoperability, upgradability, security, safety, cost, and performance).

Total customer count

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

Triple bottom line

The three factors that compose the triple bottom line are commonly known as people, planet, and profit. Triple bottom line (TBL or 3BL) refers to measures of organizational success that include

social and environmental impacts, in addition to economic factors (i.e., the traditional financial bottom line).

Value Chain Integration (VCI) domain

The Value Chain Integration domain in the Smart Grid Maturity Model represents the organizational capabilities and characteristics that underlie an electric utility's ability to achieve its smart grid goals by successfully managing the utility's organizational interdependencies with both the supply chain for the production of electricity and the demand chain for its delivery. Value Chain Integration enables dynamic supply and demand management based on near real-time information.

Vertical integration

_Ownership of all aspects of production, sale, and delivery for a product or service (often as a result of mergers of firms involved in different stages of production). Electric utilities have been vertically integrated historically, with a single firm owning assets and being responsible for generation, transmission, and distribution systems, as well as for the metering and billing activities (retail).

Work and Asset Management (WAM) domain

The Work and Asset Management domain in the Smart Grid Maturity Model represents the organizational capabilities and characteristics that support the optimal management of assets and workforce resources (i.e. people and equipment) that are central to meeting smart grid goals. Increasing levels of maturity for this domain reflect an increasing capability of an organization to utilize information made available from the deployment of smart grid technologies.

Acronym List

AMI –Advanced Metering Infrastructure
AMR –Automated Meter Reading
AOBA – Apartment and Office Building Association
ASR – Automated Sectionalization and Restoration
BPL – Broadband Over Power Line
CBM – Condition-Based Maintenance
CIM – Common Information Model
CUST – Customer
DG – Distributed Generation
DOE – United States Department of Energy
DR – Demand Response
GIS – Geospatial Information System
GO – Grid Operations
HAN – Home Area Network
IEC – International Electrotechnical Commission
IED – Intelligent Electronic Devices
LOB – Line of Business
LTC – Load Tap Changing
NETL – National Energy Technology Laboratory
NIST – National Institute of Standards and Technology
OMS – Outage Management System
OS – Organization and Structure
PHV – Plug-in Hybrid Vehicle
PMU – Phasor Measurement Unit
RFID – Radio-Frequency Identification
RFP – Request for Proposals
ROI – Return on Investment
RTU – Remote Terminal Unit
SCADA – Supervisory Control and Data Acquisition
SE – Societal and Environmental
SEI – Software Engineering Institute
SGMM – Smart Grid Maturity Model
SLA – Service Level Agreements
SMR – Strategy, Management, and Regulatory
TECH – Technology
VAR – Volt/Volt-Ampere Reactive (VAR)
VCI – Value Chain Integration
VVO – Volt/VAR Optimization
WAM – Work and Asset Management

4. RATES

4.1	Establish water rates at or below 80% of the average rates in the area	Dec 2014	Kavounas				
4.2	Reduce electrical rates to 35% below SCE	Dec 2014	Steiger				
4.3	Increase annual electrical wholesale revenue to $10M	Jun 2015	Lins				
4.4	Reduce electrical system losses to <10%	Dec 2019	Abueg				

5. WATER INFRASTRUCTURE

5.1	Reduce unaccounted-for water to 5%	Jun 2016	Kavounas				
5.2	Replace/rehabilitate 25 miles of pipe	Jun 2016	Kavounas				
5.3	Implement effective asset management	Dec 2013	Kavounas				

6. POWER INFRASTRUCTURE

6.1	Reduce number of preventable outages to less than 25 per year	Jun 2014	Abueg				
6.2	Upgrade transmission system to 69 kV	Jun 2023	Abueg				
6.3	Convert distribution feeders from 4 kV to 12 kV	Jan 2027	Abueg				
6.4	Replace all electromechanical relays with state-of-the-art relays	Jan 2018	Abueg				
6.5	Implement effective asset management	Dec 2014	Abueg				

7. WORKFORCE

7.1	Continually improve job satisfaction of our employees	Ongoing	Steiger				
7.2	Have <5% vacancy rate	Jun 2013	Bassin				
7.3	Achieve annual utility average OSHA incident rate of 2.0 or less	Ongoing	Bassin				
7.4	Have zero preventable vehicle accidents each year	Jun 2012	Bassin				

8. SYSTEMS

8.1	Implement Smart Grid Maturity Model	Jun 2013	Kuennen				
8.2	Operate GWP within a city-wide GIS	Dec 2013	Bassin				
8.3	Implement new Dept of Finance processes for GWP transactions	Ongoing	Fox				
8.4	Create a GWP system integration that assures no redundant data entry	Dec 2013	Bassin				
8.5	Launch profitable new business ventures	Jan 2013	Steiger				

9. CITY OF GLENDALE

9.1	Improve communications with customers, City Council, and City Departments	Ongoing	Steiger				
9.2	Develop optimum transfer level for mutual benefit	Dec 2014	Steiger				
9.3	Implement communication vehicles to improve GWP's public image	Dec 2011	Bassin				
9.4	Develop a comprehensive outreach plan	Dec 2011	Bassin				
9.5	Implement new collaborative ventures with City departments	Dec 2011	Steiger				

10. LEGISLATION & REGULATION

10.1	Establish and continue on-going relationships with state and federal legislators and regulators	Ongoing	Lins				
10.2	Develop specific GWP legislative strategy and initiatives	Ongoing	Lins				
10.3	Provide quarterly reports on compliance, strategies, relationships and major activities	Ongoing	Lins				