November 7, 2011

Office of Electricity
Delivery & Energy
Reliability

REPORTING OF METRICS AND BENEFITS FOR ARRA SMART GRID PROJECTS

EU/US Smart Grid Metrics and Benefits Framework

Dissemination Approaches and Communication Plans

Joe Paladino & Steve Bossart

Objectives

Elements	*What we are trying to accomplish*
Technology Deployment and Impact	• **Show the relationships between technology, grid function, enhanced capability, costs and benefits** • **Provide the magnitude of benefits streams based on emperical information (correlate observed impacts with underlying factors)** • **Report on consumer response, acceptance and retention in 10 externally-valid pricing studies** • **Describe the performance of SGDP technologies**
Communicating Results	• **Convey information on program efforts, analytical methods and results in a highly structured way on smartgrid.gov** • **Show correlations between technology, functions and benefits** • **Provide anecdotes, not just evidence**
Engaging Stakeholders	• **Analytical approach(es) to support business case analysis (costs/benefits and relative merits)** • **Consumer behavior re: pricing and technology** • **Technology transfer (best practices for building out a smart system)** • **Peer-to-peer exchange**

Information Relating to Technology Deployment and Impacts

Project Reporting For SGIG/SGDP

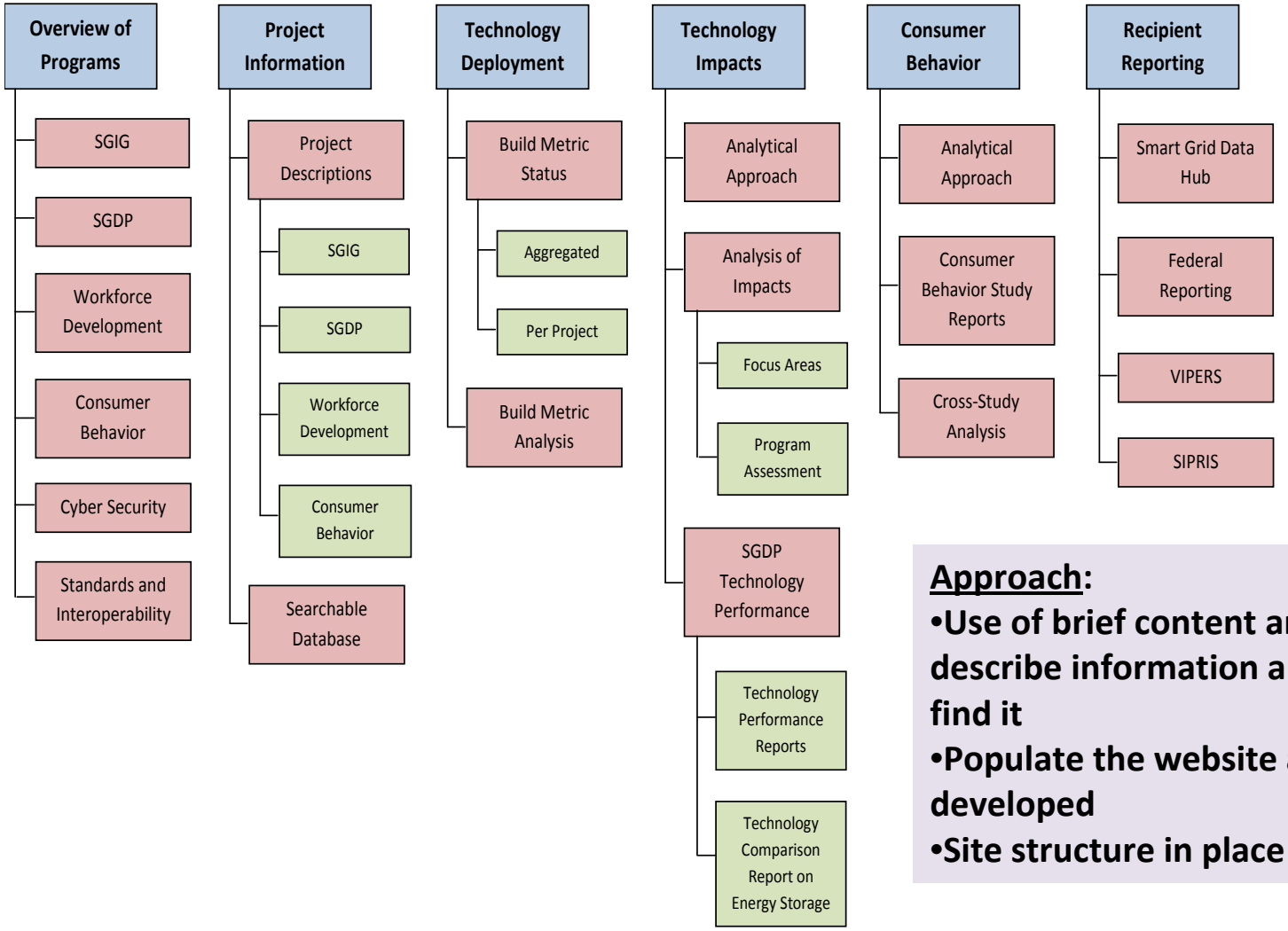
Build Metrics:
- Technologies, configurations, functionality, costs, extent of deployment

Impact Metrics:
- Peak demand and electricity consumption
- O&M improvements from AMI and DA
- Distribution system reliability
- Energy efficiency improvements in DA
- Applications of synchrophasor technology

Consumer Behavior Studies:
- Response to pricing and enabling technologies
- Customer acceptance and retention

Technology Performance Reports:
- SGDP technology performance and impacts
- Energy storage technology comparison

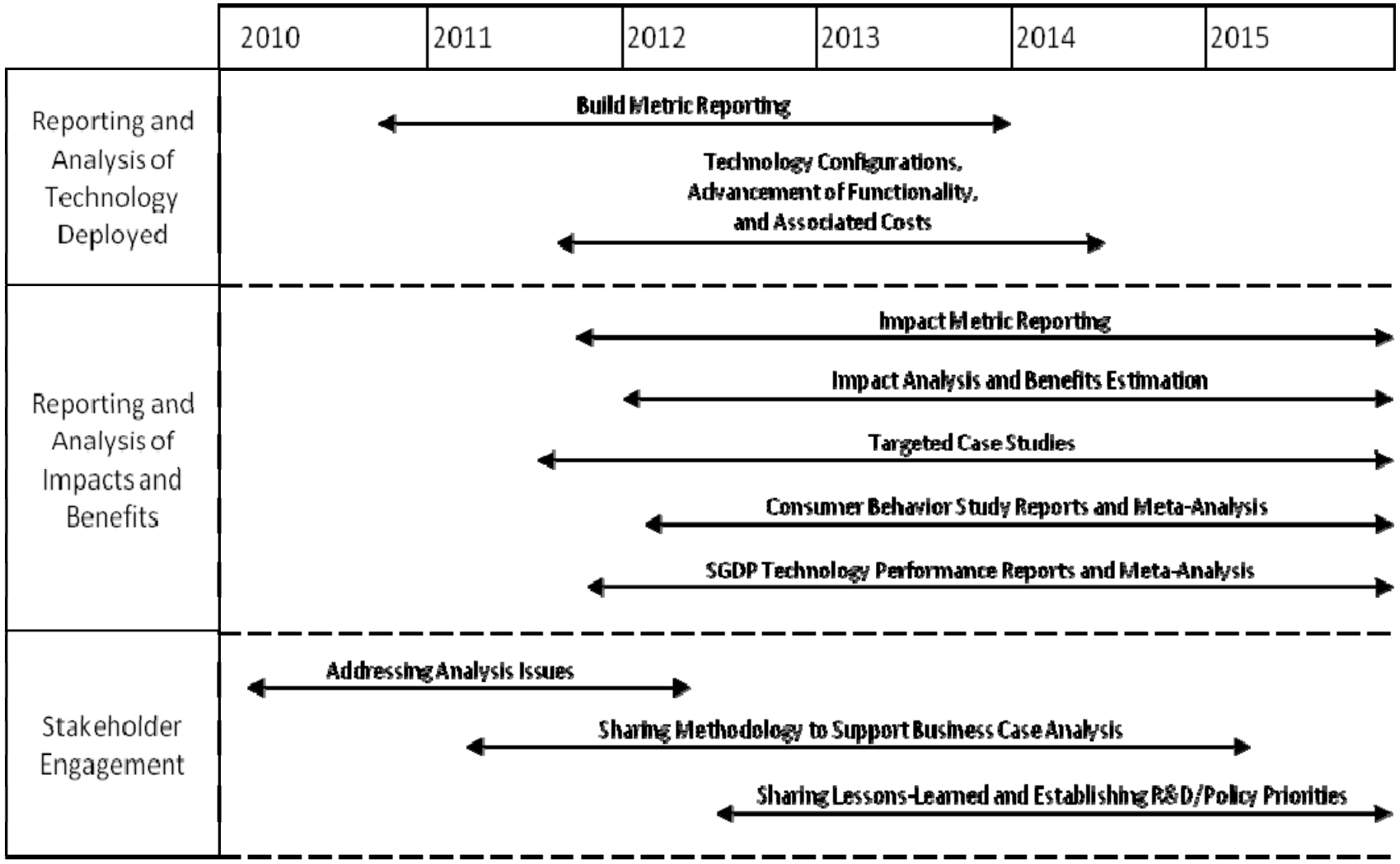
www.smartgrid.gov



<u>Approach</u>:

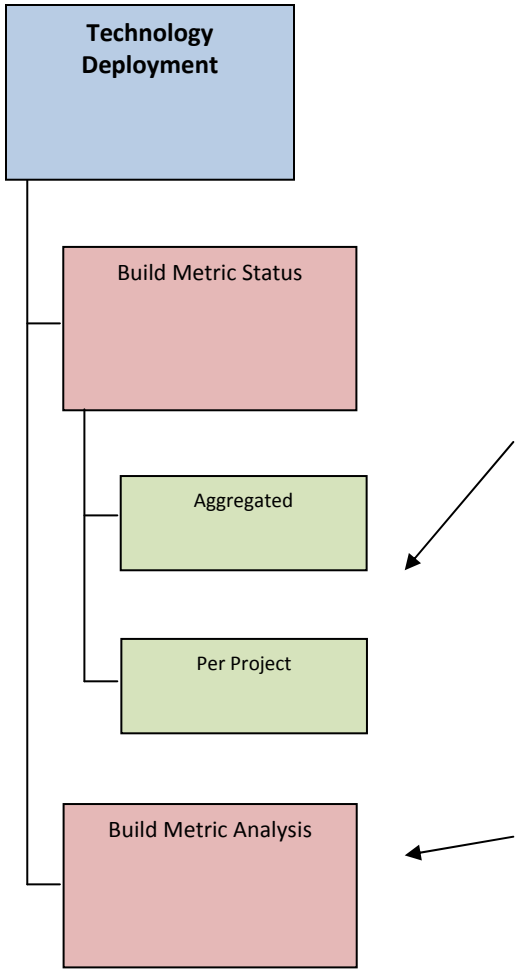
- **Use of brief content and graphics to describe information and where to find it**
- **Populate the website as content is developed**
- **Site structure in place by Jan 2012**

Schedule of Activities



BUILD METRICS

Technology Deployment Reporting



Build metrics, which are reported quarterly by recipients, are presented here on a per-project and aggregated basis.

This section will present a description of the technology configurations being deployed in these projects, their associated costs, their extent of deployment, and the additional functionality and capability they provide.

Build Metrics Reporting

Assets, Policies, Programs, and Monetary Investments
Quarterly reporting by recipient
Posted on smartgrid.gov

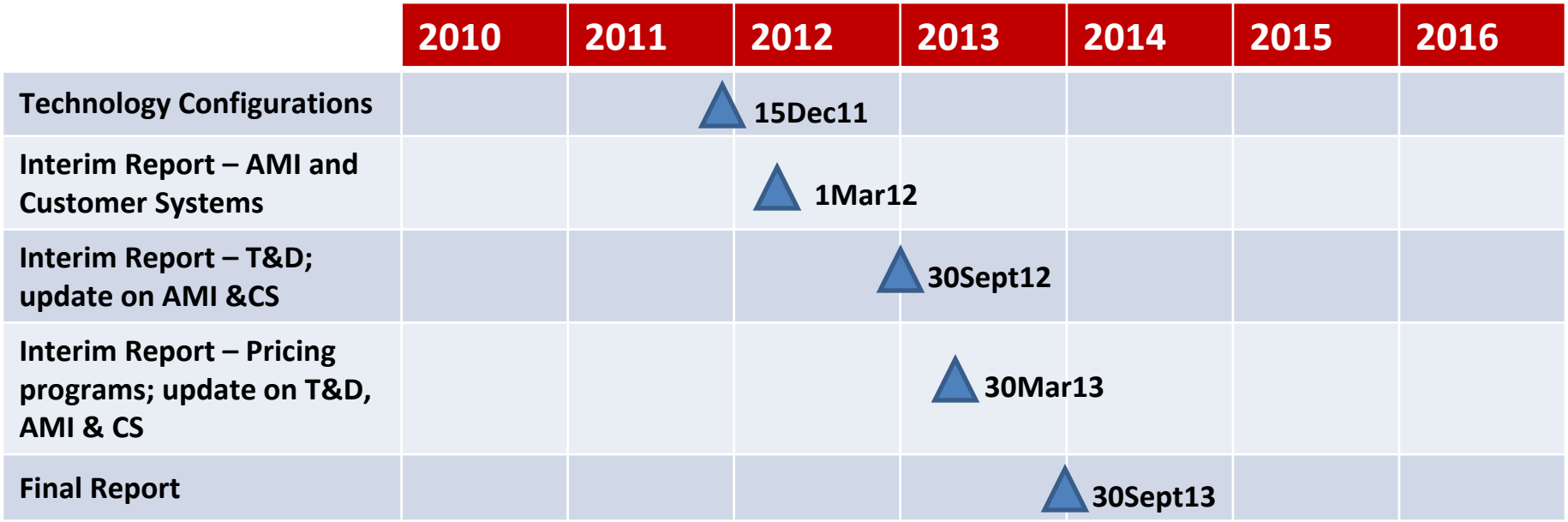
- Per Project
- Aggregated

Meta-Analysis Report

- Various configurations of technologies
  - AMI, DLC, DA, PMU, communications, DER/EV
- Relate technology configurations to grid capabilities & benefits
- Extent of deployment
- Costs

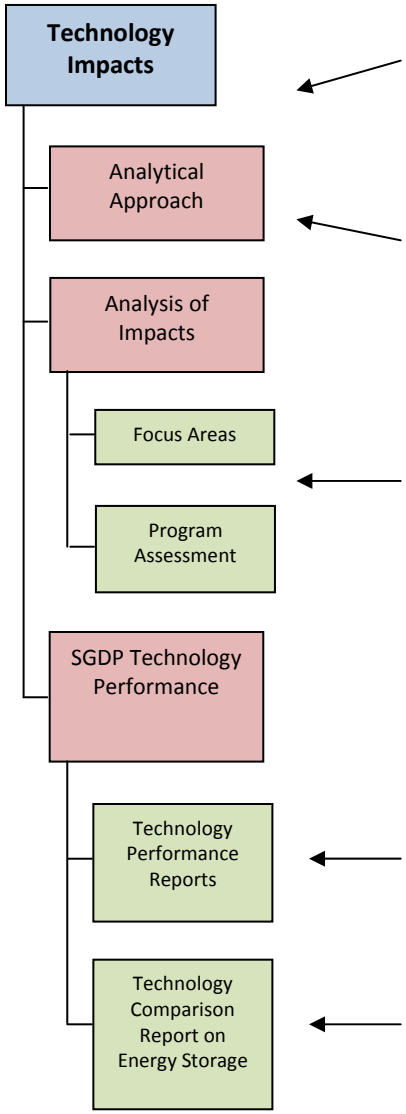
Follow-Up Reports

Build Metric Analysis



IMPACT METRICS

Technology and Impacts Reporting



Case studies showing the impacts expected and observed for individual projects will be archived here, although presented on the front page of smartgrid.gov.

The analytical approach and underlying calculations used to determine impacts and benefits will be documented here, including guidance documents, computational tools and all applied methods.

DOE will report on observed impacts, contributing factors, and associated benefits in key areas. In addition, DOE will present an assessment of the overall benefits provided by the SGIG and SGDP.

Interim and Final Technology Performance Reports submitted by SGDP recipients will be posted here.

DOE will provide a report discussing the performance and the relative value of the energy storage technologies demonstrated in the SGDP.

Impacts and Technology Performance Reporting

Analytical metrics & benefits framework and methodology

Impacts and benefits

<u>SGIG</u>

- **Projects report impact metrics semi-annually**
- **DOE will not report impact metrics for individual projects except case studies**
- **Meta-analysis of SGIG projects (6 Focus Areas)**
  - **Reduce peak demand and consumption**
  - **O&M improvement from AMI**
  - **O&M improvements in distribution system**
  - **Distribution reliability**
  - **Energy efficiency in distribution**
  - **Application of synchrophasors**

Impacts and Technology Performance Reporting

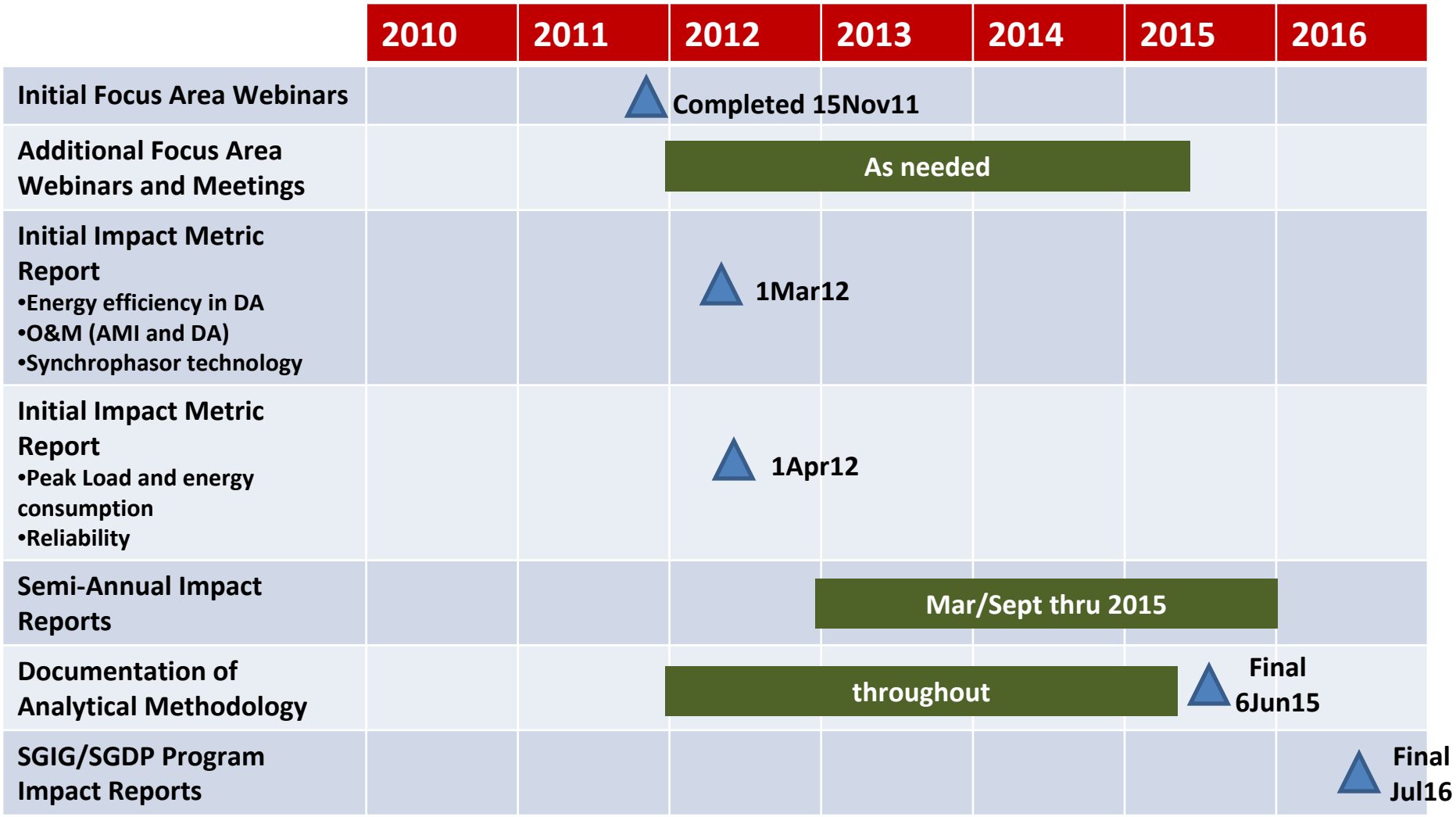
Impacts and benefits

SGDP

- **Interim and final technology performance reports for each project**

- **Meta-analysis of SGDP/Energy Storage projects**

Impact Metric and Benefits Analysis

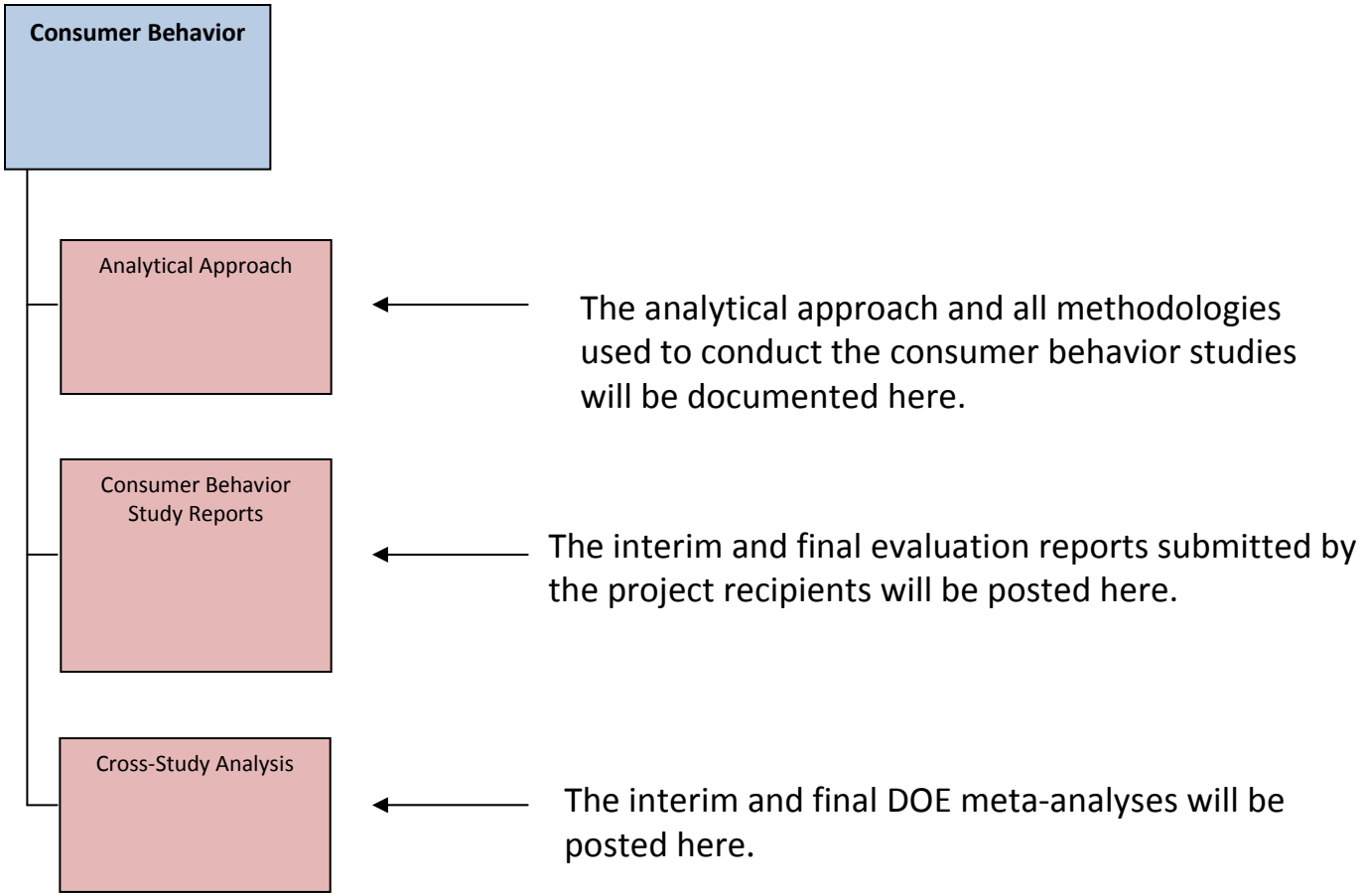


SGDP Technology Performance Reporting

	2010	2011	2012	2013	2014	2015	2016
Interim and Final Technology Performance Reports		Begin Oct 12	→	→	→	End 2015	
DOE Energy Storage Technology Comparison Report						Final	

CONSUMER BEHAVIOR STUDIES

Consumer Behavior Reporting



Consumer Behavior Studies

Impacts and Technology Performance Reporting

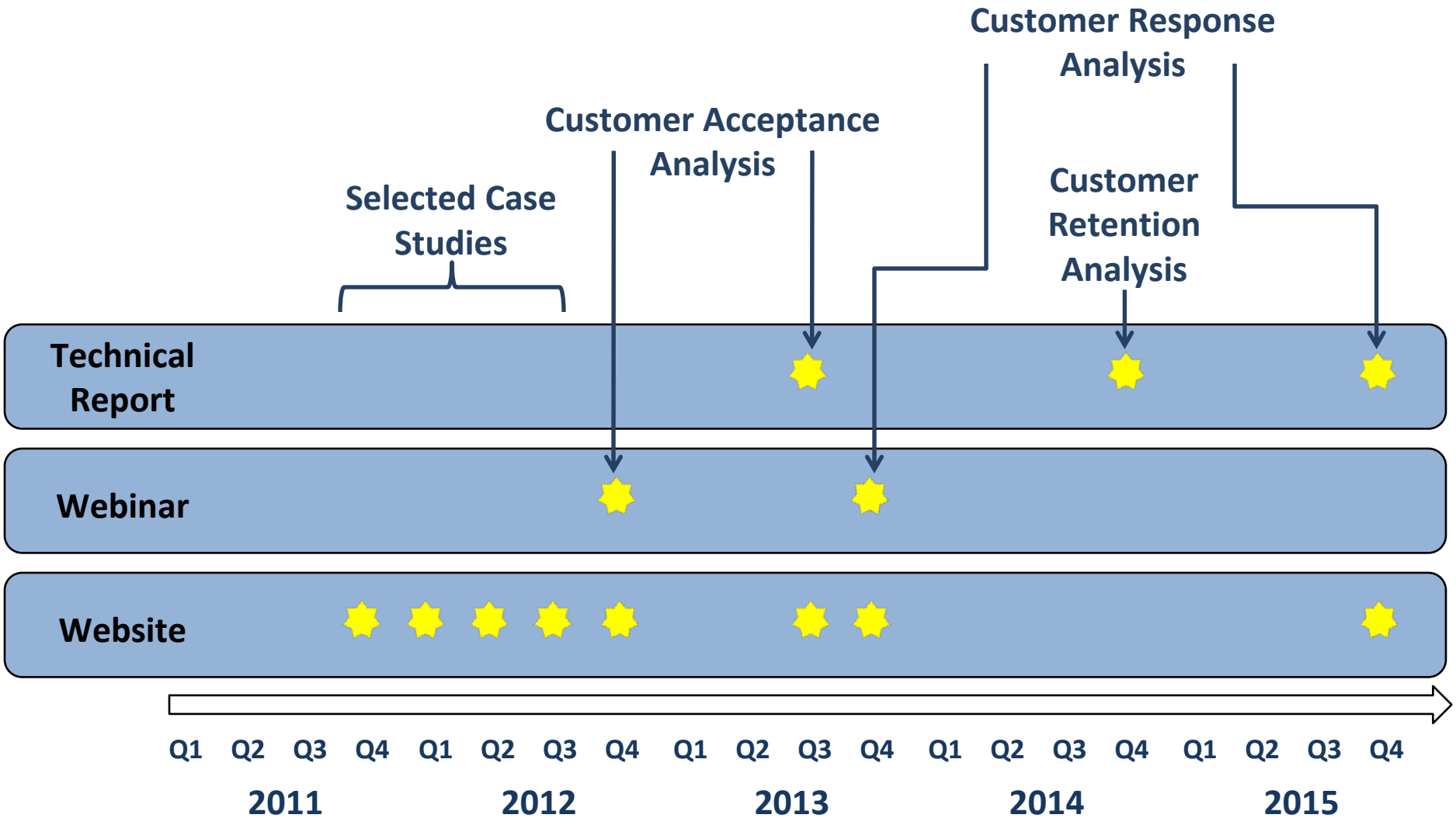
Impacts and benefits

<u>Consumer Behavior Studies</u>

- **Project provide interim and final reports from 2011 through mid-2015**

- **Technical Advisory Group will conduct meta-analysis**
  - **Interim and final reports Q4 2012 and Q3 2013 (acceptance)**
  - **Interim and final reports Q4 2013 and Q4 2015 (response)**
  - **Final technical report Q4 2014 (retention)**

Cross-Study Analysis



STAKEHOLDER ENGAGEMENT

Engaging Stakeholders

Analytical Methodology:
- Addressing data-gathering and analysis issues
- Advancing methodology to support business case analysis

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Reporting Results:
- Sharing empirical results
- Technology transfer

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Peer-to-Peer:
- Consumer Behavior Forum
- NASPI
- Encourage technical discussions (focus areas)

Key Stakeholders:

EEI/EPRI
NRECA
APPA
NASPI

NARUC/PUCs
Consumer Advocates

Demand Response Coalition

Engaging Stakeholders