TRANSMISSION & DISTRIBUTION WORLD

Smart Grid Survey 2010

- Investigation conducted exclusively for S&C Electric Company.
- Methodology, data collection and analysis by Penton Research.
- Data collected February 3, 2010 through February 10, 2010.
- Methodology conforms to accepted marketing research methods, practices and procedures.

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Objectives & Methodology

Objectives

Objectives of this study effort include:

1. Investigate perceptions surrounding deployment of the nation's smart grid.
2. Determine importance of various technologies in the success of the smart grid.
3. Obtain key demographics.

Methodology

e-mail Survey.

Sample framework

On February 3, 2010, Penton Media e-mailed invitations to participate in an online survey to a total of 9,315 subscribers of *Transmission & Distribution World*, with the following job titles:

- General or Corporate Management (other than engineering, operations, purchasing, stores & commercial)
- Engineering: Systems, Planning or Design, IT
- Energy Consulting, Contracting

Response motivation

To encourage prompt response and increase the response rate overall, the following marketing research techniques were used:

- A drawing was held for one of four $50 Visa gift cards.
- A link was included on the invitation to route respondents directly to the questionnaire.
- The magazine name was used on the invitation to tie the study effort to *Transmission & Distribution World*.
- A follow-up e-mail was sent to non-respondents on February 9, 2010.

Survey instruments

Copies of the invitations and questionnaire are included in Appendix B.

Sample Statistics

A.	Total mailing	9,315
B.	Bouncebacks/undeliverables	1,164
C.	Effective mailing (A-B)	8,151
D.	Completed surveys	487*
E.	**Effective response rate**	**6.0%**

**Note: 69 respondents did not indicate one of the three job titles selected for inclusion in the study, and as such were excluded from the analyses. Analyses presented on the following pages are based on the responses of the remaining 418 respondents.*

High costs are considered the primary barrier to deployment of the smart grid.

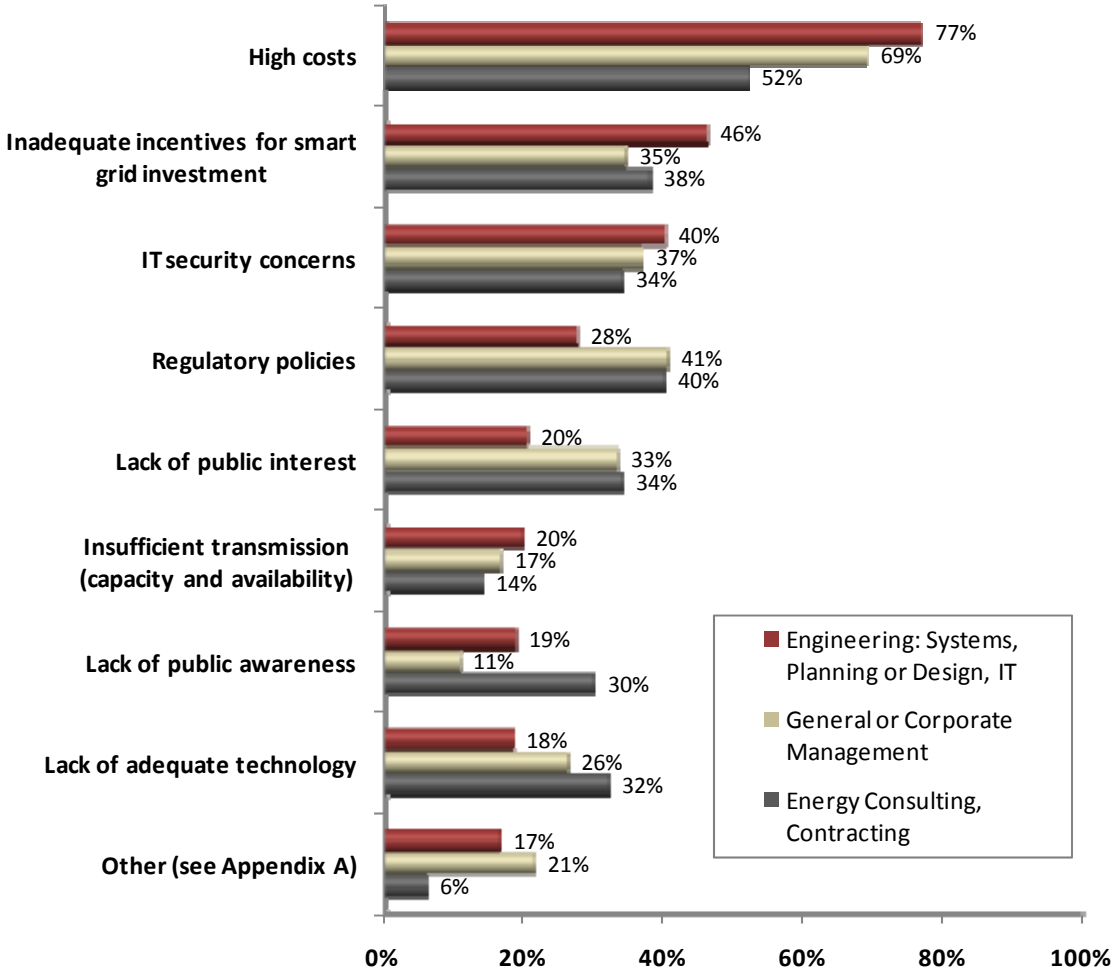
Engineering respondents comprised the only group for which three predominant barriers emerged: high costs (77%), inadequate incentives for smart grid investment (46%) and IT security concerns (40%).

Those in General or Corporate Management were clearly concerned about high costs (69%), followed by regulatory policies (41%). Other commonly mentioned barriers include IT security concerns (37%), inadequate incentives for smart grid investment (35%) and lack of public interest (33%).

Common barriers mentioned by Energy Consulting/Contracting respondents include high costs (52%), regulatory policies (40%) and inadequate incentives for smart grid investment (38%).

Barriers to Deployment of the Smart Grid

- *What do you consider the top three barriers to the deployment of the smart grid?*



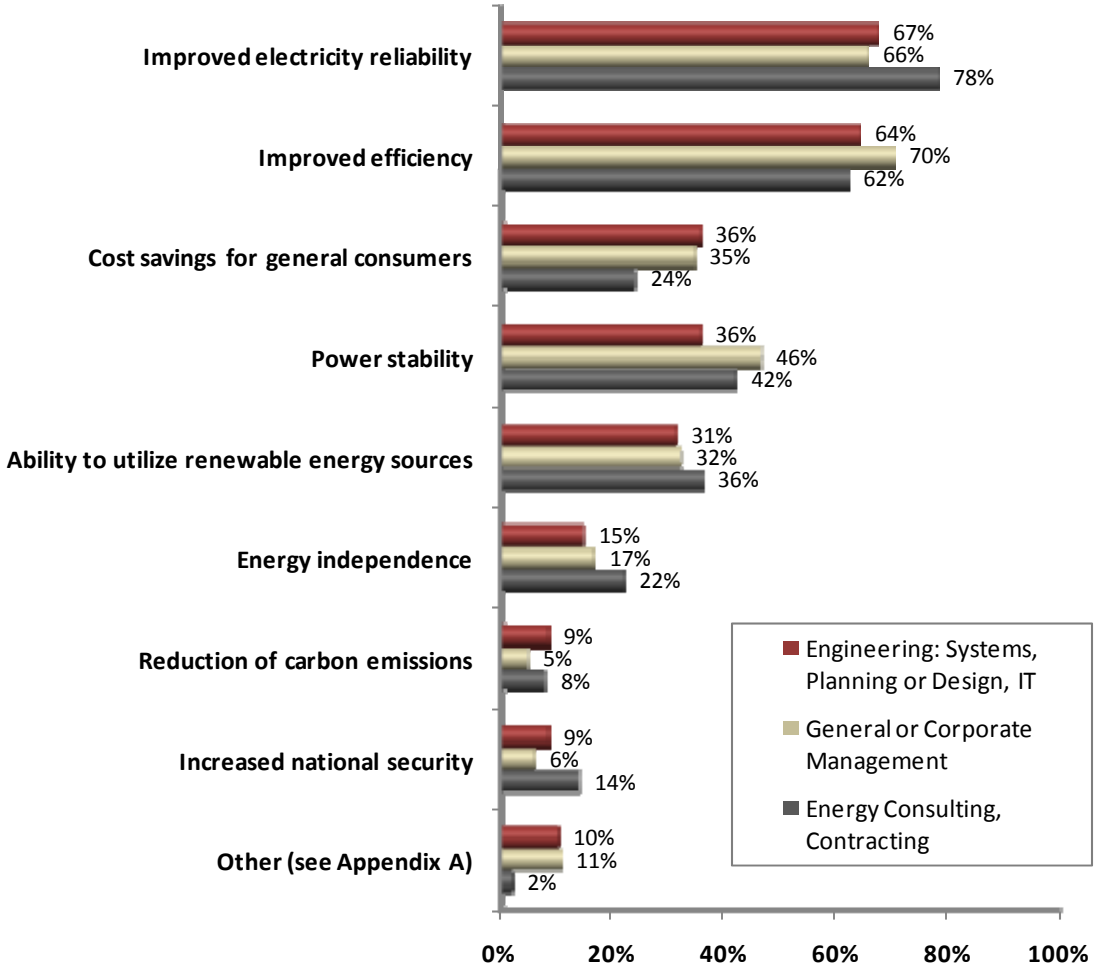
Base = all respondents (418); multiple answers permitted.

Improved electricity reliability and efficiency are considered the top two benefits to deployment of the smart grid.

Cost savings for general consumers, power stability, and the ability to utilize renewable energy sources comprise a second tier of benefits.

Benefits to Deployment of the Smart Grid

- *What do you consider the top three benefits to the deployment of the smart grid?*



Base = all respondents (418); multiple answers permitted.

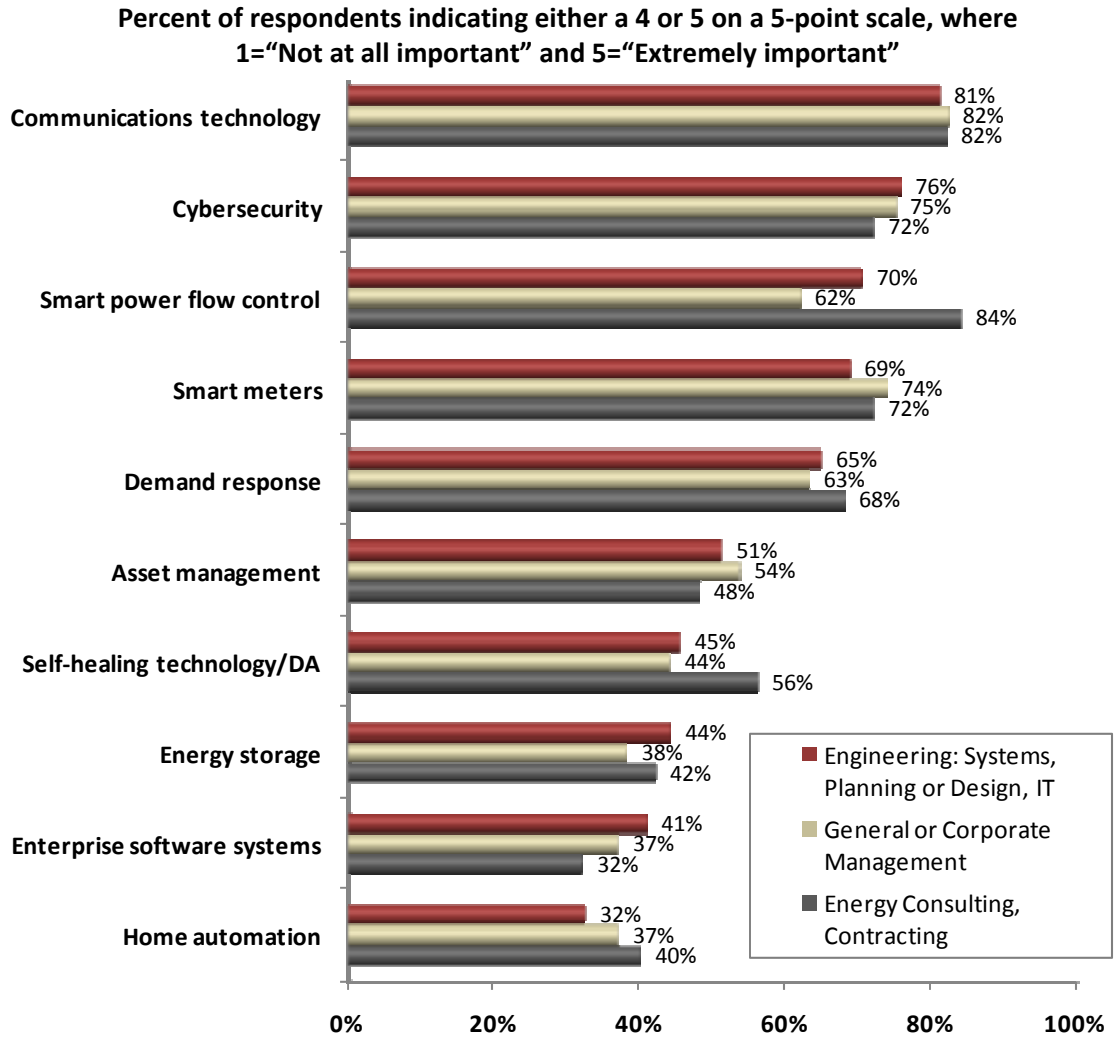
Respondents rate communications technology most critical in terms of delivering the benefits promised by the smart grid.

Cybersecurity, smart meters, smart power flow control, and demand response are also considered instrumental to the success of the smart grid.

Energy Consulting, Contracting respondents are particularly likely to rate smart power flow control as important (84%).

Importance of Various Technologies to the Smart Grid

- *How important are each of the following technologies to deliver the benefits promised by the nation's smart grid?*



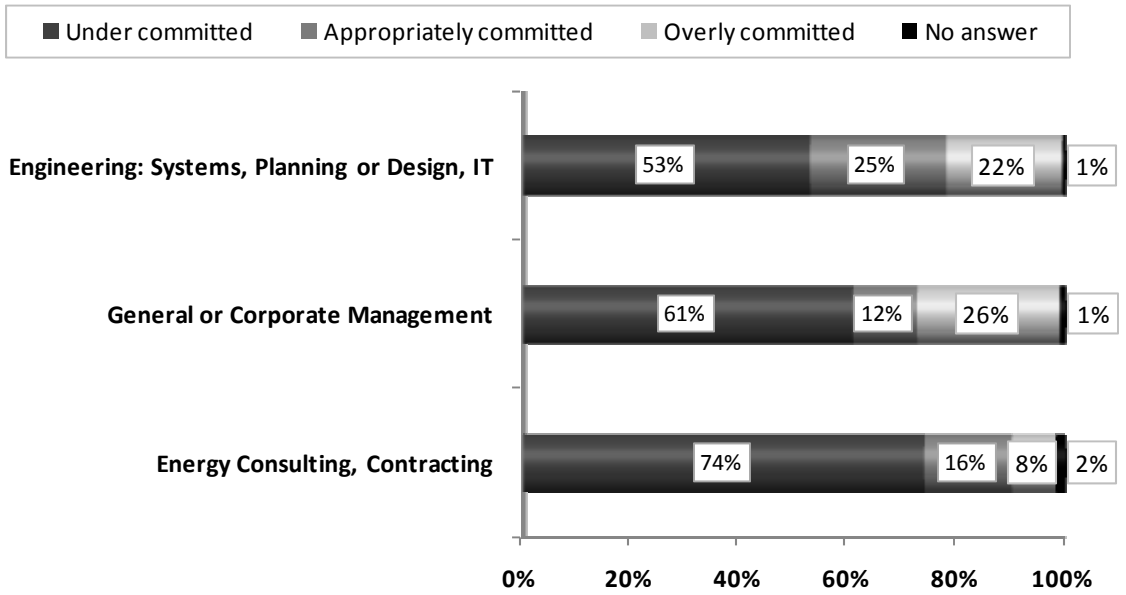
Base = all respondents (418).

The majority of respondents believe U.S. policy makers need to increase their level of commitment to building the smart grid.

This is particularly true for Energy Consulting, Contracting respondents, 22% of whom believe U.S. policy makers are "significantly less committed than I think necessary" *(see table on page 17 for complete data).*

U.S. Policy Makers' Commitment to the Smart Grid

- *How would you characterize U.S. policy makers' commitment to building a smart grid?*



Base = all respondents (418).

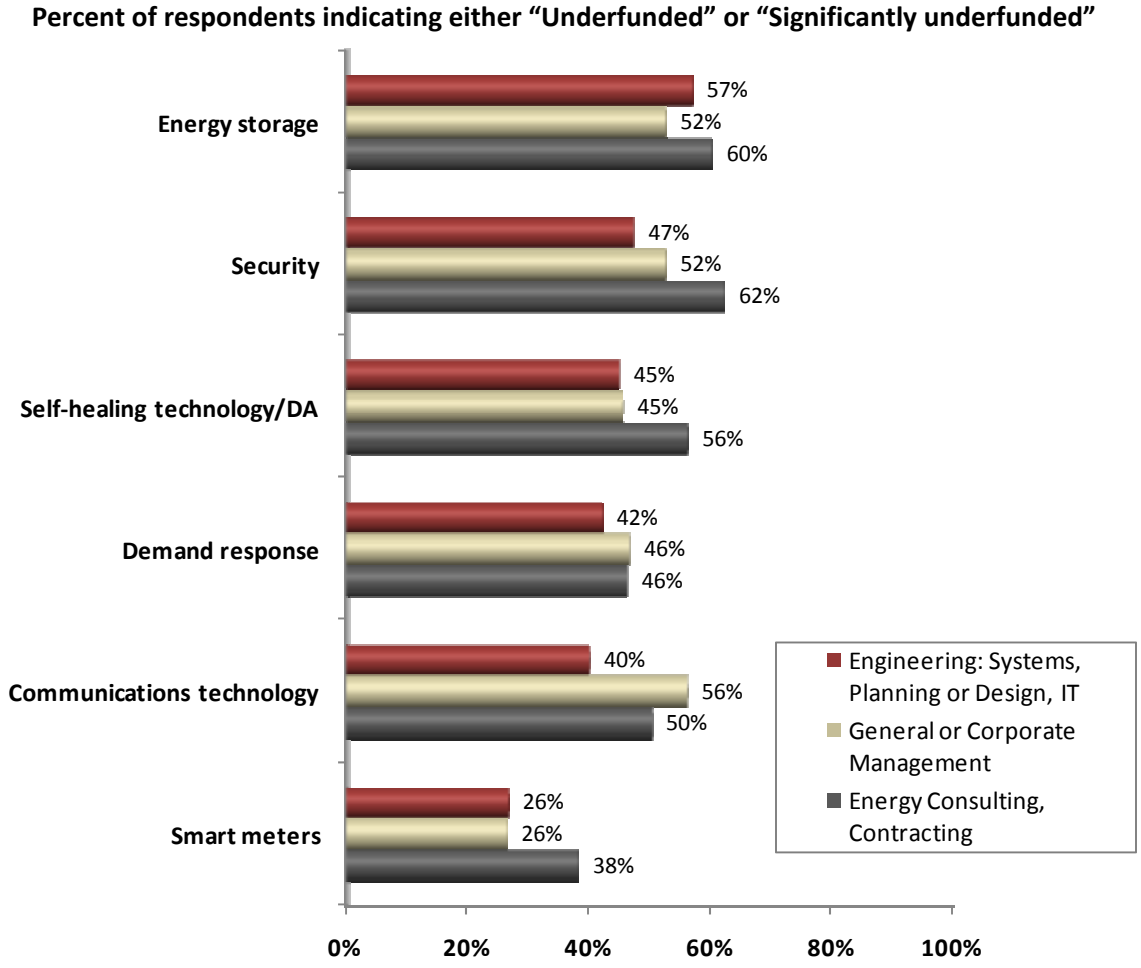
Respondents are least likely to believe smart meters are underfunded.

Energy Consulting, Contracting respondents are more likely to believe security (62%), self-healing technology/DA (56%) and smart meters are underfunded (38%) in comparison to Engineering and Management respondents.

Those in General or Corporate Management are most likely to believe communications technology is underfunded (56%).

Perception of Smart Grid Financial Investment Allocation

- *Do you believe the U.S. is targeting smart grid financial investment appropriately to each of the following technologies that comprise the smart grid?*



Base = all respondents (418).

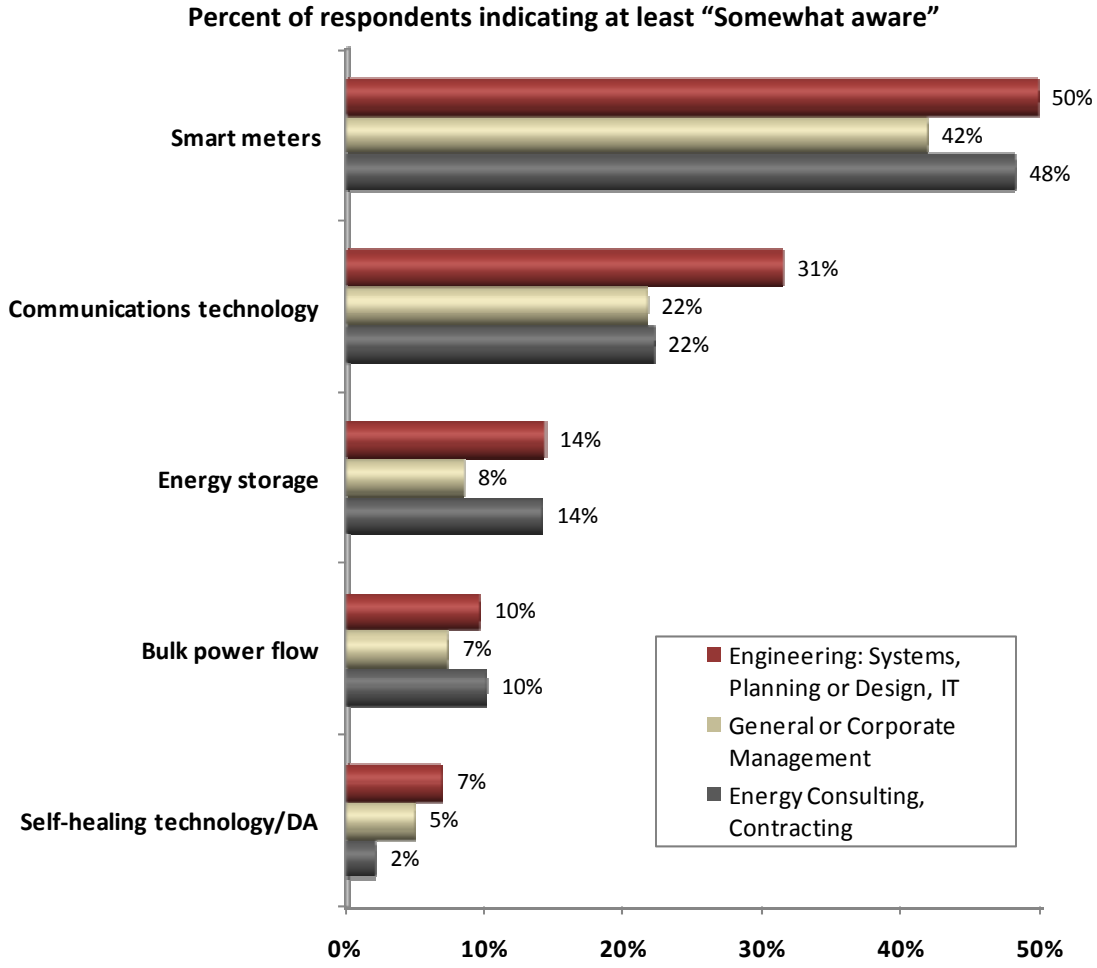
Respondents believe the public is most aware of the role of smart meters in the smart grid.

The public is considered largely unaware of the roles played by self-healing technology/DA, bulk power flow, and energy storage.

Those in Engineering positions believe the public is significantly more aware of the role of communications technology (31%) than do those in Management (22%) or Energy Consulting, Contracting (22%).

Perceived Public Awareness: Roles of Various Technologies in the Smart Grid

- *How would you characterize the general public's awareness of the role each of the following technologies plays in the smart grid?*



Base = all respondents (418).

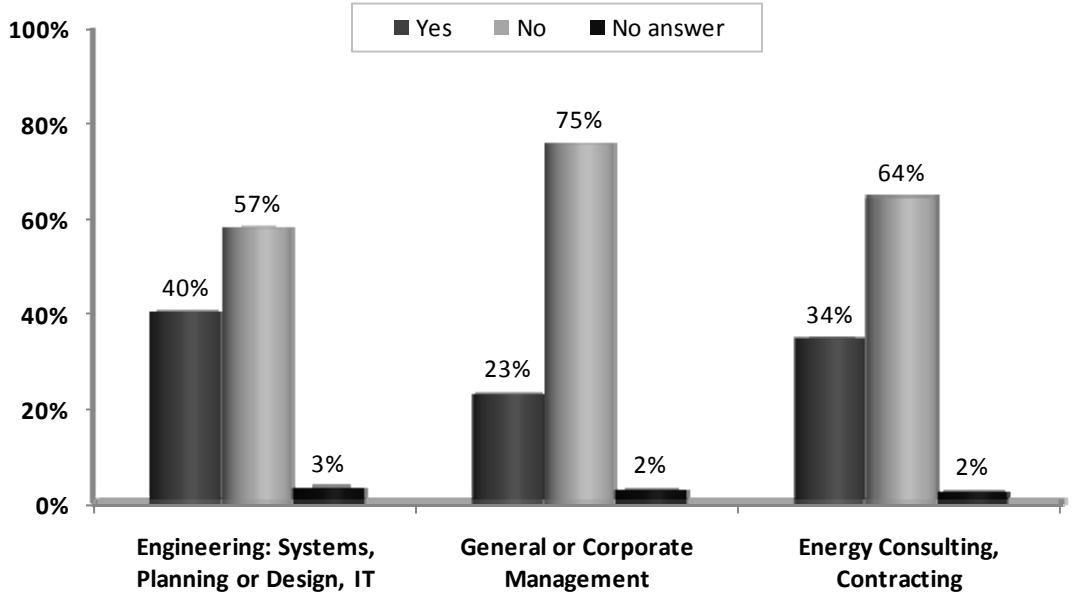
The majority of respondents do not believe the right infrastructure is in place for smart metes to live up to their promise.

Those in General or Corporate Management are particularly pessimistic.

When asked to explain why they did not believe the right infrastructure was in place for optimal smart meter performance, respondents commonly cited inadequate communications, antiquated transmission and distribution systems, and security concerns *(see pages A-3 through A-8 for all verbatim comments).*

Adequate Infrastructure for Smart Meter Optimization

- *Do you believe the right infrastructure is in place for smart meters to live up to their promise?*



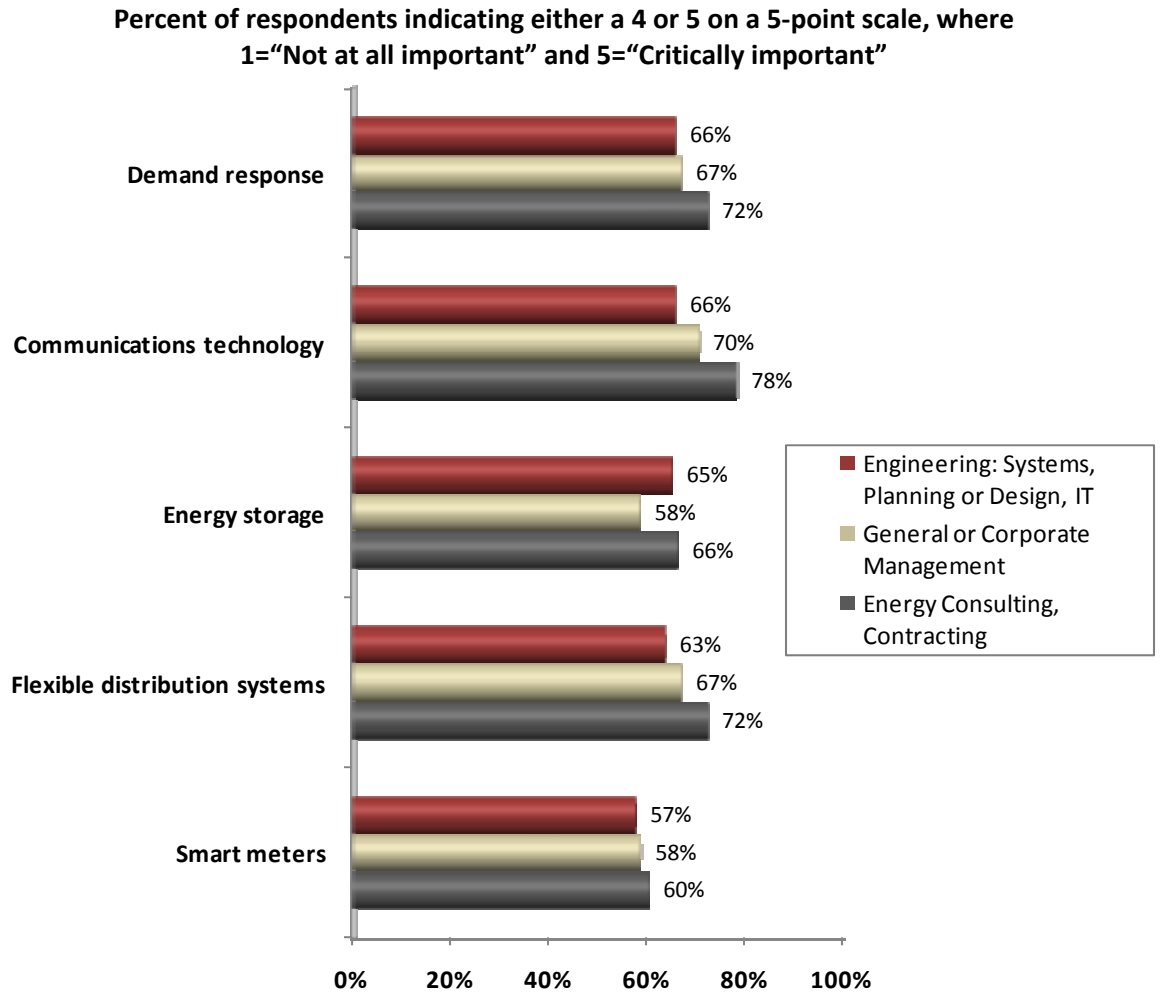
Base = all respondents (418).

All technologies addressed in the study are considered important to the integration of renewable energy sources.

More than half of all respondents, regardless of job title, rate each technology at least a 4 on a 5-point scale, where 1="Not at all important" and 5="Critically important."

Importance of Various Technologies in Enabling Integration of Renewable Energy Sources

- *How important are each of the following to enabling integration of renewable energy sources, including distributed energy resources?*



Base = all respondents (418).

Nuclear energy is perceived as most important to the world's future energy supply.

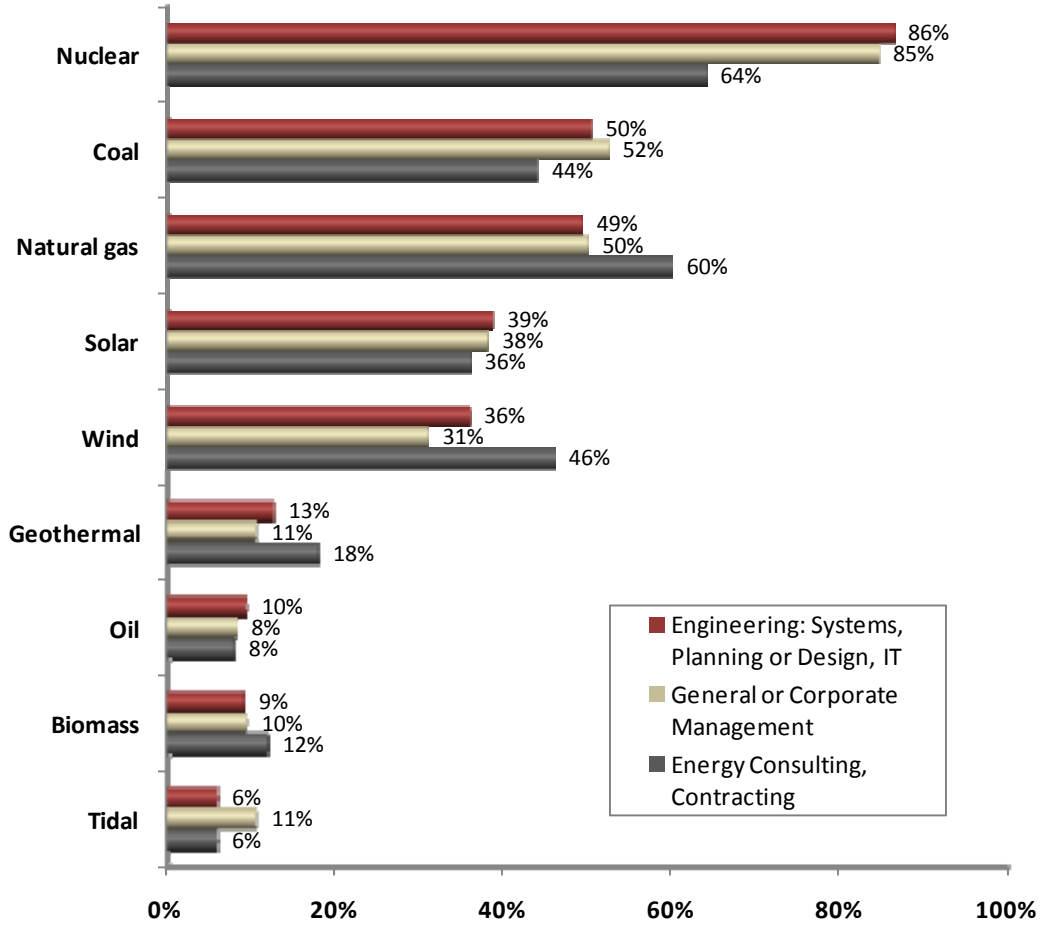
Respondents in Engineering and Management rate the various energy sources very similarly. However, those in Energy Consulting, Contracting differ significantly.

Energy Consulting, Contracting respondents consider nuclear (64%) and natural gas (60%) to be of equivalent importance, followed by wind (46%) and coal (44%).

Engineering and Management respondents consider nuclear energy the most critical source going forward (86%, 85% respectively), followed by coal and natural gas (ratings range from 49% - 52%).

Critical Sources of the World's Future Energy Supply

- *What do you believe will be the three most important sources of the world's future energy supply?*



Base = all respondents (418).

Q1. What do you consider the top three barriers to the deployment of the smart grid?

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents; multiple answer.	**418**	**284**	**84**	**50**
High costs	**302** **72.2%**	218 76.8%	58 69.0%	26 52.0%
Inadequate incentives for smart grid investment	**179** **42.8%**	131 46.1%	29 34.5%	19 38.0%
IT security concerns	**162** **38.8%**	114 40.1%	31 36.9%	17 34.0%
Regulatory policies	**132** **31.6%**	78 27.5%	34 40.5%	20 40.0%
Lack of public interest	**103** **24.6%**	58 20.4%	28 33.3%	17 34.0%
Lack of adequate technology	**90** **21.5%**	52 18.3%	22 26.2%	16 32.0%
Insufficient transmission (capacity and availability)	**77** **18.4%**	56 19.7%	14 16.7%	7 14.0%
Lack of public awareness	**77** **18.4%**	53 18.7%	9 10.7%	15 30.0%
Other (see Appendix A)	**68** **16.3%**	47 16.5%	18 21.4%	3 6.0%
No answer	**1** **0.2%**	1 0.4%	- -	- -

Analyst note: Respondents were limited to three choices.

Q2. What do you consider the top three benefits to the deployment of the smart grid?

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents; multiple answer.	**418**	**284**	**84**	**50**
Improved electricity reliability	**285** **68.2%**	191 67.3%	55 65.5%	39 78.0%
Improved efficiency	**272** **65.1%**	182 64.1%	59 70.2%	31 62.0%
Power stability	**161** **38.5%**	101 35.6%	39 46.4%	21 42.0%
Cost savings for general consumers	**142** **34.0%**	101 35.6%	29 34.5%	12 24.0%
Ability to utilize renewable energy sources	**134** **32.1%**	89 31.3%	27 32.1%	18 36.0%
Energy independence	**67** **16.0%**	42 14.8%	14 16.7%	11 22.0%
Other (see Appendix A)	**39** **9.3%**	29 10.2%	9 10.7%	1 2.0%
Increased national security	**36** **8.6%**	24 8.5%	5 6.0%	7 14.0%
Reduction of carbon emissions	**32** **7.7%**	24 8.5%	4 4.8%	4 8.0%
No answer	**2** **0.5%**	2 0.7%	- -	- -

Analyst note: Respondents were limited to three choices.

Q3. How important are each of the following technologies to deliver the benefits promised by the nation's smart grid?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = all respondents.							
Asset management	3.5	20 4.8%	38 9.1%	128 30.6%	144 34.4%	70 16.7%	18 4.3%
Communications technology	4.3	10 2.4%	9 2.2%	51 12.2%	136 32.5%	204 48.8%	8 1.9%
Cybersecurity	4.2	11 2.6%	20 4.8%	60 14.4%	106 25.4%	208 49.8%	13 3.1%
Demand response	3.8	10 2.4%	28 6.7%	95 22.7%	175 41.9%	96 23.0%	14 3.3%
Energy storage	3.3	23 5.5%	69 16.5%	139 33.3%	107 25.6%	71 17.0%	9 2.2%
Enterprise software systems	3.3	25 6.0%	57 13.6%	157 37.6%	116 27.8%	47 11.2%	16 3.8%
Home automation	3.0	50 12.0%	71 17.0%	138 33.0%	111 26.6%	32 7.7%	16 3.8%
Self-healing technology/DA	3.4	13 3.1%	48 11.5%	146 34.9%	140 33.5%	54 12.9%	17 4.1%
Smart meters	3.9	14 3.3%	21 5.0%	82 19.6%	157 37.6%	136 32.5%	8 1.9%
Smart power flow control	3.9	14 3.3%	20 4.8%	75 17.9%	179 42.8%	115 27.5%	15 3.6%
Other (see Appendix A)	4.7	- -	- -	1 0.2%	2 0.5%	11 2.6%	403 96.6%

Q3. How important are each of the following technologies to deliver the benefits promised by the nation's smart grid?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = engineering respondents.							
Asset management	3.5	15 5.3%	25 8.8%	89 31.3%	95 33.5%	50 17.6%	10 3.5%
Communications technology	4.3	8 2.8%	3 1.1%	39 13.7%	87 30.6%	143 50.4%	4 1.4%
Cybersecurity	4.2	10 3.5%	10 3.5%	41 14.4%	65 22.9%	150 52.8%	8 2.8%
Demand response	3.8	8 2.8%	18 6.3%	67 23.6%	120 42.3%	64 22.5%	7 2.5%
Energy storage	3.4	17 6.0%	39 13.7%	98 34.5%	76 26.8%	49 17.3%	5 1.8%
Enterprise software systems	3.3	13 4.6%	37 13.0%	111 39.1%	79 27.8%	37 13.0%	7 2.5%
Home automation	3.0	32 11.3%	46 16.2%	105 37.0%	73 25.7%	19 6.7%	9 3.2%
Self-healing technology/DA	3.4	10 3.5%	34 12.0%	102 35.9%	93 32.7%	36 12.7%	9 3.2%
Smart meters	3.9	10 3.5%	13 4.6%	61 21.5%	105 37.0%	90 31.7%	5 1.8%
Smart power flow control	3.9	10 3.5%	12 4.2%	53 18.7%	127 44.7%	73 25.7%	9 3.2%
Other (see Appendix A)	4.7	- -	- -	1 0.4%	1 0.4%	7 2.5%	274 96.8%

Q3. How important are each of the following technologies to deliver the benefits promised by the nation's smart grid?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = general or corporate management respondents.							
Asset management	3.6	3 3.6%	4 4.8%	26 31.0%	31 36.9%	14 16.7%	6 7.1%
Communications technology	4.3	2 2.4%	3 3.6%	7 8.3%	24 28.6%	45 53.6%	3 3.6%
Cybersecurity	4.2	1 1.2%	4 4.8%	12 14.3%	21 25.0%	42 50.0%	4 4.8%
Demand response	3.7	2 2.4%	6 7.1%	17 20.2%	39 46.4%	14 16.7%	6 7.1%
Energy storage	3.2	4 4.8%	22 26.2%	23 27.4%	18 21.4%	14 16.7%	3 3.6%
Enterprise software systems	3.1	8 9.5%	13 15.5%	26 31.0%	25 29.8%	6 7.1%	6 7.1%
Home automation	3.0	12 14.3%	14 16.7%	21 25.0%	22 26.2%	9 10.7%	6 7.1%
Self-healing technology/DA	3.4	3 3.6%	11 13.1%	26 31.0%	28 33.3%	9 10.7%	7 8.3%
Smart meters	3.9	4 4.8%	6 7.1%	10 11.9%	33 39.3%	29 34.5%	2 2.4%
Smart power flow control	3.8	4 4.8%	6 7.1%	17 20.2%	30 35.7%	22 26.2%	5 6.0%
Other (see Appendix A)	4.8	- -	- -	- -	1 1.2%	3 3.6%	80 95.2%

Q3. How important are each of the following technologies to deliver the benefits promised by the nation's smart grid?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = energy consulting, contracting respondents.							
Asset management	3.4	2 4.0%	9 18.0%	13 26.0%	18 36.0%	6 12.0%	2 4.0%
Communications technology	4.1	- -	3 6.0%	5 10.0%	25 50.0%	16 32.0%	1 2.0%
Cybersecurity	3.9	- -	6 12.0%	7 14.0%	20 40.0%	16 32.0%	1 2.0%
Demand response	4.0	- -	4 8.0%	11 22.0%	16 32.0%	18 36.0%	1 2.0%
Energy storage	3.3	2 4.0%	8 16.0%	18 36.0%	13 26.0%	8 16.0%	1 2.0%
Enterprise software systems	3.1	4 8.0%	7 14.0%	20 40.0%	12 24.0%	4 8.0%	3 6.0%
Home automation	3.0	6 12.0%	11 22.0%	12 24.0%	16 32.0%	4 8.0%	1 2.0%
Self-healing technology/DA	3.7	- -	3 6.0%	18 36.0%	19 38.0%	9 18.0%	1 2.0%
Smart meters	4.0	- -	2 4.0%	11 22.0%	19 38.0%	17 34.0%	1 2.0%
Smart power flow control	4.2	- -	2 4.0%	5 10.0%	22 44.0%	20 40.0%	1 2.0%
Other (see Appendix A)	5.0	- -	- -	- -	- -	1 2.0%	49 98.0%

Q4. How would you characterize U.S. policy makers' commitment to building a smart grid?

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents.	**418**	**284**	**84**	**50**
Significantly less committed than I think necessary	**69** **16.5%**	35 12.3%	23 27.4%	11 22.0%
Less committed than I think necessary	**169** **40.4%**	115 40.5%	28 33.3%	26 52.0%
Appropriately committed	**89** **21.3%**	71 25.0%	10 11.9%	8 16.0%
More committed than I think necessary	**54** **12.9%**	35 12.3%	15 17.9%	4 8.0%
Significantly more committed than I think necessary	**33** **7.9%**	26 9.2%	7 8.3%	- -
No answer	**4** **1.0%**	2 0.7%	1 1.2%	1 2.0%

Q5. Do you believe the U.S. is targeting smart grid financial investment appropriately to each of the following technologies that comprise the smart grid?

	Significantly underfunded	Underfunded	Appropriately funded	Overfunded	Significantly overfunded	No answer
Base = all respondents.						
Communications technology	25 6.0%	160 38.3%	177 42.3%	25 6.0%	11 2.6%	20 4.8%
Demand response	20 4.8%	161 38.5%	181 43.3%	22 5.3%	15 3.6%	19 4.5%
Energy storage	61 14.6%	174 41.6%	115 27.5%	39 9.3%	12 2.9%	17 4.1%
Security	37 8.9%	172 41.1%	148 35.4%	28 6.7%	14 3.3%	19 4.5%
Self-healing technology/DA	23 5.5%	170 40.7%	167 40.0%	25 6.0%	11 2.6%	22 5.3%
Smart meters	16 3.8%	100 23.9%	201 48.1%	58 13.9%	23 5.5%	20 4.8%

Q5. Do you believe the U.S. is targeting smart grid financial investment appropriately to each of the following technologies that comprise the smart grid?

	Significantly underfunded	Underfunded	Appropriately funded	Overfunded	Significantly overfunded	No answer
Base = engineering respondents.						
Communications technology	13 4.6%	100 35.2%	132 46.5%	19 6.7%	9 3.2%	11 3.9%
Demand response	12 4.2%	107 37.7%	128 45.1%	15 5.3%	10 3.5%	12 4.2%
Energy storage	40 14.1%	121 42.6%	81 28.5%	22 7.7%	9 3.2%	11 3.9%
Security	22 7.7%	112 39.4%	108 38.0%	19 6.7%	11 3.9%	12 4.2%
Self-healing technology/DA	15 5.3%	112 39.4%	115 40.5%	17 6.0%	11 3.9%	14 4.9%
Smart meters	10 3.5%	65 22.9%	148 52.1%	32 11.3%	16 5.6%	13 4.6%

Q5. Do you believe the U.S. is targeting smart grid financial investment appropriately to each of the following technologies that comprise the smart grid?

	Significantly underfunded	Underfunded	Appropriately funded	Overfunded	Significantly overfunded	No answer
Base = general or corporate management respondents.						
Communications technology	9 10.7%	38 45.2%	24 28.6%	5 6.0%	1 1.2%	7 8.3%
Demand response	6 7.1%	33 39.3%	30 35.7%	5 6.0%	5 6.0%	5 6.0%
Energy storage	14 16.7%	30 35.7%	21 25.0%	12 14.3%	3 3.6%	4 4.8%
Security	9 10.7%	35 41.7%	26 31.0%	7 8.3%	2 2.4%	5 6.0%
Self-healing technology/DA	3 3.6%	35 41.7%	33 39.3%	7 8.3%	- -	6 7.1%
Smart meters	4 4.8%	18 21.4%	37 44.0%	16 19.0%	5 6.0%	4 4.8%

Q5. Do you believe the U.S. is targeting smart grid financial investment appropriately to each of the following technologies that comprise the smart grid?

	Significantly underfunded	Underfunded	Appropriately funded	Overfunded	Significantly overfunded	No answer
Base = energy consulting, contracting respondents.						
Communications technology	3 6.0%	22 44.0%	21 42.0%	1 2.0%	1 2.0%	2 4.0%
Demand response	2 4.0%	21 42.0%	23 46.0%	2 4.0%	- -	2 4.0%
Energy storage	7 14.0%	23 46.0%	13 26.0%	5 10.0%	- -	2 4.0%
Security	6 12.0%	25 50.0%	14 28.0%	2 4.0%	1 2.0%	2 4.0%
Self-healing technology/DA	5 10.0%	23 46.0%	19 38.0%	1 2.0%	- -	2 4.0%
Smart meters	2 4.0%	17 34.0%	16 32.0%	10 20.0%	2 4.0%	3 6.0%

Q6. How would you characterize the general public's awareness of the role each of the following technologies plays in the smart grid?

	Not at all aware	Minimally aware	Somewhat aware	Aware	Very aware	No answer
Base = all respondents.						
Bulk power flow	230 55.0%	146 34.9%	30 7.2%	6 1.4%	2 0.5%	4 1.0%
Communications technology	132 31.6%	163 39.0%	89 21.3%	27 6.5%	2 0.5%	5 1.2%
Energy storage	192 45.9%	165 39.5%	44 10.5%	9 2.2%	1 0.2%	7 1.7%
Self-healing technology/DA	248 59.3%	139 33.3%	20 4.8%	3 0.7%	1 0.2%	7 1.7%
Smart meters	67 16.0%	144 34.4%	126 30.1%	60 14.4%	14 3.3%	7 1.7%

Q6. How would you characterize the general public's awareness of the role each of the following technologies plays in the smart grid?

	Not at all aware	Minimally aware	Somewhat aware	Aware	Very aware	No answer
Base = engineering respondents.						
Bulk power flow	148 52.1%	106 37.3%	20 7.0%	6 2.1%	1 0.4%	3 1.1%
Communications technology	81 28.5%	111 39.1%	66 23.2%	22 7.7%	1 0.4%	3 1.1%
Energy storage	127 44.7%	113 39.8%	32 11.3%	7 2.5%	1 0.4%	4 1.4%
Self-healing technology/DA	160 56.3%	101 35.6%	17 6.0%	1 0.4%	1 0.4%	4 1.4%
Smart meters	42 14.8%	97 34.2%	87 30.6%	45 15.8%	9 3.2%	4 1.4%

Q6. How would you characterize the general public's awareness of the role each of the following technologies plays in the smart grid?

	Not at all aware	Minimally aware	Somewhat aware	Aware	Very aware	No answer
Base = general or corporate management respondents.						
Bulk power flow	52 61.9%	26 31.0%	5 6.0%	- -	1 1.2%	- -
Communications technology	36 42.9%	29 34.5%	13 15.5%	4 4.8%	1 1.2%	1 1.2%
Energy storage	42 50.0%	33 39.3%	6 7.1%	1 1.2%	- -	2 2.4%
Self-healing technology/DA	60 71.4%	19 22.6%	2 2.4%	2 2.4%	- -	1 1.2%
Smart meters	15 17.9%	32 38.1%	21 25.0%	10 11.9%	4 4.8%	2 2.4%

Q6. How would you characterize the general public's awareness of the role each of the following technologies plays in the smart grid?

	Not at all aware	Minimally aware	Somewhat aware	Aware	Very aware	No answer
Base = energy consulting, contracting respondents.						
Bulk power flow	30 60.0%	14 28.0%	5 10.0%	- -	- -	1 2.0%
Communications technology	15 30.0%	23 46.0%	10 20.0%	1 2.0%	- -	1 2.0%
Energy storage	23 46.0%	19 38.0%	6 12.0%	1 2.0%	- -	1 2.0%
Self-healing technology/DA	28 56.0%	19 38.0%	1 2.0%	- -	- -	2 4.0%
Smart meters	10 20.0%	15 30.0%	18 36.0%	5 10.0%	1 2.0%	1 2.0%

Q7. How important are each of the following to enabling integration of renewable energy sources, including distributed energy resources?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = all respondents.							
Communications technology	4.0	6 1.4%	23 5.5%	93 22.2%	130 31.1%	154 36.8%	12 2.9%
Demand response	3.8	11 2.6%	29 6.9%	89 21.3%	182 43.5%	96 23.0%	11 2.6%
Energy storage	3.8	10 2.4%	33 7.9%	98 23.4%	145 34.7%	121 28.9%	11 2.6%
Flexible distribution systems	3.8	6 1.4%	23 5.5%	101 24.2%	173 41.4%	99 23.7%	16 3.8%
Smart meters	3.7	12 2.9%	46 11.0%	104 24.9%	140 33.5%	102 24.4%	14 3.3%

Q7. How important are each of the following to enabling integration of renewable energy sources, including distributed energy resources?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = engineering respondents.							
Communications technology	4.0	5 1.8%	13 4.6%	71 25.0%	81 28.5%	105 37.0%	9 3.2%
Demand response	3.8	7 2.5%	18 6.3%	64 22.5%	126 44.4%	60 21.1%	9 3.2%
Energy storage	3.9	5 1.8%	24 8.5%	63 22.2%	98 34.5%	86 30.3%	8 2.8%
Flexible distribution systems	3.8	6 2.1%	15 5.3%	72 25.4%	120 42.3%	60 21.1%	11 3.9%
Smart meters	3.6	9 3.2%	34 12.0%	69 24.3%	96 33.8%	67 23.6%	9 3.2%

Q7. How important are each of the following to enabling integration of renewable energy sources, including distributed energy resources?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = general or corporate management respondents.							
Communications technology	4.0	- -	6 7.1%	17 20.2%	27 32.1%	32 38.1%	2 2.4%
Demand response	3.8	4 4.8%	6 7.1%	17 20.2%	34 40.5%	22 26.2%	1 1.2%
Energy storage	3.7	3 3.6%	8 9.5%	22 26.2%	29 34.5%	20 23.8%	2 2.4%
Flexible distribution systems	3.9	- -	5 6.0%	21 25.0%	31 36.9%	25 29.8%	2 2.4%
Smart meters	3.7	3 3.6%	7 8.3%	22 26.2%	25 29.8%	24 28.6%	3 3.6%

Q7. How important are each of the following to enabling integration of renewable energy sources, including distributed energy resources?

	Mean	1 = Not at all important	2	3	4	5 = Critically important	No answer
Base = energy consulting, contracting respondents.							
Communications technology	4.0	1 2.0%	4 8.0%	5 10.0%	22 44.0%	17 34.0%	1 2.0%
Demand response	3.9	- -	5 10.0%	8 16.0%	22 44.0%	14 28.0%	1 2.0%
Energy storage	3.9	2 4.0%	1 2.0%	13 26.0%	18 36.0%	15 30.0%	1 2.0%
Flexible distribution systems	4.0	- -	3 6.0%	8 16.0%	22 44.0%	14 28.0%	3 6.0%
Smart meters	3.8	- -	5 10.0%	13 26.0%	19 38.0%	11 22.0%	2 4.0%

Q8. Do you believe the right infrastructure is in place for smart meters to live up to their promise?

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents.	**418**	**284**	**84**	**50**
Yes	**149** **35.6%**	113 39.8%	19 22.6%	17 34.0%
No (please explain)	**258** **61.7%**	163 57.4%	63 75.0%	32 64.0%
No answer	**11** **2.6%**	8 2.8%	2 2.4%	1 2.0%

Q11. What do you believe will be the three most important sources of the world's future energy supply?

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents; multiple answer.	**418**	**284**	**84**	**50**
Nuclear	**348** **83.3%**	245 86.3%	71 84.5%	32 64.0%
Natural gas	**212** **50.7%**	140 49.3%	42 50.0%	30 60.0%
Coal	**209** **50.0%**	143 50.4%	44 52.4%	22 44.0%
Solar	**160** **38.3%**	110 38.7%	32 38.1%	18 36.0%
Wind	**151** **36.1%**	102 35.9%	26 31.0%	23 46.0%
Geothermal	**54** **12.9%**	36 12.7%	9 10.7%	9 18.0%
Biomass	**40** **9.6%**	26 9.2%	8 9.5%	6 12.0%
Oil	**38** **9.1%**	27 9.5%	7 8.3%	4 8.0%
Tidal	**29** **6.9%**	17 6.0%	9 10.7%	3 6.0%
No answer	**2** **0.5%**	- -	1 1.2%	1 2.0%

Analyst note: Respondents were limited to three choices.

Q12. The category that best matches my type of company is:

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents.	**418**	**284**	**84**	**50**
Consulting engineer	**129** **30.9%**	84 29.6%	9 10.7%	36 72.0%
Investor-owned electric utility	**124** **29.7%**	110 38.7%	14 16.7%	- -
Municipal electric utility	**42** **10.0%**	31 10.9%	11 13.1%	- -
Rural electric or other electric cooperative	**33** **7.9%**	24 8.5%	9 10.7%	- -
Manufacturer/equipment supplier	**22** **5.3%**	6 2.1%	15 17.9%	1 2.0%
Other (see Appendix A)	**17** **4.1%**	4 1.4%	9 10.7%	4 8.0%
Other publicly owned electric utility, including state agency or district	**14** **3.3%**	9 3.2%	5 6.0%	- -
State or federal regulatory agency or commission; association or institution	**8** **1.9%**	5 1.8%	2 2.4%	1 2.0%
Independent power producer/independent system operator	**7** **1.7%**	4 1.4%	2 2.4%	1 2.0%
Line/substation construction company or inside electric distribution contractor serving electric utilities	**6** **1.4%**	3 1.1%	3 3.6%	- -
Federal power agency, system or project	**5** **1.2%**	3 1.1%	2 2.4%	- -
Wholesaler or distributor or electric utility equipment	**5** **1.2%**	- -	1 1.2%	4 8.0%
ESCO (Energy Service Company)/energy marketer	**4** **1.0%**	- -	2 2.4%	2 4.0%
No answer	**2** **0.5%**	1 0.4%	- -	1 2.0%

Q13. Which of the following best describes your job function?

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents.	**418**	**284**	**84**	**50**
Engineering: Systems, Planning or Design, IT	**284** **67.9%**	284 100.0%	- -	- -
General or Corporate Management (other than engineering, operations, purchasing, stores & commercial)	**84** **20.1%**	- -	84 100.0%	- -
Energy Consulting, Contracting	**50** **12.0%**	- -	- -	50 100.0%
Operations, including Construction or Maintenance	**-** **-**	- -	- -	- -
Energy Marketing/Energy Sales (Utility)	**-** **-**	- -	- -	- -
Purchasing or Stores	**-** **-**	- -	- -	- -
Commercial	**-** **-**	- -	- -	- -
Other (see Appendix A)	**-** **-**	- -	- -	- -
No answer	**-** **-**	- -	- -	- -

Q14. My primary area(s) of responsibility include:

		Job Function		
		Engineering: Systems, Planning or Design, IT	General or Corporate Management	Energy Consulting, Contracting
Base = all respondents; multiple answer.	**418**	**284**	**84**	**50**
Distribution	**267** **63.9%**	184 64.8%	52 61.9%	31 62.0%
Transmission	**235** **56.2%**	152 53.5%	49 58.3%	34 68.0%
Generation	**103** **24.6%**	49 17.3%	34 40.5%	20 40.0%
Other (see Appendix A)	**59** **14.1%**	28 9.9%	17 20.2%	14 28.0%
No answer	**3** **0.7%**	3 1.1%	- -	- -

Appendix A – Write-in Answers

Q1. What do you consider the top three barriers to the deployment of the smart grid? Other responses:

Engineering: Systems, Planning or Design, IT

"Smart Grid" does the same old stuff as before, can you say mechanical clock on water heater.

"Smart grid" is a buzz word. Nobody has really defined it let alone prove it is reliable technology.

1. From the public perspective, "smart grid" seems to be more of a federal government catch-phrase than a well defined process. 2. Payback on investment.

Actual necessity

Benefit not justified by extremely high costs.

Communication infrastructure

Companies agreeing with each other

Company Resources & Budgets in this economy to implement a smart grid.

Concern for stranded assets. Technology is still evolving

Focus on end-points (i.e. meters) and not on entire distribution grid (Transmission grid is already smart)

Hard to get management support when this concept is so new and there are very few examples that persuade management that smart grid will save money in the long run, reduce energy consumption, etc.

I doubt if the majority of customers will really want to actively monitor real-time electricity prices and change their use accordingly.

I work in Transmission which does not take part in Smart Grid Tech, but from what the rumors are is that cost and existing conditions play the largest role i holding up the program.

In the Midwest, there is no demonstrated need for the capability.

Inadequate distribution infrastructure for both capacity and condition issues.

Ineffective means to accomplish stated goals.

Insufficient analysis tools to evaluate and plan for smart grid deployment.

Justification of replacing currently functioning infrastructure

Lack of clear goals and objectives

Lack of communication backhaul

Lack of consumer incentives (not penalty rates).

Lack of national stds Cost exceeds benefit at present

Lack of proven applications.

Lack of public knowledge to the importance as well as guidance by our politicians to make Smart Grid a priority.

Lack of qualified people to design, build, and operate

Lack of working together between Utilities

Legacy Maintenance

Most customers want to know how much something will cost, and not deal with minute by minute changes. Too many definitions of "Smart Grid". Some just mean substation automation.

No true and specific definition of the term "smart grid" it remains a politicized concept.

Note the transmission capacity above is equally applicable to distribution assets as well

Public resistance, maintainability

Reluctance from utility engineers who still believe that protection is more important than a smart grid

Resource limitations and competition

Risk smart grids bring to the system

Standards

The complexities of dealing with getting multiple agencies to adopt standards -- certainly doable, but adds time to the process

The constant change in technology that will leave investments stranded

The Smart Grid concept is by far the most asinine concept I have heard in my entire life. You must be an absolute moron if you are for smart grid deployment. It is a complete waste of money. If you think the smart grid is a good thing, then you must be an oxygen thief.

There should be no barriers.

Time Frame in which to implement in order to get funding

Unfavorable justification

Unproven return on investment

Unwillingness of utilities to hire adequate technical staff for analysis and operation.

Utility Engineers are not familiar with the technology

Vapor ware, lack of standardization,

While we assume that customers will use less if more informed, we don't know exactly how they will change given smart meters.

Work load priority. All manpower and resources allocated for vital projects. No to the "nice to have" yet.

General or Corporate Management

Applications promoted by smart grid vendors can be achieved with existing technology. It is difficult to pinpoint the incremental benefits. End User smart grid is a solution looking for a problem in that a utility and its customers must buy into the concept that time of use rates for all customers are the end goal. If that is the goal, you need mass deployment of smart grid tech. If that isn't the goal, then you can implement targeted deployment of smart grid tech with much more cost effective results.

Appendix A – Write-in Answers

Q1. What do you consider the top three barriers to the deployment of the smart grid? Other responses: (Continued…)

General or Corporate Management (Continued…)

Complexity of systems being developed. Inability to know if something is working correctly.
Customer perceived benefit
Grid automation and AMI occur where it is cost justified and recoverable, DSM occurs where price signals are meaningful and clearly understood by the customer
Implications to customer costs. Additional capital expenditure infrastructure upgrades would drive the need for increased rates. POV of customers is that the utility is providing them a tool that will be used to charge higher commodity costs for peak demand AND higher rates for the upgrades required to deliver the tool.
Insufficient utility co. interest(!) They are more interested in finding ways to raise rates (!)
Lack of a substantive and well thought out business case
Lack of knowledge, especially at the smaller rural utilities
Lack of legal instrument for sharing data
Lack of understanding of the benefits or nature of the smart grid.
Maintenance - training & costs
People to implement the program effectively.
Poor definition of what is being attempted to be accomplished. The term Smart Grid is a buzz word. It means different things to different people. I think of it as a tool.
Sheer stupidity of the advocacy groups involved in the process
Smart Grid is absurdly expensive and won't happen for decades so quit the silly publicity fanfare of it!
The state of the distribution network acting as a communication network
Too many independents putting up lines and taking land through eminent domain. The public wants renewable energy but the push back from eminent domain issues is starting to be felt. Also, lack of willingness to underground - which would help alleviate the eminent domain issue.
Utilities agreeing to one technology

Energy Consulting, Contracting

Interoperability standards
Lack of an integrated plan for implementation
Landowner resistance

Q2. What do you consider the top three benefits to the deployment of the smart grid? Other responses:

Engineering: Systems, Planning or Design, IT

1. Cost savings for large customers only. 2. Decreased congestion in some areas if demand can be controlled. 3. Deferred expansion of T&D facilities in some areas.
Ability to shave and level out demand peaks
Ability to utilize distributed generation
Accurate prioritization of capital improvements. Which XF, relays, lines to upgrade #1,#2,#3, etc. to get the most system benefit from
Aside from automating the entire grid and hence creating efficiency and stability in the delivery of power to end users, I don't foresee any benefits. In addition, I don't believe this is the most cost effective way to provide said stability.
Automated reads, future uses
Benefit to which stakeholders - customers = neg benefit as seen in CA
Better engineering data.
Better idea of what is happening in the system, but not sure that this will save money or resources, unless the information received leads to better planning.
Empowering customers with information
Extremely high costs do not provide a benefit.
faster restoration after outages
Faster restoration time for customers
no benefits over real infrastructure
No real benefit other than greater data collection. This stuff is not new - Electric Energy Delivery System monitoring has been around for decades. This is not new.
None *(3 mentions)*
None of these benefits are real
Only benefits I see for customer's is to be able to control when they run things and run/use electricity on the cheaper rates.
Other than quick and accurate identification of power outages, I see no reason to waste Taxpayer money for these.
Peak demand control
Profits for snake oil salesmen. More work for bureaucrats.
Reduced peak demand.
Reduction in SAIDI
There are no benefits.
There are not 3 top benefits.
There is no proof of any benefit.
Willingness of regulators to grant rte increases.

General or Corporate Management

Ability to bill those that contribute to the peaks at the time they cause that cost
Additional/better system information
Again, not worth the cost. Quit dreaming!
Customer management of usage

Q2. What do you consider the top three benefits to the deployment of the smart grid? Other responses: (Continued…)

General or Corporate Management (Continued…)

Designing rate schedules to force changes in behavior.

Enables a time of use cost based rate structure.

It remains unclear that smart grid will lower energy consumption. It might move peak usage by modifying end-user profiles, but the parasitic load of the incremental technology (including data storage) requirements may cause overall energy consumption in the nation to go up, not down. Typical demand response applications, with the exception of lighting, shift the usage profile, but do not lower overall usage.

Job Creation/Economic Stimulus

None of the above. The main benefit would be the capability of customers to potentially understand how they utilize power.

Energy Consulting, Contracting

Time of day pricing. Higher prices for utilities

Q3. How important are each of the following technologies to deliver the benefits promised by the nation's smart grid? Other responses:

Engineering: Systems, Planning or Design, IT

Cogeneration and onsite power - without these we have no way to keep the lights on when central plants, T&D have emergency outages, storms, attacks, etc.

Compressed air storage tec.

Equipment must be able to communicate. Whether it be self-healing distribution automation or a "smart meter." For applications of distribution systems, these methods of communications must be very secure.

Must be economically sound.

Plug & play internet connections over conventional powerlines, ...similar to DSL as offered by phone companies...when will it happen?

PMU -synchronphasor measurement realtime data configuration is the heart of the whole concept to protection and control minded personnel.

Rate structure to provide incentive for consumer participation.

Smart Grid technology investment must be able to cut costs, in both O&M and capital investment, in order to create (head) room for dealing with the existing and growing future aging infrastructure needs. To deal with significant increases in capital investment for aging infrastructure, new technology must be able to improve reliability and cut operating costs more efficiently than past/traditional investments. My company is dealing with a significant aging infrastructure issue, associated with a distribution system that was largely built out between the mid-1950s and early 1970s, and is still in service.

Training of personnel for the future maintenance and upkeep and development of the new technology.

General or Corporate Management

Affordable technology-whatever is used, it must be affordable and open. No "Bill Gates of the smart grid" with prop. technology.

Cooperation between utilities. Federal legislation to force it

Data analysis applications

Voltage optimization

Energy Consulting, Contracting

Hardware functionality. Electrical insulation reliability for hardware as voltage ratings of equipment increase

8. Do you believe the right infrastructure is in place for smart meters to live up to their promise? If no, please explain:

Engineering: Systems, Planning or Design, IT

2-way communications with consumers is lacking

Additional control devices to utilize the smart meters are not in place at almost all sites.

Communications are slow and unreliable

Communication infrastructure is lacking.

Communications

Communications and distribution automation are insufficient. Engineering software tools are inadequate or expensive.

Communications infrastructure is far to sparse to deliver real value via smart meters

Communications network not ready

Consumers will not use the information to change their usage.

Control of Smart Grid components is going to be dependent on communications equipment and media. Existing systems will be overwhelmed with additional burden of Smart Grid needs. Manpower and resources not in place to maintain communication and control equipment needed on the distribution system.

8. Do you believe the right infrastructure is in place for smart meters to live up to their promise? If no, please explain: (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

Current newsworthy articles suggest way more benefit than I think possible at least in today's environment. Costs of implementing smart grid will cause rates to increase enough to justify smart grid. There are a lot of technologies which can reduce peak demand without expensive costs of smart meters and the communications needed to fully use them and without causing consumers to change their lifestyle.

Customer would not want to pay for a device that may decrease their bills. Need a true savings.

Customers not equipped to use it. and most won't spend any money to do it.

Cyber security, communications protocol, and method of communications are still evolving.

Data storage and processing equipment to use all of the data that will be captured by smart meters

Don't know yet.

Energy storage facilities do not exist to provide the needs that have been specified.

First thing consumer awareness is very important. Than equipment and machines in the household have to be capable of new technology.

For the most part, the infrastructure is not the problem. Depending on what type of smart metering network you select the data collection is the easy part. Once you put the meters in and they start collecting 15 minute interval data, how do you backhaul the data back to your MDMS? There are more than several ways to send the data and usually at least one is available. The real problems start after data collection takes place. What if you don't have a MDMS? Who stores the data? How do you extract the useful data and delete the info you don't need? How do you integrate all this information coming from the meters into your billing system? For some this may not be as big an issue, however where I work the billing system is old and mainly manual.

High voltage grid needs to be modified to be able to accommodate smart grid in a bigger picture.

Home area networks, smart appliances, comm between, std platforms, etc. lacking

I believe that the transmission infrastructure is severely lacking therefore significant strides in self healing and demand response cannot happen

I believe the infrastructure is seriously aged and it would be short sighted to believe that smart grid technology alone will solve the efficiency and renewable energy problem. To some level, the overall infrastructure has to be upgraded as well.

I do not believe customers will embrace and use the full functionality over the long term

I don't believe common communications standards, nor the technology itself is ready for widescale deployment. My company did a pilot of two different communications technologies over the past two years. The first, using a mesh (meter-to-meter) communications worked less successfully than advertised: Local topography and interference from vegetation caused communications problems. A second trial using central tower located transmitter/ receiver worked better than mesh, but is very expensive, up front, for adequate coverage. In the second case, customer TOU rates/incentives were also piloted in order to change customer behavior. Results indicate that customers generally were not inclined to change behavior and shift/reduce usage.

I think it depends upon the region you live in. Some areas are more ready than others to benefit from smart meters.

In city areas I believe that it is in place to work. The rural areas it will depend on how the smart meters communicate to the utilities.

In our area, the infrastructure wont be in place for years.

Inflexibility and islanding needs addressing.

Insufficient data networks in place to receive, store, model and act on the amounts of information available.

Insufficient delivery infrastr.

Integration of renewable energy sources is way behind schedule....needs to be speeded up.!

It depends on the types of equipment in a home.

It is available but not in place.

It will take expansion of the communications grid and further investment at the home end of things to really allow smart meters to shine.

It would depend whether the capacity exists where the demand is.

Lack of analytical tools to leverage more thorough integration of technology & capabilities, 1) ease of analysis for leveraging time of use rates, 2) data compliers for ease of generation end use load profiles or desired days, seasons and for entry into other systems like DMS for analytical purposes, this load profiling for end use customers could also be utilized for DSM purposes.

Lack of distributed generation.

Lack of standards & proven technology

8. Do you believe the right infrastructure is in place for smart meters to live up to their promise? If no, please explain: (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

Lines need upgrading and communications eqpt should be installed
Many systems do not full advantage of all the data and capabilities of smart meters.
May be YES for some of the Investor Owned Utilities. No for the smaller municipals.
Maybe right, but insufficient
More important than the infrastructure is the ability to use the information.
More infrastructure is needed.
Most electric utilities don't have the means for an adequate communications structure.
Most movers and shakers don't see any benefit in it for them, and, if they can't be at the center of a movement, forget it.
Most of the infrastructure on the system today is aging and will not be able to keep up with demand.
Most residential customers have no real incentive or capability to adjust their power demand
Most utilities do not have the right tools in place to fully utilize smart meter capabilities yet.
Most utilities don't have the communications infrastructure in place at the distribution level.
Most utilities have not installed smart metering and there is no cost justification in some cases for doing so until the old meters reach their end of life.
Much better/updated utility grid system required along with new and better power development means.
National power grid needs to be supported before smart meters can fully be efficient.
Need better connectivity and capacity to the renewables.
Need in-home options to include smart appliances
Need more infrastructure for reliable data collection and data integrity and network security.
Need real-time feed of energy used cost information to consumers
Need the right people in the right places to accomplish the promised benefits (theft investigation, voltage conservation, ...)
Need to deploy infrastructure inside the home (past the meter)
Need to open communications standards
Needs to develop since the technology is new. Obvious.
Nobody has fully figured out how to get the maximum benefit from this infrastructure.
Not enough info given back to consumers/end users.
Not enough is done at the homeowner and small business level to gain benefits from a smart meter. The technology stops at the meter instead of being integrated with the end user.
Not quite yet but getting there
Not sure
Not yet deployed
Only a small percentage of all meters have been converted to AMI smart meters. In order to make AMI successful there needs to be a robust 2-way communication system that is expandable as the Smart Grid system changes. Also, Meter Data Management Systems (MDMS) need to be in place to manage the amount of AMI meter data that will be collected and stored. The MDMS system MUST be able to integrate with such systems as Outage Management (OMS), Customer Billing (CIS), and Engineering Analysis (EA) to be fully successful.
Only for peak reduction, but could improve with spot pricing
Our company lacks an accurate record of the plant.
People are not going to sit at home waiting for their meter to tell them to turn appliances on and off. Smart appliances are needed, not smart meters.
Private and Public Utilities have been lax in infrastructure development and transmission uprates/ improvements.
Probably only on a very limited basis. I don't believe we can yet fully anticipate what shortcomings we still have with our infrastructure.
Public awareness is lacking
Short term savings vs. long-term reliability
Smart meter is sold as Smart Grid whereas reality is that there are many more components between a meter and substation. The Smart Grid investment should flow for centralized enterprise system and DA instead it is heavily focused on high latency, low bandwidth AMI technology
Smart metering is more than just having two way communications to the meter. The ability to control devices through the meter and have real time information available the smart metering is just a fancy meter reading system.
Smart meters are only one small piece of a large puzzle.

8. Do you believe the right infrastructure is in place for smart meters to live up to their promise? If no, please explain: (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

Smart meters will provide feedback on energy / power use but the state of the typical distribution system is inadequate to allow much control of the system and response to customers' needs or desires for power use changes. This infrastructure is from a design that does not incorporate the type technology needed to support the smart grid and use of smart meters and improvement would be very costly and difficult to achieve.

Smart meters would be the first step. Once information is obtained for some period of time from the smart meters then a road map to develop the infrastructure can be developed.

Some local integration exists but customers are nowhere near where they should be in knowledge or motivation.

Some regions do have the right infrastructure, but some other really need improvement.

Synchro phasers are needed, policy & financial incentives more so.

Technology is not in place.

The communication infrastructure; wireless, powerline carrier, or fiber to the home (residential Customers) needs to be developed for communicating with smart meters.

The communications infrastructure is not robust enough

The concept is in its infancy. Much needs to be implemented. Much is yet to be discovered.

The consumer will not be in a position to have their energy information directly from the smart meters

The current infrastructure is insufficient on its face.

The human element is the critical piece of the pie that is not ready. The power industry is mired in tradition and typically afraid of losing control on energy delivery and flexibility the smart technology will bring. CIP standards have also made IT depts in the power industry gun-shy of using existing infrastructure to process smart meter data.

The infrastructure isn't there yet

The meters are there but the communication systems have yet to be proven

The smart meters being installed are based on the traditional needs of meters. the future will require more information and functionality at the meter. We may be spending significant dollars on technology that won't fit the future needs

The technology is still not mature and the communications and security components are not in place.

The theme from town hall meetings is "set it and forget it" so need smart appliances too.

The transmission grid needs to be updated.

There are still gapes in the infrastructure.

There are still too many issues with reliable communications.

There are too many technologies in use. Need to see standards evolve to minimize stranded assets.

There is no infrastructure in place for smart meter to reduce demand

There is not a nationwide secure system to carry the wireless traffic.

This is a broad question. Smart meters can be utilized in many ways. For simplicity usage, the home owner can benefit by having a smart meter sound an alarm if monthly used is approaching a limit set by the home owner. The owner can then adjust their usage for that month.

To make use of smart meters you need smart appliances and smart controls

Too much, too fast leads to quick and inappropriate decisions about infrastructure. Almost seems backwards - put in the meters then implement communication and security protocols.

Transmission systems are old and underbuilt.

Unless there is an overall benefit to the consumer, they will not utilize them. Especially if it forces to use appliances at odd hours when they would normally be sleeping.

Unreliable transformer bypass technology and inadequate communications.

Upgrades and additions to cross-country high voltage lines are required. Improved access/pricing/ownership models are required.

Utility rate structure and change management for how the customers can benefit is weak

We are getting close, but not quite there yet.

We presently do not have the hardware on the distribution system to utilize smart meters.

What exactly IS their promise? versus what realistically can they accomplish towards reduced energy.

What promise? Do you really think most people are going to watch a meter and change their electric usage for a few cents an hour in savings?

Will need home automation

Wiring in Buildings are important.

With the exception of a few cities, most deployments of smart meters have literally no sustaining infrastructure to support DR and DG

8. Do you believe the right infrastructure is in place for smart meters to live up to their promise? If no, please explain: (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

Without a single stable national standard in place, SM will require massive upgrade/replacement before they reach a breakeven cost point.
Without Home Area Networks deployed, consumers have the possibility of facing increased utility bills if time of use pricing is used.
Yes in some areas primarily urban areas, No in others areas primarily rural

General or Corporate Management

All parts of USA not on board
Cities - yes, rural communities - no
Communication infrastructure and home appliance interfaces need expanded
Communication is not adequate to support smart meters
Communication, data management not appropriately ready
Communications between smart meters, distributors and back to generators is not complete.
Communications systems are required first to enable the use of smart meters
Communications technology is still immature and the grid is too antiquated.
Customers still have no clue. If customers don't care, the smart meter cannot work to potential.
Demand response and data mining capabilities need to be improved.
Each utility will need to install much more equipment to meet the needs of smart technology
For Smart meters support DSM we need new tariff understanding, meaningful price signals, price signal integration with user load.
Implementation is partial within the community.
Inadequate communication infrastructure
Inadequate funding for capital expenditures.
Infrastructure is available but not in place, generally
Insufficient communications in place and insufficient in-home technologies.
It all starts with communication infrastructure. Everyone needs that to have a smart grid, then they need endpoints, not the other way around. It's much more important to have information at switches, switchgear, fuses, etc. than at the customer premise. Do the grid first and the premise second. With only a 1% adoption rate of actually doing anything at all with the meter info, it's insane we are spending this money on residential meters. Commercial meters, yes, residential, NO!
It just isn't
Just like health care, even though needed, politicians are pressing ahead as if they know what they are doing. The cart is running ahead of the horse.
Just not there
Limited communications on both sides of the meter
More definition of how to get the value from the data that smart meters can provide is necessary.
Much more integration needed, HES, Demand response, etc.
Need all vendors working on common standards, communication networks in place, rate structures, education programs for customers, behavior changes from customers, competitive generation markets with price signals
Need to have meters installed which give consumer choice and ability to act on data
No proven, widely accepted, open, communications protocol. Too many companies want to get rich off THEIR protocol. Government needs to decide and force the issue.
No. Insufficient transmission and generation to meet future demand. Rotating brownouts will be more newsworthy soon than a 'smart grid'.
Public awareness and home automation need to advance considerably first
RFI from failing equipment and overall grid distribution reliability will interfere with interactive elements of the smart grid expectations
Security solutions are key, in all areas of business and technology, and process.
Slow economy and lack of proper incentives for utilities to make the investment needed to support
Smart grid is all about developing the communications, demand response, regulatory, and tariff 'infrastructure' for Smart Grid.
Smart meters must be able to communicate between users and energy providers and infrastructure is not in place to do that.
Smart meters provide a lot of data that utilities cannot process.
Software systems to handle data and technology to provide information to customers is not mature.
Standardization of communications protocols and compatibility with enterprise software applications is missing.

8. Do you believe the right infrastructure is in place for smart meters to live up to their promise? If no, please explain: (Continued…)

General or Corporate Management (Continued…)

Technology not proven, customer acceptance unclear

The disconnect between the layers of the Smart Grid model are significant enough that any possible gains from smart meters cannot be fully utilized, limiting any actual success by the meters.

The grid is not a two way system yet. Information not truly in customers hands.

The in-house automation has to follow to fully utilize the smart meters capabilities.

The smart meter is only one part of a smarter grid, and at the moment not one of the more urgent components as say will be needed for T&D control, especially for renewable and power markets. The smart meter deployment is more similar to the PC deployment. It was deployed long before it could be economically justified, but once it became common and new applications and networks were developed, it (PC or smart meter" became an integral part of the corporate system.

There are always unexpected problems with the infrastructure when launching new technologies.

There are ways to use passive methods first before getting into costly active smart grid technology, especially for the elimination of transmission bottlenecks

Too much federal funding emphasis is put on end-user applications. There is a lack of understanding of the current technologies. Smart Grid solutions such as meter replacement cover up underlying and longstanding problems like a lack of a meter testing or replacement program. Meters that are replaced with smart meters should have been replaced a long time ago. Accuracy goes up, but the meter could have been replaced with a "standard" meter and (*surprise*) accuracy would have gone up.

Using the data not developed sufficiently

We as a country are not focusing on the future

We cannot have a true smart grid without a new backbone high-voltage transmission system.

We have smart meters & they only have the basic features enabled at this time.

Energy Consulting, Contracting

A lack of adequate standards for interoperability of equipment.

Although the technology is available, there does not seem to be a master plan for the financing and implementation.

Apparently not, considering the PGE situation

As I noted before, smart meters won't get the appropriate retail response until retail loads can see volatile wholesale pricing.

Customers have reported seeing an increase in energy costs after smart meters were installed in their residences.

Cybersecurity is not up to speed to work well yet.

Different utilities have different strategies. A few are ahead of the "pack". We need more interchange of experience and guidelines for the rest of the utilities to avoid mistakes of the pioneers and take the right approach.

Education of the public on usage will accomplish more than smart meters. If somebody's supper is delayed by a Smart meter they won't be happy

Infrastructure? Maybe. I had a smart meter over twenty years ago and had it removed because the benefits were not worth the sacrifice.

Lack of affordable two-way communication

Lacking "real" energy storage systems for solar & wind.

Need more infrastructure in all areas.

Nobody has a fine explanation of what it is. Big players trying to get money.

Not yet

Note sure how integrated smart grid is with transmission system operations.

Okay in some places but lacking in a lot of areas due to the lack of infrastructure

Residential appliance applications too limited.

Small new generation intertie provisions lack of overall centralized control

Smart Grid is more than just smart meters. What about other components? Has anyone defined what they are? How does current plan cover/consider those?

Technology infrastructure is not in place throughout the country, only in very limited areas

There is not enough knowledge to know best use of the information.

There is to many vendor strategies and it confuses the process

Too complicated to use with existing facilities need new idea to make it useful

Two way communication on the grid is in its infancy and must improve to really take advantage of smart meters. Using cellular backhaul networks for transmitting smart meter data will prove inadequate in the near future.

Use in average home has not been defined

We need to have a way of measuring and identifying each load in our buildings.

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful?

Engineering: Systems, Planning or Design, IT

5%. many things, scada sensing and auto control along with upgraded system capacity to dispatch to weak points

A company's current practices should be evaluated. In the past OH distribution circuits were designed as a radial system. Adapting current practices to a smart grid environment may increase costs for some improvements.

A little too hyped up. Most technology is already in place.

A lot of good ideas but no real action. We need to see what works and what doesn't.

Actual results.

Aggressive pursuit of money but not sure the capital are going to bring about the desired results.

Almost nonexistent.

Automation is the key to smart grid technology being successful. Complex programming with exponentially complex algorithms will be required to process the significant amount of information required to create a "smart" grid.

Behind the times

Benefits of smart grid still nebuleus. Benefits need to be clearly identified.

Better generation and transmission is need to cover all the load requirements and contingencies.

Can't answer. Too many hypes involved, too many definitions. Need something better than a buzzword

Common standards for communications, including Home Area Network (HAN) protocols, are needed. Also, the (political) will to shift rates to a TOU incentive, to expose customers to real-time pricing, are necessary.

Communication and the identification of devices to be deployed

Communication over powerlines for home internet connections. Price needs to come down on DA equipment.

Communication technology

Communications and cybersecurity.

Construct more power generation system using renewable energy like wind, solar.

Consumers need to be educated to boost the public support.

Controversial. In order for smart grid to be successful, a standard method for the customer to automatically interact with the grid must be developed that does not inhibit their pleasure or ease of use.

Cost of electricity needs to increase to create more incentives to save and change user habits

Costs

Current state is just getting started. To be successful the government needs to stay out of it.

Currently in its infancy. Need time to pilot and prove out the concepts.

Currently it is mainly wishful thinking. Costs need to come down by an order of magnitude.

Customer knowledge needs to be increased.

Data software needs to catch up with the meter & telecom hardware

Definitely agreements between utilities and political organizations.

Delivery infrastructure.

Developmental stage. Improve the cost benefit ratio and consumer incentives.

Early stage, we are just getting started our communication with field devices

Educating utility engineers about how smart grid technology can be applied, and educating utility policy makers about how smart grid can benefit their business.

Equipment costs need to come down or rates need to increase. Rate increases would not be desirable.

Evolving/Cybersecurity

Evolving. The costs are much higher than the benefits at this time.

Farewell introduce with utilities and broadcast to endusers

Full-scale implementation is not imminent, since the peacocks don't see other peacocks benefitting.

Funding and research for better impact

Get a real energy plan and strategy together that would get set a long term bar for investment.

Get the government out of it.

Government incentive programs must improve so that utilities can purchase these products, otherwise utilities must pass down the cost to the customer and they may not be on board to pay the extra money for a device they may not use.

Hit and miss. Some areas are up to speed, while others are still in the dark ages of distribution.

I am ok with the state of the grid

I am thinking more about transmission than distribution. The transmission grid needs more software automation to supply the really big picture to the operators in a timely manner.

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

I believe that the smart grid is still in its early stages and until the technology and funding are in place it is not going to be developed in a timely fashion.

I consider the grid to be pretty damn "smart" already. I personally hate how congress and the general public think use hot button phrases like "smart grid" when they really have no idea how any of it works in the first place.

I don't believe it will ever be a success, it will be forced down the consumers throat whether they like it or not.

I think communication across power companies needs to be improved. Regionally, the companies are similar, but across the country they vary.

I think it is quite a ways from reality

I think the current state of the smart grid is fine. Left alone, market and technological conditions will advance the smart grid at an appropriate pace. Necessity is the Mother of invention.

I would say the smart grid is in its infancy.

In 4th Grade - funding, distribution equipment improvements

In good progress

In its infancy *(3 mentions)*

In its infancy, more cost-benefit analyses are necessary to "right size" the infrastructure and keep costs reasonable

In its infancy. Communication technologies need to improve and customers need to see and understand its benefits.

In its infancy. Significant policy and financial incentives are needed, especially those to consumers and RE generators.

In process

Increase pace of deployment. Show results as you go.

Increased focus on implementation and security. More products may need to be developed, but the technology exists for a successful smart grid.

Infancy *(4 mentions)*

Infancy. Improve everything.

Infancy. Time & Planning--Power is the most infrastructure intense business and it takes time and careful planning to change it significantly.

infant stage

Infant stage. Lots of tests on an actual smart grid system would be beneficial and verifies the liability of the system.

Infrastructure is in place, it is all about dollars

Initial stages. Need to improve communications technologies

Instead of having these projects as PR stunts, the utilities need more internal (not consultant or contractors) to work on these project. Internal people must understand their systems.

Integration of renewable energy sources is way behind schedule....needs to be speeded up.!

It drops off the radar screen until another energy crisis occurs due to a middle east oil embargo. It needs to be a national program or objective of our country to reduce our dependence on foreign oil.

It has great potential. More advanced technology needs to be made to reduce costs and make it more efficient

It is a nice buzzword but regulators won't approve funds for installations. Regulators need to get onboard to allow for increased investments to properly do smart grid.

It is like a puzzle missing pieces.

It is slowly developing a communications backbone and a few pilot projects are being tested with metering. More smart appliances and devices connected to the grid and a significant means to store unused energy are vital to smart grid success.

It is still in its infancy. There really has been no push or rush for utilities to invest heavily. The main reason for the existing smart meter deployments was mostly for reasons due to meter reading issues/problems.

Its barely starting. Public education is the #1 thing to allow successful implementation of full smart grid technology.

It's coming along well.

It's hard to describe the current state of the smart grid. There is not enough information available yet to give a good assessment. There needs to be more demonstration projects all over the country so that more people can become aware of the smart grid and what benefits it can achieve. Even though you hear the term smart grid all over the news most people that I know don't truly understand what it is.

It's in good shape. We just need some real world deployments to show that it works.

It's in its infancy. The success of the initial deployments are critical to the pace of future investments, particularly by those who are not be supplemented by the government. Additionally, need to improve regulatory approval of smart grid technologies and must be able to educate customers in order to achieve the stated benefits.

It's not that smart. Communications

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

It's still very foggily defined. A better description of what each technology can bring versus simply describing anything and everything as smart grid would help everyone move forward on the ideas that are actually economically smart.
Just emerging as an impact to the market.
Just started, a long way to go.
Lack of education to the end user
Long way to go
Longer track record of success
Lower cost; payback on investment; better defined roadmap of implementation
Many people inside and outside the power industry don't have realistic expectations about what applications are cost-effective.
Massive increase in funding promoted by a swing in public opinion
More a concept than a reality. Investment is quite high and the payoff is unproven
More commitment to creating this "smart grid", both privately and publicly.
More demonstration/pilot projects are needed to study the overall benefits and potential risks associated with smart grid technologies (ex: cyber security, common mode software glitches, etc.)
More emphasis, more funding, more focus via more pilot projects.
More federal investment in basic research
More financial help
More investment in grid shock absorber infrastructure
More successful stories of installations and positive cash-flows that don't take forever achieve after installation. Get the customers involved; let them know that there are many good reasons for them to participate. One of the main ones being "they can save money".
Much of the relay and monitoring structure is in place or readily available. Lack automatic systems to link and act on the data produced.
Needs improvement: support and resources need to be allowed to ensure success.
Needs more investment incentives, cyber security development.
New technology in process to be proved
No one can define what it is - including its promoters! Those who view it as a method to perform regulation to follow the ever-changing MW output of wind & other renewables are barking up the wrong and a very dangerous tree.
No overall coordination within and between utilities to make this happen to the degree that it effects supply and demand goals.
Non existent
None existent in our area
Not available.
Not enough is being moved forward, too many trial programs...it works, just start doing it now.
Not in yet, need re thinking on the compressed air storage and distribution
Not there yet. More funding probably.
Not very good. It will require a lot more investment from all energy providers to make a difference.
Only touched the surface of the start! Regulatory agencies need to provide support with requirements on new or upgraded substations with some financial incentives for these improvements.
Overall I believe that more in government need to be interested in this program. Too many good ideas are shot down and not allowed to progress on through to advancement.
Overall SG efforts have been minimal to date, w/exception of DOE Stimulus Grants which have provided some SG funding enablement. Otherwise limited funding by many to this time and mainly in limited functionality pilot efforts w/o larger scale systems integration strategies to broaden implementation. Improvement areas needed: 1. Regulatory SG funding incentives 2. Regulatory focus on requiring utility strategies for critical aging infrastructure. 3. Lack of utility Bus Cases for supporting SG functionality. This bus drivers will vary between utilities. Also lack of utility internal coordination of ALL affected depts to work together driving out ALL benefit areas/aspects impacting bus process/resp overlap within the org.
Over-hyped, industry needs to kick government out of the process & focus on realistic benefits & costs
Parent company gets most profit from generation and does not see distribution as an asset.
Prices need to come down on many products. Consumers need to become interactive.
Proper integration of Wind and Solar power onto the bulk electric system. Var support, energy storage, gen-to-load when either wind or solar falls off due to low wind conditions or clouds.
Public and consumer education is a critical area to implement the smart grid technology
Public awareness and funding
Public education
Public knowledge and how to apply the technology to everyday lives

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

Regulatory insights

Renewable energy technology and energy storage

Security and communications infrastructure are not being thought of enough

See above

Seems to be moving ahead despite marginal benefits.

Settle on standards through IEEE and get large corporation investments in the technology

Slowly moving toward the smart grid. Additional funding/emphasis on the need is required.

Smart grid deployment will increase utilization of assets and push them closer to the limits, reducing reliability. New cybersecurity threats may also reduce reliability.

Smart grid functionality has been around for years but it was not called smart grid. Transmission, subtransmission and distribution facilities have been using automated restoring systems for years along with SCADA and EMS controlled devices.

Smart Grid is 100% hype. Utilities are just using the name to get Federal funds.

Smart grid is a concept that sounds good but is not realistic in providing any improvement in cost control or reliability. It is too structured by the utilities that it is to benefit and is of high cost to be workable on the short term. Decisions on what to control and in what way will be difficult due to different management decisions and decision making in response to customer needs and power use. Success will lie within/work in accordance with the ability of the industry to educate customers, to install the appropriate customer load regulating equipment (this will take a lot of customer concurrence on load management)and a change in how the utility management views reducing load which has the impact of reducing income.

Smart grid is currently political bullshit. It would take billions or trillions of dollars to actually make it work.

Smart Grid is deployed in small scale programs at this time. It must be deployed in a larger scale.

Smart grid is in infancy stage as far as I know. It will take several years and a standard. appliances will have to be built with smart grid capabilities such as remote monitoring and control, etc.

Smart grid is in its infancy

Smart grid is in its infancy. All system components need improvement, from cross-country transmission through home metering through incentives for homeowner/business buy-in.

Smart Grid is in its infancy. Forms of smart metering, on the other hand, are more widely established. The biggest hurdle to smart grid implementation is monetary. If a state legislature, utility commission, or the federal government wants to hasten the transformation to a smart system, then the procedures and pathways for recouping investment must be defined, published, and guaranteed.

Smart grid is still a cloud. Not well defined as a standard. Need a common language and goal for regional and national deployment.

Smart grid is still in its infancy. Transmission lines must be improved. Alternative communications methods must be implemented. Public must be sold on the benefits of smart grid. HEM must improve to the point where it is truly intelligent. Monitoring and visualization capabilities must be enhanced with tools that allow effective load control.

Smart grid movement has used communications as a shotgun approach without figuring out ahead of time how to get all the benefits from it. We should figure out how we will benefit before making all this investment.

Smart meter is sold as Smart Grid whereas reality is that there are many more components between a meter and substation. The Smart Grid investment should flow for centralized enterprise system and DA instead it is heavily focused on high latency, low bandwidth AMI technology

Smart meters need to become better and grids need to become more and more interconnected.

Spotty. Wider system integration to allow shipping energy from areas with excess generating capacity to areas of utilization need, dependent on time of day as well as seasonal demands.

Stalled

Standards are necessary

Standards.

State regulators who must oversee costs and federal policy makers must rationalize the vast differences in their expectations

Still in Developmental stage

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

Still in the early stages as many utilities do not seem to have a clear roadmap defined to get to a "smart grid". Some of this is due to the lack of clear guidance as there is too much competition between the Standards Development Organizations such as IEC and IEEE to be the "thought leaders" of the smart grid.

Still too conceptual for homeowners and small business. Need more demonstration and pilot projects to prove benefits.

Still very early in real implementations. Need standards and real large scale deployments to validate capabilities

Taking baby step, still evolving. One thing is cost and technology is not mature.

Taking Tax Payer money to fund utilities

technically possible but highly flawed

Testing phase.

The "grid" is already smart. There is not a need to spend vast amount of money to implement something that really is not needed.

The "Smart Grid" is seen as a panacea by many and an opportunity for profit by others. What is need is a realistic appraisal of its real benefits long term.

The communication infrastructure.

The concept of Smart Grid needs more focus, and particularly on the demand side.

The current state of the smart grid is at it's beginning point. Improvements in the utility enterprise integration needs to be improved so that the AMI data can be utilized in the various utility business processes (SCADA, OMS, CIS, DMS, etc.). Improvements in Distribution Automation (DA) needs to made in order to handle smart network configurations and operations as well as account for Distributed Generation (DG).

The current state of the smart grid is in its infancy. I answered Yes to number 8, "Do you believe the right infrastructure is in place for smart meters to live up to their promise?" I am working with Central Maine Power and its project to roll out smart meters to 600000 customers. The project team put together needs to continue as it has. Specifically I am a GIS programmer (c#, .net, ESRI, etc) working on the outage part of the project.

The economics of the smart grid must be affordable for utilities to install the equipment.

The existing utility grid system was set up years ago and has been shown to be shaky particularly in the east U.S. The smart grid will not be a cure all. Only a stop gap fix.

The infrastructure that is currently in place needs to be updated for the smart grid to work.

The smart grid is in its infancy. Perhaps it's different for large IOUs, but smaller systems cannot cost justify a self-healing grid.

The smart grid must self healing systems that are reliable. The security of the communication systems in of utmost importance.

There has to be a system to be made smart. Current infrastructure probably insufficient.

There need to be established federal priorities. I get so sick of hearing that "smart grid means different things to different people". It really clouds the discussion. We need to have clear definition about what smart grid is and what we want it to do and establish fundamental priorities so that it can eventually be rolled out across the country (perhaps optimistic). As an example I don't think the dedicated communications infrastructure is in place for most utilities to deploy smart grid, but it doesn't seem like much is being said about upgrading communications infrastructure it's all about getting the smart meters into homes....

Too few investor-owned utilities involved to reach the critical mass necessary for smart grid success.

Too general. Unique utility demographics have unique requirements.

Too much emphasis is being placed on smart grid instead of investment in infrastructure.

Too much emphasis on smart meter, demand response (dist) Not enough emphasis on rest systems, power control (trans)

Too much internal talk amongst industry. Need to more actively involve and educate consumers.

Under incentivised

upgrade aging transmission lines and switchyards

Utilities are trying to do too much too soon. Need more pilot projects to determine which technologies are best.

Utilities need a reality check. Different controls are being run out to do the same thing that did not work in the 60's. Can you truly see the Emperor's New Clothes?

Utilities need better communications to link devices.

Very early in its growth. It's difficult to answer exactly because everyone seems to have a different idea of what constitutes the "smart grid".

Very early stages

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

Engineering: Systems, Planning or Design, IT (Continued…)

Very inexperienced and in need of promoting a better understanding of its benefits.

Virtually non-existent. Needs to become more economically viable without inconsistent, artificial subsidy support.

We have a long way to go to get started

We need to have more transmission of power interconnected grid.

We need to look at alternative pricing for utilities, and how all this will affect energy economics. It's appropriate for utilities to only act on projects that have tangible benefits.

What is the smart grid - it has a dynamic definition depending on the bias of the speaker

What smart grid?

While remote/smart metering has been a proven and welcome technology for some time, regulatory concerns and barriers at the state level will inhibit deployment of smart grid networks for at least the next five to eight years. Public service commissions in most states need to presented with viable industry models from which solid regulatory action may be implemented on behalf of smart gridding at both intra and interstate boundaries.

Why are we pushing the smart grid? It should push itself -- that is, when its benefits exceed its cost, it will move forward.

Will not work in older cities without first redoing the entire grid due to old tech and incompatibility.

General or Corporate Management

At a birth stage for the most part

Being planned

Birthing. more deployment of voltage controls etc.

Clear understanding of goals/objectives/ priorities. Every supplier wants to get into the act. Diverse interests reduce focus on priorities. Priorities: 1) secure system automation and capacity to assure availability and reliability, 2) meter communications to support improved situational awareness, customer services, and DSM , 3) DSM products and services including load curtailment automation to reduce the rate of demand growth and peak shave.

Common definition of what a smart grid really is.

Common sense at the top ... we need to do it for the benefit of the country and not for the benefit of a bunch of politicians. We need to slow down .. involve the public .. and bring it together when technology full supports the solution.

Communication protocols.

Conceptual. Need items described above worked out

Confused *(2 mentions)*

Confused; needs regulatory reform & demand response implementation to be successful.

Confusion. Much better definition of goals - national, local, each utility - to be accomplished. Possibility exists to waste a great deal of money with very little to show for it.

Current definition of smart grid is not clear. A clear definition.

Current Grid: The current grid is pretty smart. It could be smarter. Current State of Smart Grid Policy: Aggressively leaning, covering up underlying questionable historic business practices, lacking in understanding of fundamental issues related to starting and stopping services for combined water and electric utilities, not well thought out. "Not well thought out" meaning, as an example, the approach where the benefits of Demand Response are not coupled with the cost of implementing demand response - including the human, energy, and other resources necessary for the implementation. Pilot DR programs fail to recognize that a DR participant will take their family out to dinner at a location that is not a DR participant if a trigger event occurs. There are too many "false positive" analysis being done which discuss the benefits but are base on incomplete assumptions. What Needs To Be Improved: There have been improvements in self-healing communication networks and vendo rs providing a better service package for transition to an AMI metering system. There have been improvements. In order for the smart grid to be successful, the hype needs to be dialed down because it is reducing its credibility and concerned end-users are getting more agitated.

Current State - Infancy Needs To Improve - Data management systems that will handle the amount of data generated from smart meters.

Current state of Smart Grid?: little interest by consumers What needs to improve?: major region wide blackouts

Define what it is and is not.

Defining what "smart grid" is and is not would improve the response to its deployment. Few know what smart grid means.

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

General or Corporate Management (Continued…)

DOA - All talk no funding due to return on investment issues
Dumb
Education of the public on what it is and how it works
Energy storage
Floundering
Improvements are needed in public accpetance, regulatory alignment, and cost recovery for utilities
Infancy massive effort to communicate to public, deploy technologies, and continue improving technologies
Infancy. It needs to be able to pay for itself with being subsidized.
Infancy. More attention needed on the pre-assessment of the electric plant and the integration of digital networks operating in the area of analog power systems.
Infrastructure - especially rural
Interconnectivity of the information obtained by the distributors back to the generators on a real time basis.
It doesn't exist, nor will it for decades!
It doesn't exist. Need application of available technology
It is very difficult to have smart greed in rural areas , due to other problems such as trees and accessibility
Just starting. Need more equipment put in place to begin understanding the potential gains and risks.
More information security.
More money
More public education.
Mostly a great deal of uncertainty. Successful large pilot demonstrations - 500,000 or more
Nascent - needs greater industry leadership
Nascent; needs a better business case.
Needs a great leap forward but no financial incentives at this point.
Not fully set up with all parties
Presently the smart grid is a collection of promising technologies. System level design concepts to integrate these technologies and assess their potential benefits and reliability are needed before widespread deployment.
Public education on its use and benefits. and funding for the high cost of infrastructure
Rising from the back burner
Self-healing communications infrastructure
Some 20% of our substations still don't have SCADA and we're talking about George Jetson style homes. Fix the grid first.
Standardization in communication protocol is needed quickly.
Still in pilot stages. Regulators paying lip service.
Still needing additional research
The consumer needs to see immediate results.
The current grid is somewhat smart for it to get smarter more education for customers is crucial since they will be considerably more involved.
The grid is well managed by well informed and capable operators. However, to be self sustaining, regulators need to better understand the technologies and enable funding recovery. The prevailing issue is who pays.
The smart grid is in its infancy. All of the building blocks mentioned in your questions above need to be put into place in order for the smart grid to function as it should.
The so-called smart grid is being oversold. Sort of like "Green". Major problem is the evolution to the present "national" grid which consists of stringing together a host of regional grids. That's not how the system was designed. Will require significant reconstruction to get the proper foundation in place. Also need to be able to efficiently operate a "dumb" grid before trying to make it "smart" because the nation cannot afford not to have a "dumb" backup for a variety of reasons. Everyone seems to be jumping on the smart bandwagon with no assurance they are making the right investments. Needs to be well-planned and structured for the long term. Otherwise, they may be doing things that will require backtracking in the future. Smart is similar to Green. Everyone seems to embrace both without really understanding either.
The transmission has seen the earliest and most deployment of smart grid technologies, in part because that is where the early economic value is and also it is being driven by pressures to meet renewable portfolio standards and power market demands. However, to approach full value of a smarter grid, intelligent sensing and control must be distributed throughout the value chain, including the customers.
There are many elements to a "smart grid" that still need to be defined. What is the overall purpose? Reliability? Outage management? Efficiency? Streamlining organizations? The answers to those will help define how to deploy the "smart grid." Most critics would agree that ultimately it is about empowering the customer to conserve energy.

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

General or Corporate Management (Continued…)

There is no smart grid. there are test sites but the investment is not being made. Incentives need to be pushed harder. Incentives need to usable for all companies.

There is probably more need to repair our grid before we make it smarter.

Tie all the divergent pieces together to get the total value.

Too much reliance on old technologies. Increased implementation of newer technologies needed.

True impact is not yet understood by the public but are willing to use stimulus funding to implement.

Utilities are still in the process of determining what it means to them and customers are overwhelmed by hype. Need to get a real plan and not just individual parts for purchase.

Very beginning. Infrastructure needs to improve, training and information awareness for both users and providers of power, and national policies should be established so that reliability, efficiencies and information security issues are all addressed from the national level.

Very spotty. Some utilities have taken some bold steps. Others are only replacing meters with smart meters with normal attrition.

We are so far behind the times it is sad. There is much promise but the degraded state of today's distribution infrastructure makes this a decades long process. Transmission is slightly better but not by much.

We need more technology and a defined entry level grid to match

We will never have one, unless there are changes in D.C. and at FERC to address the challenges in building new transmission lines.

What is the definition of smart grid? This is being driven by vendors and politicians without a concern on what the consumer really wants or will really do. The only way that the "smart grid" would work would be for a fully integrated utility from Generation to Distribution. For Municipals and Cooperatives who only deal with distribution the technology is greatly overstated.

What smart grid? We don't have anything, anywhere, close to a real smart grid compared to those countries that do. The US thinks we are the best and smartest, but we are not. We have a LONG, LONG way to go and must do it in a very short time. Too much capitalism can be a bad thing.

Energy Consulting, Contracting

Asset management, system upgrades and integration of renewable energy into the grid are essential.

Awareness and develop rational and need to the general public for support

Better forms of communication

Cybersecurity is the one item that needs work

Early stage

From scratch it has to improve

Haphazard - not all companies are equal in its deployment

I would like to see a Nationalization of our power generation and distribution system. Similar to the aviation and interstate systems.

In its infancy. security and integration of systems needs to occur for the concept to be successful.

Insufficient communication and overall control. Poor. Establish better communications to achieve effectively overall centralized point of control

It is in a build out phase. Cost of energy needs to rise dramatically to drive true market demand as opposed to legislative mandates.

Long way to go.

More of the pilot stage to see what is working best. More focus on most important areas and not trying to do to much at one time.

More public awareness and acceptance, more funding, more action now.

More understanding of the power system reliability issues and higher focus on developing solutions that are acceptable to the designers, builders and operators - too much focus on just smart meters

Needs - Fluid communication between active devices and data bases

Not consistent. Roll out a successful project and encourage other utilities to implement similar system.

Not very visible from public awareness-so regulatory and corporate interest are not always cohesive or compatible--leads to uncertainty and slow advancement.

One ugly conglomeration

Overrated. Energy storage of renewable energy systems.

Sad, upgrades to the transmission grid need to be completed 1st throughout the entire system

Smart Grid is just beginning. Changes in the financial model need to be made. Time of Use or similar approaches are required.

Q9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful? (Continued…)

Energy Consulting, Contracting (Continued…)

Smart grid is still in more of conceptual and experimental stage . The communications and smart meter technologies must prove their reliability and security and benefits in actual runs so as to be accepted by mass population.

Smart grid is still in the nice thing to have level of development

Some successful pilots where applications produce concrete benefits.

Structure rates (esp. Demand based) to encourage load shifting

The current state of the smart grid not so smart. Improve technology and security.

The smart grid especially at the distribution level is still at the proof of concept stage. Aggressive goals must be established to move this effort forward to improve reliability.

The smart grid is in an implementation phase and efforts need to be more coordinated. De-regulated utilities have to be provided with tools (funding) that enables them to catch up.

The state of the smart grid is still very much in its infancy but improving. The technology for smart grid improvements is becoming more widespread and affordable and the current presidential administration has shown a much greater commitment to its deployment.

Using pregnancy as a comparison, fertilization is about to occur. Everyone is talking smart grid but only a few have fertilized the egg!

Very early in the process. Must improve two-way communication and power flow, handle intermittent supply from renewable sources, integrate energy storage into the system, and accommodate a growing number of electric and plug-in hybrid vehicles.

Very early in the 'stage' of development . Most people are looking at the overview, but the details are what will determine success.

Very early stage. A structure has to be built up to have certain goals (renewables, distributed generation, reliability) in mind and allow for easier interconnection of these resources as they are developed in the future. Sounds like we need more of a flexible distribution system.

What smart grid? There is none implemented except at generating stations and in major cities.

Q10. What additional concerns/comments do you have about the smart grid?

Engineering: Systems, Planning or Design, IT

Txt

General or Corporate Management

Txt

Energy Consulting, Contracting

Txt

Appendix A – Write-in Answers

Q12. The category that best matches my type of company is: Other responses:

Engineering: Systems, Planning or Design, IT
Aggregate Mining
Power resource user
Regional Transmission Operator
University

General or Corporate Management
Consultant to Management
Consulting to Utilities
Engineering support services to the electric utility industry
EPC Contractor
Fuel Consultant
IO water and power utility
Power system training
University research
No answer

Energy Consulting, Contracting
Electronics Consulting
Energy and environmental consultant.
Financial Analyst consulting/advising on power industry.
Strategic Marketing Consultant

Q13. Which of the following best describes your job function? Other responses:

Respondents with "other" job titles were excluded from the analysis.

Q14. My primary area(s) of responsibility include: Other responses:

Engineering: Systems, Planning or Design, IT
Bulk power system reliability.
Communications
Energy supply sources
GIS
Industrial Plant Power systems: substations, generation, distribution.
Industrial Power Systems
It Infrastructure
Legislative analysis and policy development
Metering and Smart Grid design
On request, I dig into a topic for clients and try to get past the puffery.
P&C Substations
Peak generation
Power and lighting design-low voltage side.
Process Development
Project management
R&D
SCADA Management
Solar applications
Substation *(6 mentions)*
Substation design
System protection
Utilization
Wind ,compressed air and solar

General or Corporate Management
Customer Service
Demand mgmt
Efficient utilization
Executive mgmt.
FAC-003, 008, and 009 support for line certifications
Financial
Financing
Fuel
Identifying and implementing new equipment technologies.
IT Systems and Applications
No answer
Planning
Regulatory Relations/DSM
Regulatory, Financial
Substation
Substation material packaging
Wholesale power, transmission, telecommunications, and rates

Energy Consulting, Contracting
Alternative energy generation
Broad coverage of energy cost reduction
Compliance
Demand management
Demand Response
Electrical Insulation(crosses borders of above categories)
Electronics Consulting
Energy Efficiency
Energy Management
Energy markets
Environmental controls and management
Telecommunications
Training NRC personnel for nuclear plant inspections and oversight
Utility planning for emergencies and disasters, power system restoration and reliability of service.

Appendix B – Survey Instruments

Dear Reader:

Transmission & Distribution World is conducting a very brief survey concerning the nation's smart grid, and we are very interested in your input. The survey should take only five minutes of your time.

Since the number of industry professionals being contacted is small, your assistance is vital to achieve meaningful results. Please be assured that we treat any information you provide as STRICTLY CONFIDENTIAL, used only in combination with answers from other respondents. Simply click the link below to access the survey:

Take the Survey!

Thank you in advance for your help and your continued interest in *Transmission & Distribution World.*

Sincerely,

David Miller
Group Publisher

DRAWING—A $50 VISA GIFT CARD

P.S. At the end of the survey, you may enter a drawing for one of four $50 Visa gift cards. To view the rules and regulations regarding the drawing, please click on the following link: Sweepstakes Rules

TRANSMISSION & DISTRIBUTION WORLD

Dear Reader:

A few days ago I sent you an email asking for your help with a very brief survey concerning the nation's smart grid. IF YOU HAVE ALREADY COMPLETED THE SURVEY, PLEASE ACCEPT MY PERSONAL THANKS AND DISREGARD THIS EMAIL. If you have not yet had the chance to complete it, I am still very much interested in your input!

Since the number of industry professionals being contacted is small, your assistance is vital to achieve meaningful results. Please be assured that we treat any information you provide as STRICTLY CONFIDENTIAL, used only in combination with answers from other respondents. Simply click the link below to access the survey:

Take the Survey!

Thank you in advance for your help and your continued interest in *Transmission & Distribution World.*

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David Miller
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TRANSMISSION & DISTRIBUTION WORLD

Thank you for participating in our survey. Your opinions are important to us! Please be assured any information you provide is strictly confidential.

About Smart Grids...

1. **What do you consider the top three barriers to the deployment of the smart grid?** *(Please choose only three.)*

- ☐ High costs
- ☐ Inadequate incentives for smart grid investment
- ☐ Insufficient transmission (capacity and availability)
- ☐ IT security concerns
- ☐ Lack of adequate technology
- ☐ Lack of public awareness
- ☐ Lack of public interest
- ☐ Regulatory policies
- ☐ Other (please specify below)

2. **What do you consider the top three benefits to the deployment of the smart grid?** *(Please choose only three.)*

- ☐ Ability to utilize renewable energy sources
- ☐ Cost savings for general consumers
- ☐ Energy independence
- ☐ Improved efficiency
- ☐ Improved electricity reliability
- ☐ Increased national security
- ☐ Power stability
- ☐ Reduction of carbon emissions
- ☐ Other (please specify below)

3. How important are each of the following technologies to deliver the benefits promised by the nation's smart grid?

	1 = Not at all important	2	3	4	5 = Critically important
Asset management	○	○	○	○	○
Communications technology	○	○	○	○	○
Cybersecurity	○	○	○	○	○
Demand response	○	○	○	○	○
Energy storage	○	○	○	○	○
Enterprise software systems	○	○	○	○	○
Home automation	○	○	○	○	○
Self-healing technology/DA	○	○	○	○	○
Smart meters	○	○	○	○	○
Smart power flow control	○	○	○	○	○
Other (please specify below)	○	○	○	○	○

4. How would you characterize U.S. policy makers' commitment to building a smart grid?

- ○ Significantly less committed than I think necessary
- ○ Less committed than I think necessary
- ○ Appropriately committed
- ○ More committed than I think necessary
- ○ Significantly more committed than I think necessary

5. Do you believe the U.S. is targeting smart grid financial investment appropriately to each of the following technologies that comprise the smart grid?

	Significantly underfunded	Underfunded	Appropriately funded	Overfunded	Significantly overfunded
Communications technology	○	○	○	○	○
Demand response	○	○	○	○	○
Energy storage	○	○	○	○	○
Security	○	○	○	○	○
Self-healing technology/DA	○	○	○	○	○
Smart meters	○	○	○	○	○

6. How would you characterize the general public's awareness of the role each of the following technologies plays in the smart grid?

	Not at all aware	Minimally aware	Somewhat aware	Aware	Very aware
Bulk power flow	○	○	○	○	○
Communications technology	○	○	○	○	○
Energy storage	○	○	○	○	○
Self-healing technology/DA	○	○	○	○	○
Smart meters	○	○	○	○	○

7. How important are each of the following to enabling integration of renewable energy sources, including distributed energy resources?

	1 = Not at all important	2	3	4	5 = Critically important
Communications technology	○	○	○	○	○
Demand response	○	○	○	○	○
Energy storage	○	○	○	○	○
Flexible distribution systems	○	○	○	○	○
Smart meters	○	○	○	○	○
Voltage regulation	○	○	○	○	○

8. Do you believe the right infrastructure is in place for smart meters to live up to their promise?

- ○ Yes
- ○ No (please explain)

9. How would you describe the current state of the smart grid? What needs to improve in order for the smart grid to be successful?

10. What additional concerns/comments do you have about the smart grid?

11. What do you believe will be the <u>three</u> most important sources of the world's future energy supply? *(Please choose only three.)*

- ☐ Biomass
- ☐ Coal
- ☐ Geothermal
- ☐ Natural gas
- ☐ Nuclear
- ☐ Oil
- ☐ Solar
- ☐ Tidal
- ☐ Wind

About You and Your Company...

12. The category that best matches my type of company is:

- ○ Investor-owned electric utility
- ○ Municipal electric utility
- ○ Rural electric or other electric cooperative
- ○ Federal power agency, system or project
- ○ Other publicly owned electric utility, including state agency or district
- ○ Consulting engineer
- ○ Independent power producer/independent system operator
- ○ Line/substation construction company or inside electric distribution contractor serving electric utilities
- ○ ESCO (Energy Service Company)/energy marketer
- ○ Wholesaler or distributor or electric utility equipment
- ○ Manufacturer/equipment supplier
- ○ State or federal regulatory agency or commission; association or institution
- ○ Other (please specify below)

13. Which of the following best describes your job function?

- ○ General or Corporate Management (other than engineering, operations, purchasing, stores & commercial)
- ○ Engineering: Systems, Planning or Design, IT
- ○ Operations, including Construction or Maintenance
- ○ Energy Marketing/Energy Sales (Utility)
- ○ Purchasing or Stores
- ○ Commercial
- ○ Energy Consulting, Contracting
- ○ Other (please specify below)

14. My primary area(s) of responsibility include: *(Select all that apply)*

- ☐ Transmission
- ☐ Distribution
- ☐ Generation
- ☐ Other (please specify below)

Thank you for your time and input!

To enter into a drawing for one of four $50 Visa gift cards, please provide the following information. Only surveys that provide complete information are eligible for the gift cards. This information will be used to contact you ONLY in the event that you are selected as one of the drawing winners. Again, all answers will remain completely anonymous.

Name (first and last):

Street address:

City:

State:

Zip code:

Email:

(Please click the "Submit" button below to complete the survey.)