GridWise Architecture Board First Gathering
Westminster, Colorado
July 13-15, 2004

Meeting Minutes

The meeting was held from July 13-15, 2004 at the Westin in Westminster Colorado and led by Steve Widergren. The following individuals were present:

Architecture Board Members

Ron Ambrosio, IBM T.J. Watson Research Center

Jay Britton, AREVA-T&D Corporation

David Cohen, Infotility

Rik Drummond, Drummond Group Inc.

Brad Nacke, standing in for Albert Esser, Emerson Network Power

Erich Gunther, EnerNex Corporation

Stephanie Hamilton, Southern California Edison (SCE)

Larsh Johnson, eMeter Corporations

Jack McGowan, Energy Control Inc.

Vito Stagliano, Calpine Corporation

Wade Troxell, Colorado State University

Eric Wong, Cummins Inc.

Architecture Board Support

Steve Widergren, PNNL

Mia Bosquet, PNNL

Facilitation

Elgie Holstein, Resource Consultants, Inc.

Guests

Bill Parks, DOE OETD (July 13, morning)

Rob Pratt, PNNL (July 13)

Bill Rose, WJR Consultants, (July 13 to July 14)

Anto Budiardjo, Clasma, Inc., (July 14)

Steve Hauser, UAI, (via conference call July 13, morning)

Day 1, Tuesday, July 13

Introductions

Steve Widergren opened the meeting. The first order of business was to welcome and introduce those present and encourage thoughts on agenda items for the July meeting and later meetings. Steve also requested that AB members give thought to the topic of chairperson selection during the course of the meeting.

See GridWise Architecture Board Mtg 071304.ppt for general meeting slides.

GridWise Overview

Bill Parks highlighted the significance of this effort for the Department of Energy Office of Electric Transmission and Distribution (DOE OETD) and extended thanks to the members and their companies for their presence, verbally and through a letter of recognition from the OETD Director to each Architecture Board member. Bill Parks presented the **DOE OETD GridWise Program** and explained the historic context for this effort.

Steve Hauser explained the context, membership and objectives of the **GridWise Alliance,** suggesting ways in which the GridWise Architecture Board and GridWise Alliance may be mutually supportive as the AB unfolds. Steve Hauser said it will be a challenge to be as comprehensive as possible and conserve the value of the consensus-type process. The GridWise Alliance and member companies will be available and are supportive of the Architecture Board. They can offer assistance as advisors and in promoting the AB activities. Steve Hauser's question to the Architecture Board is, "What role would the Architecture Board like the Alliance to play?"

GridWise Alliance objectives include:

- Position and focus on appropriations bills
- Articulating and presenting the GridWise Vision well (to the public and media)
- Project opportunities branded as GridWise (currently constrained by resources)

Rob Pratt presented the **GridWise Vision** (GridWise Intro AB 2.ppt). Members were particularly intrigued by the potentials of the Grid-Friendly Appliance chip (as a new technology for load frequency control, with respect to selective control possibilities, positive implications of slow turnover and rollout of white goods, related simulation capacities and control theory, security concerns, and the long-term business model for the GFA).

Vision, Mission and Terms of Reference

Steve Widergren and Mia Bosquet presented the current vision and mission statements upon which the Architecture Board has been formed, based primarily on the GridWise vision and the Architecture Board Terms of Reference.

Elgie Holstein provided guidance on strategic planning terminology to enable coherent structuring of key messages for the group:

- Mission—a reason for being

- Vision—a preferred future state
- Goal—a desired long-term result
- Objectives—specific outcomes (annual)
- Projects—discrete work activities to achieve objectives

The Vital Role of Communications

The ensuing discussions reiterated the importance of communication for the Architecture Board, creating a range of communication materials to provide 'arms for telling our story.' The AB will need support materials to pass the message to others (create presentation sets), with guidance on who to accredit with respect to branding of GridWise, PNNL, DOE, Alliance.

Mission

Group guidance on refining the mission statement is to avoid overstatements and make it simple.

Vision

The group reflected on the current formulation of the GridWise vision and potential specificities for the Architecture Board. Specific suggestions for editing the vision were made and a list of characteristics of the future, transformed grids was brainstormed. These will be captured in a revised version of the "Terms of Reference."

Vision Discussion: Characteristics of a Transformed Grid

- Collaborative environment; unifying force
- Transformational
- Transparent
- Decentralized (optimal mix of centralized and distributed power system control)
- Interoperable and enabling distributed systems
- Efficient
- Stable, reliability, recovery, resilient
- Safe operation
- Secure
- User friendly
- Sustainable: cost, ownership, technical
- Proliferation of market choices, freedom of choice (loosened market constraints)
- Real-time information/knowledge
- Emerging new business models (enabling new businesses, new economic value propositions, new functions, different paths to success, evolution)
- Framework within which technologies can grow and flourish

- Extensible: stimulates evolution of unforeseen technologies, products and services
- Flexibility, freedom of choice
- Non-discriminatory access
- A regulatory structure (effecting non-regulated stakeholders and promoting innovation among regulated actors) that:
    - Supports innovation
    - Sends appropriate signals, (allows market places to decide what's best)
    - Preserves fairness and equity
    - Enables markets at every level (including retail)
    - Enhances national security
    - Supports interoperability

Provocative Notions: Tenets and Illustrations

Steve Widergren presented some straw-person notions from the GridWise Tenets and Illustrations, providing provocative notions before discussing issues facing the GridWise Architecture Board's vision of the future.

Structured Brainstorming on Issues

The Architecture Board members did a structured brainstorming exercise considering the question, "What are the most significant issues that must be addressed to achieve the GridWise Architecture Board's vision for the future?" First, the group listed issues that they identified. In a second phase, members gave a 'score' of 1 to 7 to those seven issues that he/she saw as most significant (7 being the most significant). This 'scoring' was performed on day 2 after some revising of the list.

The final list which was ranked provides some insight into the issues which will be facing the Architecture Board, though this is by no means a final or comprehensive list. The ranking may provide some insight as to which issues are seen as most important for the group as a whole, though this tallied outcome was not presented during the meeting, has not been discussed among members, and should not be seen as comprehensive or in any way conclusive. The issue list and ranking are presented in Appendix A.

Applying the concept of the 80/20 rule of thumb often applied in weighted voting exercises, we can observe that, indeed, a large portion of the scoring went to a relatively small number of issues. The top 5 issues identified through this initial, informal exercise are:

- Creating a compelling vision and clear value story
- Utilities can help achieve the vision and getting support of utilities is necessary and a clear business case for utilities is necessary for their support
- Establishment of bulk and retail market structures in all regions of the US
- Effective design of demand side market - Design and development of effective demand function for existing and future market structures
- Buy-in and support from all stakeholders (utilities, customers, ISO/RTO, ESCOs,…)

Day 2, Wednesday, July 14

Standards Landscape

Mia Bosquet presented an overview of the GridWise Standards Mapping Overview. This report provides some structure and clarification to the complex world of standards and standards developing organizations (SDOs) which may be related to GridWise technologies. Architecture Board members are invited to provide their insight and knowledge to refine and extend this report.

Additional References

In addition to this published report, individual summaries covering more detail on each of the more significant SDOs have been prepared and will be made available to the Architecture Board via the Sharepoint group website (soon to be online). Erich Gunther reminded members that the technology synopsis from the CEIDS-IECSA project (referenced in the GridWise Standards Mapping Overview) is available on line from the IECSA website.

Remarks

The Architecture Board will need to prioritize its liaisons with standards groups, choosing one or two key organizations for liaisons in each area.

Wade Troxell suggested that graduate students could make a 3-D integration of star and ladder views (sector viewpoint versus functional viewpoint) of the standards organizations, allowing us to conceptualize more readily what level of functionality the standards efforts address in each sector.

Building Integration Perspective

Anto Budiardjo presented a perspective of integration from the buildings systems industry, as it has progressed in recent years and where it seems to be heading. This presentation provided an introduction to the BuilConn forum as well as the M2M expo and conference. The example of the oBIX (Open Building Information Exchange) efforts was presented along with the progression of this effort into the OASIS standards development arena. Parallels of the trends in building integration were made with those in the electric power area.

This presentation can be viewed at:
http://www.builconn.com/anto/Anto%20Preso%20(New)_files/frame.htm

Home Networking and Consumer Electronics

Bill Rose presented a summary of markets, drivers and technologies in home networking and Consumer Electronics. A key point to remember is that the message is totally different for consumers (never call a network a network) Consumers want applications and capabilities expressed in their language, with no complications or fear.

Another key suggestion was that the GridWise efforts should be attune to piggybacking on major investments like those related to the needs of an aging population.

This talk reminds us of the lobbying weight of the consumer electronics sector, as well as its potential to be a driving force for GridWise.

Liaisons Opportunities

Liaison opportunities should be pursued for a variety of reasons including, but not limited to:

- Informing other efforts of GridWise AB efforts
- Leveraging other efforts
- Contributing to a network of GridWise actors
- Enhancing communication
- Building external support

An action item for upcoming reflection and meetings will be to prioritize prospective liaison opportunities and establish the necessary mechanisms (organizational and communication) to initiate the various liaisons. Potential liaisons include:

- Active interest
  - GridWise Alliance
  - E2I CEIDS IECSA
  - CECA
  - CABA
  - OMG
- Potential Interest
  - 'Reality Check' liaison from distribution/transmission/planning
  - OASIS (oBIX, ebXML)
  - NRECA (MultiSpeak)
  - WS-I, web services
  - OPC
  - BACnet
  - NAESB
- Suggestions during the meeting
  - CEN—security PKI work (RD)
  - EG: UCA International Users Group
  - EG: ISO/IEC TC 57 (TC13)
  - RA: ISO/IEC JTC1 SC25 WG1
  - EG: ANSI C-12 C-22 (metering standards)
  - SW: RosettaNet Business processes implementation
  - DC: BPEL Business Process Execution Language
  - DC: IETF Data transfer & security
  - JB: RTO ITC Information

- GridWorks
- Regulatory/Policy outreach (NARUC…)

Name Discussion

Both the E2I CEIDS efforts and the GridWise Alliance have expressed concern about the GridWise Architecture Board name and confusion it may cause: "architecture" may be confused with the E2I CEIDS IECS Architecture project; "board" may be confused with the GridWise Alliance Board of Directors. The GridWise Architecture Board members discussed options for altering their name and the desirability of such a change.

Alternative names suggested include:

- Architecture Interoperability Board
- GridWise Electric System Transformation Board
- Technical Strategy Council
- Technology Council

Several members expressed the opinion that they see this group's work as being centered on architecture, and see architecture as at a very high conceptual level, with nothing above it in the Information Technology world. They believed that there was a good thought process which went into determining the name 'GridWise Architecture Board.'

Members with strong IT background indicated that 'Architecture' is a well recognized word in the IT community and corresponds in their eyes to the type of work set forth in the GridWise Architecture Board mission statements. The word "board" in the context of groups like the IETF and OMG carries a lot of meaning with respect to the functions of these groups, which may not yet be reflected in the context of the GridWise Architecture Board in its initial phases.

Erich Gunther shared the difficulties that he has witnessed over the past year from confusion surrounding the word 'architecture' for the IECSA project, and the detraction from real work caused by such issues. Stephanie Hamilton explained that from a power grid perspective, IT works for distribution (lower in organization levels), below the engineering structure.

Suggestions include keeping the name and adding an additional, qualifying word, or adding a tagline to help distinguish this effort from others. Members noted that if we don't do anything with the words, then we have to have very strong and clear mission, vision and goals.

No final decision was taken on the topic of name change; possible taglines should be formulated. This will be reviewed at the next web conference.

Governance

Mia Bosquet provided a quick overview of proposed governance material: the Terms of Reference and Bylaws. A Governance Task Force was formed including Stephanie Hamilton, Dave Cohen, and Wade Troxell to revise the governance materials with the assistance of Steve Widergren and Mia Bosquet.

13th Architecture Board Seat

A synopsis of the status of the Call for Candidates for the thirteenth seat was provided. Two candidacies have been received to date. Vito Stagliano suggested that the Call for Candidates be sent to National Grid, and Wade Troxell provided a contact name at National Grid.

The Call will be maintained open at least until all initial prospects have been re-contacted and solicited again. The members agreed that we shall use the Nominations Committee which established the initial Architecture Board slate to select a nominee among the candidates. Final confirmation of the nominee for the 13th seat will be done by the current members of the board along with approbation from the DOE.

Tasks & Deliverables Discussion

Members broke into 4 groups to define near-term tasks and deliverables. The results of these groups are included in Appendix B and will be used as we formally define GridWise Architecture Board tasks and deliverables in the future.

Day 3, Thursday, July 15

Scheduling

For scheduling purposes, the group agrees that Fridays works best for WebEx meetings, generally 11am – 1pm Pacific Time (2pm-4pm Eastern). Gatherings will be best on Tuesday-Wednesday or Wednesday-Thursday or piggy-backing on another event. Gatherings should be on two days 8am-5pm first day, 8am-3pm second day.

Proposed meeting schedule

- September 2, 2004 (back-up date August 27), 11am- 1pm, Pacific Time, WebEx
- October 26-27, 2004 (back-up November 11-12), Dallas/Ft Worth
  - Proposed topic for stimulation focus: How present organized markets work
  - Possible speakers: Andy Ott (PJM), Dick Brooks (ebXML in ERCOT and Ireland), Calpine trading market, power merchant EMS, Vito Stagliano on general regulatory picture, ERCOT market example
- December 10, 2004, 11am- 1pm, Pacific Time, WebEx
- January 27-28, 2005 (back-up date Jan 24-25) piggyback on Distributech, San Diego
  - Proposed topic highlights: Visit to Distributed Grid facilities (SCE)
- March 11, 2005, 11am- 1pm, Pacific Time, WebEx
- May 3 & 4, 2004 NY
  - Proposed topic highlights: Hold meeting at and visit IBM Watson Research facilities, EnergyWorks or Schneider Electric DOE Project examples

Other topic suggestions for future meetings:

- FERC: Dick O'Neil
- Interoperability cases from each member
- Take one specific example ('turn off that load') try to put into an XML document and pick it apart (pivot point between business and IT. Work with some simple messages and learn about related issues…
- ebXML use in Texas and Ireland Power Markets
- Microgrids
- Talk of issues from Control Center Operator, visit of Control Center
- ISO/RTO Council's Information Technology Committee (IRC ITC), Overview of power markets today: Andy Ott
- CEIDS IECSA
- Regulatory picture
- Examples of current GridWise-like implementations
- Infotility Case Study
- eMeter Case Study

Members are encouraged to make suggestions as thoughts arise.

Interoperability

Rik Drummond presented an overview of current global interoperability efforts. The talk underscored the vastness and complexity of the task of creating interoperability.

Rik pointed out that there is a continuum of architecture: the inventory of present, the inventory of future, incremental architecture; the Architecture Board's task will be to define the Architecture of next phase. Interoperability requires federation, major buy-in of stakeholders over time. Long-term Architecture can be seen as wide scale incremental interoperation. Architecture can be seen as a constitution (rules & structures) providing a common understanding of concepts much like the nation's constitution clarifies notions of 'freedom'.

This presentation, along with the day 2 presentations on building systems and home networking both highlighted the different 'languages' spoken based on industry sectors and experience. This underscored the need for communication and education across groups both for the Architecture Board members and for their outreach efforts.

Chairperson

Rik suggested that the chairperson is about team process, we are still getting to know each other and a decision on the chairperson may be premature (also while awaiting a 13th). The chair needs to be someone who keeps the board moving forward. Maybe we should name an ad hoc chair and decide to name the chair at the end of the year.

In considering a chairperson, a suggestion was made that there was a publicity advantage to having a chairperson from the energy Industry, though not necessarily from a utility company. However, there was general agreement that this was secondary to selecting an individual with the qualities to best fulfill the chairperson role. Members are encouraged to nominate candidates as this fulfills an important function (as opposed to self-nominations).

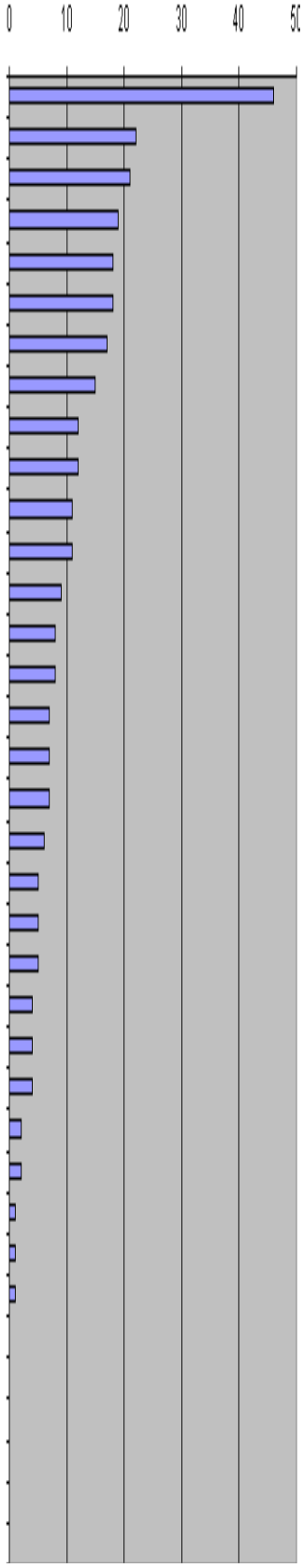
Action Items:

#	Item	Owner	Due Date
1.	Governance Task Force phone meeting. Apply feedback, comments and vision characteristics.	Bosquet, Widergren, Hamilton, Cohen, Troxell	5 Aug 04
2.	Draft meeting minutes for review	Bosquet, Widergren	26 Jul 04
3.	13th candidate call: contact National Grid, finalize calls, prepare nominations process	Widergren	6 Aug 04
4.	Draft agenda for September Web Conference.	Bosquet	13 Aug 04
5.	Synthesize results from action plan breakout to progress action plan discussion.	Widergren, Bosquet, Board	13 Aug 04
6.	Confirm meeting dates with all members	Bosquet, all members	13 Aug 04
7.	Consider educational material tailored to give IT, regulatory, building, power system background to all members	Bosquet, Widergren	26 Aug 04
8.	Investigate possibilities for grad. student work on extending standards landscaping	Troxell	26 Aug 04
9.	Consider prioritization of liaison opportunities	ALL	26 Aug 04
10.	Consider group name change options	ALL	26 Aug 04
11.	Next meeting: WebEx (back-up date 27 Aug)	ALL	2 Sept 04

Appendix A: Informal Brainstorming Results: Listing & Scoring of Issues

Table A.1: What are the most significant issues that must be addressed to achieve the GridWise Architecture Board's vision for the future?

Creating a compelling vision and clear value story	46
Utilities can help achieve the vision, getting support of utilities is necessary, a clear business case for utilities is necessary for their support	22
Establishment of bulk and retail market structures in all regions of the US	21
Design & development of effective demand function for existing and future market structures	19
Buy-in and support from all stakeholders (utilities, customers, ISO/RTO, ESCOs,…)	18
Defining and valuing reliability adequately - development/design of highly secure standards of operational conduct for grid reliability (QoS)	18
Understand how to assess technology security concerns, integrity, authentication and privacy requirements & non-repudiation in a GridWise environment	17
Define how to capture and model the regulatory environment for competitive markets to emerge based on open architecture (constraints on the control system)	15
Understanding the value proposition to invest in widespread deployment of internet enabled direct digital control and enterprise energy management	12
Definition of a flexible architectural abstraction model	12
Real-time view of entire grid	11
Reeducation of electric power engineers and architects, esp. in information technology	11
Getting support of utilities is necessary and a clear business case for utilities is necessary for their support	9
Lack of focused R&D	8
Development of transactional standards for grid-associated market structures, that are compatible with operational structures	8
Business model that reflects underlying economics of technical solutions	7
Lack of acknowledgement of problems and place on the US research and education agenda	7
Scope is too broad to reasonably tackle or make progress	7
Resolution of state and federal jurisdictional conflicts	6
Deployment of capital which serves to expand Tx system	5
Efficient use of capital assets	5
Efficient use of DER	5
Consistency of market-based programs (DM, ancillary services…)	4
Open channels of communication between utilities and customers	4
Elimination of regulatory barriers fot non regulated investmnet in regulated utilities	4
Anything can talk to anything else within the system (open reference communication standard)	2
Interindustry cooperation (communication interpreters between industries)	2
Improve the access to capital	1
Some aspects of electric T & D infrastructure don't lend themselves to free enterprise	1
Price signal measurability and visibility	1
Environment which permits cooperation between utilities and development	0
Better understanding of potential risks and fallback positions	0
Public fear of intrusive technology	0
Extend cross-domain human resource base	0
Communication tools to drive interoperability outreach	0
Recognition and learning from common problems, opening minds to outside solutions	0



Please note, the above list is the result of an informal brainstorming session, and is neither intended to be comprehensive nor to represent a conclusive picture or ranking of issues.

Appendix B: Tasks & Deliverables Discussion

Members broke into 4 groups to define near-term tasks and deliverables. The results of these groups are as follows:

Near-Term Deliverables—Group A: Dave, Wade, Eric

A collection of use cases which describe how the architecture will be applied (high level abstractions with sub-system level use cases as required).

- Collection of implementation scenarios using BPEL to define end-to-end market-based transactions. (Later…define for subsystem level transactions and operational scenarios).
- Models of end-to-end, two-way communications flow from device to market (define and/or reference the data models and objects that will need to be passed between entities.
- Mapping of communication interfaces (where protocol translation must occur) onto above models.
- Public Outreach Toolkit (consists of marketing collateral and presentations, position papers, and guidelines, press releases)
- Regulator requirements guide that spells out specific regulatory actions needed to implement the GridWise Architecture.
- Reliability specifications guide to achieve QoS
- Security specifications guide to achieve minimum required security policy

Comments

- Last 2 points are ambitious for the near-term, but QoS should be captured in the use cases.
- Maybe we need to be more explicit about stating architectural requirements and the concepts and philosophy and principles that are used to help frame approaches to meeting these requirements.
- Consider creating collaborations with prototype/demo projects (DOE, GridWise Alliance, CEIDS, CABA…..) that engage other efforts and allow emphasis on "architecture" by this group.
- Eric Lightner wants to make this happen, drive plans and test sites (eg microgrid/commercial sector).
- Illustrate the architecture with the example of a demand-side function (see Group B)

Near-Term Deliverables—Group B: Vito, Rik, Jay

- High visibility project – design of an effective demand side function prototype – elastic demand.
    - Plan of attack
        - Gather domain expertise given a straw man
        - Get feedback
        - Develop use cases w/ stakeholders
    - Coordinate and engage the GridWise Alliance

Comments:

- Ask the RTOs/ISOs markets to explain what they do today, and then engage them in possible approaches / prototype.
- Clarify that demand side could include load, DG, and/or storage (DER). This looks like demand reduction from the distribution system side of the meter.
- This tests interaction and relationship with the Alliance and gets feedback from stakeholders in a sensitive, non-conflicting way.

Near-Term Deliverables—Group C: Stephanie, Brad, Jack

- Create a load-shedding/recovery strategy for grid reliability, quality of service, for micro control of devices to support the grid.
    - Load shedding/recovery strategy
        - Security priority
        - Generation augmentation
        - Communication protocol
            - Device level control v substation/relay
    - Demand reduction/pricing in real-time
        - Customer device v customer class
        - Load reduction algorithms utility v. customer
- Develop an environment that allows for market options to optimize the grid.
- Best practice review of current power business to understand existing demand reduction capabilities that can be deployed nationwide.

Comments

- There are existing demand management strategies and deployments. The value of service or price signal for encouraging these schemes is problematic today. See NYSERDA, CEC…

- 3rd bullet – describe the services that can be provided (e.g., grid reliability, price responsive demand)
- Brad will send us some more background information on the thinking here.
- Last bullet—understand demand/reduction capabilities
- There are two industry structures: utility driven direct connection to customers v. ISO—market—customers (Industry, Commercial, Residential).
- In considering load shedding strategies:
    - Case one—no market reason behind load shedding.
    - Case two—most customers don't have access to market, even those with capacity have extremely limited abilities. So how do you get the customers to enter the market separately instead of as aggregated loads. Must make distinction between what you control and for what purpose and who does the controlling.
- We should go to PJM and ask, "why have you been unable to develop a demand function?"
- Dave Cohen mapped out the whole set of business rules for the PJM emergency response programs. They put the programs out and don't get much response.
- Are we talking about managing demand or about creating an elastic demand function (with multiple market actors)?
- It's important to review of what else is out there!!! Even before establishing mission and goals.

Near-Term Deliverables—Group D: Erich, Ron, Larsh

1. Finalize the Mission, Vision, and Scope statements
    i. Develop elevator pitch presentation
    ii. Develop White Paper
2. Clearly identify all stakeholders in the new energy environment, including industry, standards, regulatory, and customer communities
    i. Develop communication plan for engaging the stakeholders
3. Identify low-hanging fruit that will help establish early credibility
    i. Identify important value propositions for different stakeholder categories
        1) Develop scenarios that illustrate those targeted value propositions
        2) Establish some form of relationship/activity with key stakeholders in those categories
    ii. Describe how a GridWise future will greatly improve resiliency of the energy infrastructure
4. Roadmap that demonstrates key milestones and vision for the board
    i. ... and also demonstrates how other organizations fit into that roadmap

5. Define and document an initial architectural abstraction model
    i. Transactive model for both information and value exchange

Comments:

- Add name of group to #1.
- Jay: Concern that we may not know what the domain/scope/context is to take these steps. If we look at a business scenario to which this material would be grounded, then it could hold together better.
- Clarified 1, ii describes this body and its work and can include multiple targeted audiences.
- Number 1 is critical to address confusion, even internal to this group.
- EG: Know that we exist, the problem we are trying to figure out, who should we communicate to, what to do to be taken seriously, feedback all of this into a roadmap, then start on architectural modeling.
- DC: Point 5, careful not to abstract too much the modeling—have to be able to show applicability, tie in to business processes. (You can combine the DC/WT stuff into this one)
- JB: Concern that we don't know the business needs sufficiently. We still need to increase our awareness of the domain and scope and context of this project.
- SEW: Point 1ii—should be developed in white papers (for different target audiences), describing the body of work (mission, vision, scope).