

# NIST Update: Grid Interop and Green Button

Smart Grid Task Force  
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# NIST role in smart grid – interoperability standards coordination and research

The Energy Independence and Security Act of 2007 gave NIST *“primary responsibility to coordinate development of a framework that includes ... **standards** ... to achieve interoperability of smart grid devices and systems...”*

Strong interagency coordination with DOE, FERC, and other agencies (incl. SGTF)

- National priority (Congress, Administration)
- Standards needed to support ARRA investments + ...
- Interoperability requires standards and conformity assessment
- Leverage NIST metrology efforts and grow research program over time



# NIST Smart Grid Program (as a whole)

Metrology	Standards	Testing/Certification
<ul style="list-style-type: none"> <li><u>Initial condition:</u> Some NIST projects, low industry R&amp;D, lack of univ. power engineer programs</li> </ul>	<ul style="list-style-type: none"> <li><u>Initial condition:</u> Heterogeneous mix of often competing int'l &amp; national standards groups without coordination</li> </ul>	<ul style="list-style-type: none"> <li><u>Initial condition:</u> Virtually non-existent initial ecosystem, scattered electric utilities testing capabilities, some user groups</li> </ul>
<ul style="list-style-type: none"> <li><u>Approach:</u> Identify new R&amp;D needs w/ increased industry interactions, fund/grow NIST research, outreach</li> </ul>	<ul style="list-style-type: none"> <li><u>Approach:</u> SGIP, technical champion and NIST co-leads of priority action plans, Framework, outreach to SDOs/SSOs + int'l</li> </ul>	<ul style="list-style-type: none"> <li><u>Approach:</u> Bottom up (no top-down FedGov authority model), SGIP TCC Interop Process Ref Manual (ISO/IEC 17025 and Guide 65) + outreach</li> </ul>
<ul style="list-style-type: none"> <li><u>Future direction:</u> NIST-RASEI R&amp;D needs workshop; work w./DOE/EPRI; CyberPhysSystems</li> </ul>	<ul style="list-style-type: none"> <li><u>Future direction:</u> Transition to SGIP 2.0 non-profit legal entity with greater private sector funding</li> </ul>	<ul style="list-style-type: none"> <li><u>Future direction:</u> SGIP support for initial ITCA programs, work with utilities and regulators on value proposition</li> </ul>



# Grid Interop 2012

- Smart Grid Interoperability Panel (SGIP) and GridWise Architecture Council (GWAC) joint event held December 2-6, 2012 in Irving, Texas
- Over 240 attendees
- SGIP 1.0 sessions – Governing Board, SGIP working groups meetings and celebration of accomplishments over past 3 years
- SGIP 2.0, Inc. public sessions – Board of Directors, various working committees
- Dec 7: Smart Grid International Cooperation: Korea & United States workshop



# Grid Interop 2012

- SGIP 1.0 Governing Board meeting
  - Final meeting, review of last three years accomplishments
  - 14 new standards presented for Catalog of Standards, Governing Board recommendation vote now in progress, then will go to SGIP 1.0 Plenary for final vote in early January
    - Includes AEIC smart meter guidelines (vigorous discussion)
    - Includes Green Button standards (NAESB REQ-21 ESPI & 22)
    - Includes IEC 62351 series on IT security for power system control operations



# Grid Interop 2012

- SGIP 2.0 activities
  - First public meetings of Board of Directors and Working Committees
    - Executive Committee
    - Technical Committee
    - Marketing and Membership
    - Nominating and Governance
    - Audit
  - Executive Director position advertised, applications received
  - SGIP 2.0 leadership was pleased with the level of member interest and involvement, and noted that several SGIP membership applications received (including NIST)
  - Issues for resolution: overall communications and status of volunteers during transition



# Grid Interop 2012



- Patrick Gallagher (Under Secretary of Commerce for Standards and Technology and NIST Director) and John McDonald (President, SGIP 2.0, Inc.) signed NIST/SGIP 2.0, Inc. Memorandum of Understanding



# Smart Grid International Cooperation: Korea & United States workshop – Dec7



## US SGIP and Korea SGSF Joint Smart Grid Workshop

SMART GRID INTERNATIONAL COOPERATION



**SMART GRID**  
Standardization Forum

**SGiP**

SMART GRID INTEROPERABILITY PANEL

IRVING, TEXAS • 7 DECEMBER 2012





# Smart Grid International Cooperation: Korea & United States workshop – Dec7

- Smart Grid Interoperability Panel (SGIP) and Korea Smart Grid Standardization Forum (SGSF) Joint Smart Grid Workshop
- Agenda:
  - Welcome and Opening Remarks
  - Smart Grid Framework and Architecture
  - Cybersecurity
  - Test & Certification
  - Smart Grid User Applications
  - Smart Grid Technologies and Tools
  - Summary of Conference Outcomes and Next Steps



# NIST Smart Grid FFO

- November 29, 2012: NIST announces Federal Funding Opportunity (FFO) for a “Smart Grid Interoperability Standards Cooperative Agreement Program”
- NIST is soliciting proposals from eligible applicants for “a program with substantial NIST participation that will support continuous innovation of the electrical grid through the coordination and acceleration of standards development and harmonization and advancement of the interoperability and security of smart grid devices and systems.”
- As described in the FFO, anticipated funding is up to \$750,000 (FY13) and \$1,000,000 (FY14 and FY15), subject to the availability of funds.



# NIST SG Federal Advisory Committee

- Dec 18-19 meeting held at NIST Gaithersburg
- Primary focus on cybersecurity
  - Industry Cybersecurity Activities and Needs: EEI and U. Illinois presentations
  - Federal Smart Grid-Related Cybersecurity Activities: DHS, DOE, FERC, NERC, NIST presentations
- NIST/RASEI Workshop Recap
- R&D Subcommittee presentation
- Update on SGIP transition
- Future Directions
- Lab tours



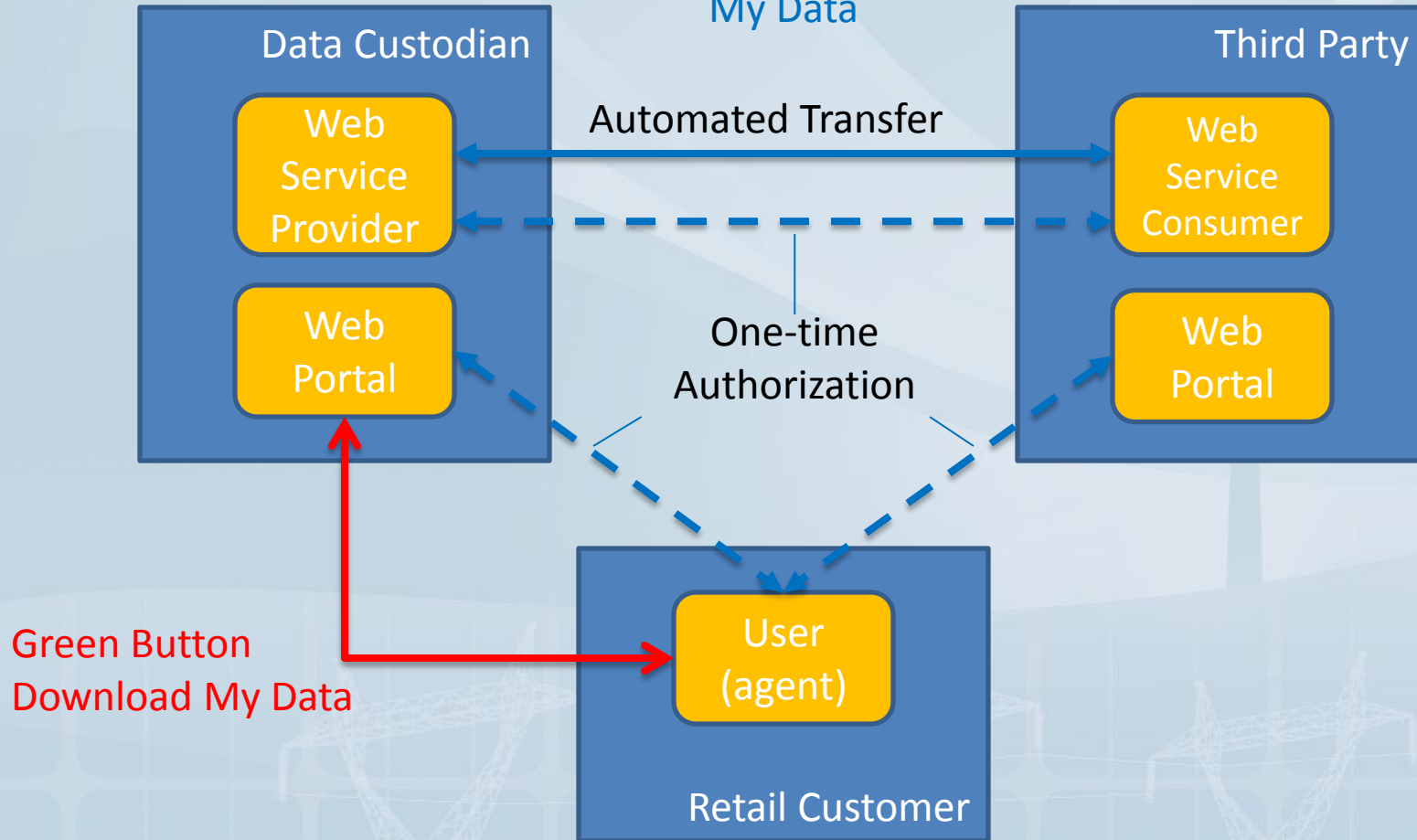
# Green Button – recent activities

- Nov 7: NIST-DOE-OSTP-CEQ planning meeting
  - Start of work meeting for new NIST contract on Green Button Implementation Support (Hypertek, Inc. – Marty Burns)
- Nov 11-13: NARUC Green Button discussions
- Dec 4 & 11: NIST SGIP PAP20 meetings – Grid Interop and OpenADE
- Dec 12: EPA – Yardstick discussion (update will enable Green Button data input)
- Dec 12: Interagency MyData programs meeting



# Roles and Relationships in Green Button Connect My Data

Green Button Connect My Data



# Green Button Standards Deliverables

- NAESB REQ18/WEQ19 Maintenance Update
  - In front of NAESB Executive Committee for Approval
- NAESB REQ.21 ESPI Errata Update  
ESPI New Requirements Update
  - Moving Help Desk Items to start NAESB ESPI update Process
- International Standard based on ESPI, and Schema availability
  - Potential resolutions to be communicated by NIST to NAESB leadership for discussion, PAP20 community support



# Green Button Testing and Certification

- OpenADE Task Force develops requirements and implementation agreements for ESPI and produces a test plan that encompasses
  - Green Button Download My Data
  - Green Button Connect My Data
- OpenADE Task Force moves test plan matrix (spreadsheet) forward to provide basis for test plan and tools
- ESPI Green Button Download and Automated Data Exchange Conformance Suite
  - Builds out test plan to deliverable status
  - Builds implementing test tools



# OpenADE Green Button Test Plan

<http://osgug.ucaiug.org/sghsystems/OpenADE/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2fsgsystem%2fOpenADE%2fShared%20Documents%2fTesting%20and%20Certification%2fGreenButtonTestPlan>

The screenshot shows a SharePoint web browser interface. The browser address bar displays the URL: [osgug.ucaiug.org/sghsystems/OpenADE/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2fsgsystem%2fOpenADE%2fShared%20Documents%2fTesting%20and%20Certification%2fGreenButtonTestPlan](http://osgug.ucaiug.org/sghsystems/OpenADE/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2fsgsystem%2fOpenADE%2fShared%20Documents%2fTesting%20and%20Certification%2fGreenButtonTestPlan). The page title is "Open Smart Grid - OpenSG". The navigation menu includes: Home, SG Systems, SG Conformity, SG Security, SG Communications, SG Simulations, SG EIM, Meetings, Other UCAIug Sites, and Member Cor. The left sidebar contains sections for Sites, Documents, Lists, and People and Groups. The main content area shows a document library for "GreenButtonTestPlan" with a table of documents.

Type	Name	Version	Modified	Modified By
Folder	referenceMaterial		4/24/2012 2:32 PM	martin.burns
Folder	Save		7/3/2012 7:13 AM	martin.burns
Excel	ESPIServices		9/20/2012 4:28 PM	martin.burns
Word	Green Button Download and Automated Data Exchange Conformance Suite - integrated deck 052812		6/28/2012 8:18 AM	martin.burns
Word	Green Button Download and Automated Data Exchange Conformance Suite PON_052112		6/27/2012 11:52 AM	martin.burns
Word	GreenButtonProformaPICS		6/28/2012 9:16 AM	martin.burns
Excel	GreenButtonTestCases		11/19/2012 4:02 PM	martin.burns
Word	GreenButtonTestPlan		11/27/2012 2:55 PM	martin.burns
Word	GreenButtonTestPlan20121025		10/26/2012 11:04 AM	martin.burns
Word	GreenButtonTestPlanOpenADECincinnati20120627		6/28/2012 8:18 AM	martin.burns
Word	HelpDeskItems	1.0	11/7/2012 4:50 AM	martin.burns
Image	SchematronDemoOpenADE20120627		6/28/2012 12:17 AM	martin.burns

Test Cases

Test Plan

Help Desk





# Green Button Test Plan Requirements Hierarchy

## Applications Profiles

- Section 3 GBTP

## Function Blocks

- Section 5 GBTP

## Test Requirements

- Rows of GBTC spreadsheet
- From source documents
- From experience

## Test Cases

- Rows of GBTC spreadsheet

### 3.2 Green Button Connect My Data

*Required Conformance Block Definition Data Custodian: FB\_1 [M], FB\_3 [M], FB\_4 [M], FB\_5 [O], FB\_6 [O], FB\_7 [O], FB\_8 [O], FB\_9 [O], FB\_10 [O], FB\_11 [O], FB\_12 [O], FB\_13 [M], FB\_14 [M], FB\_15 [O], FB\_16 [O], FB\_17 [O], FB\_18 [O], FB\_19 [O]*

*Required Conformance Block Definition Third Party: FB\_1 [M], FB\_21 [M], FB\_22 [M], FB\_23 [M], FB\_24 [O], FB\_25 [O], FB\_26 [M]*

Note: the creation and operation of the Green Button Connect My Data is explicitly defined in the Use Cases of the ESPI standard. Green Button Connect My Data extends the concepts and benefits of Green Button Download My Data; while Download My Data provides a one-time download of historical energy usage information directly to the consumer, Connect My Data

enables the secure delivery of historical and ongoing usage information from the Data Custodian to one (or possibly more) 3rd Parties, as selected by the Retail Customer.

### 5.2 Data Custodian Role

#### 5.2.1 [FB\_2] Green Button Download My Data

This block contains the test requirements that are unique to the Green Button Download My data application.

*[TR\_GB.1] Green Button: Customers shall have the ability to download usage data using a Green Button*

*[TR\_GB.2] GB Access: Customer will access the information based on current login to access their consumption data*

Test Name	Test ID	W/O	Test Type	Category	Method	W/F	Test Purpose / Requirement	Initial Conditions
HTTP	PROTO1		Positive	Protocol		Either	Verify implementation of HTTP	
HTTPS	PROTO2		Positive	Protocol		Either	Verify implementation of HTTPS	
Configure Third Party	CONF1		Positive	Security		Both	Verify ability to authorize and configure a third party	
Atom feed - GET	FND1		Positive	Fundamental		Either	Verify GET behavior for feeds	Third Party has been authorized and configured

GBTP – Green Button Test Plan Document

GBTC – Green Button Test Cases Spreadsheet



# Additional item that may be of interest to other agencies: SGIP PAP21 – Weather

- Reference: PAP21 meeting at Grid Interop, presentation at <http://www.pointview.com/data/2012/12/59/pdf/Marty-Burns-AWVXGMKG-18867.pdf> - see also SGIP PAP21 webpage
- Today there are multiple SDO weather data model efforts
- Need coordination and co-development of weather information models through:
  - use cases development
  - cross-participation between weather data model efforts
- SGIP can play a constructive role to insure interoperability:
  - broad stakeholder participation and needs representation
  - inputs by Renewable/DER, utility/ISO/RTO community
- Vision: develop unified modeling approach and/or a well-defined weather information model development ecosystem to ensure consistency and mappings.

