# *Progress and Plans: Annex 1 Global Smart Grid Inventory*

## Eric Lightner, Annex 1 Lead (U.S. DOE)

*October 2012*

# Annex 1 Participants

| | | | |
|---|---|---|---|
| Australia | | Korea | |
| Belgium | | The Netherlands | |
| Canada | | Russia | |
| China | | Spain | |
| Finland | | Sweden | |
| France | | Switzerland | |
| Ireland | | United Kingdom | |
| Italy | | United States | |
| Japan | | | |

All 22 ISGAN signatories contributing data and information to Annex 1

**Operating Agent (as of August 2011)**

KSGI

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# Annex 1 Tasks

**Task 1: Unified ISGAN framework for assessment of national-level motivating drivers and technology priorities for smart grids (completed with delivery of summary report)**

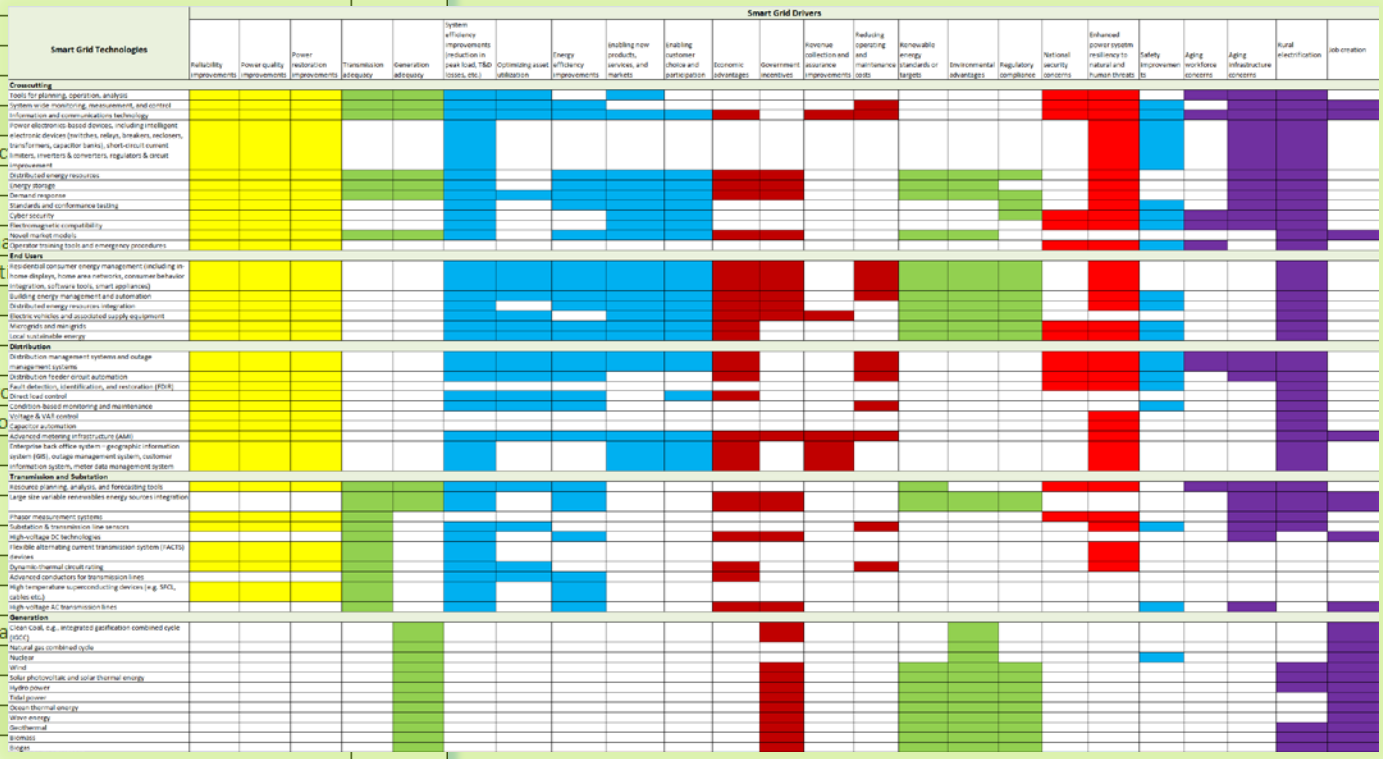
**Task 2: Development and population of the initial project inventory with data content exchangeable with those in other existing smart grid databases (in progress)**

**Task 3: Quantitative analysis on select inventory projects, using key performance indicators**

**(to start in Q4 2012)**

# Template for Annex 1 Assessment Framework

| Driver* | Ranking |
|---|---|
| *Reliability* | |
| Reliability improvements | |
| Power quality improvements | |
| Power restoration improvements | |
| Transmission adequacy | |
| Generation adequacy | |
| *Efficiency* | |
| System efficiency improvements (reduc | |
| Optimizing asset utilization | |
| Energy efficiency improvements | |
| Enabling new products, services, and m | |
| Enabling customer choice and participat | |
| *Economic* | |
| Economic advantages | |
| Government incentives | |
| Revenue collection and assurance impr | |
| Reducing operating and maintenance co | |
| *Environmental* | |
| Renewable energy standards or targets | |
| Environmental advantages | |
| Regulatory compliance | |
| *Security* | |
| National security concerns | |
| Enhanced power system resiliency to na | |
| *Safety* | |
| Safety improvements | |
| *Crosscutting* | |
| Aging workforce concerns | |
| Aging infrastructure concerns | |
| Rural electrification | |
| Job creation | |




**>24 drivers in 7 categories**
**>50 technologies in 5 categories**

**>400 combinations of driver/technology pairs to select and prioritize**

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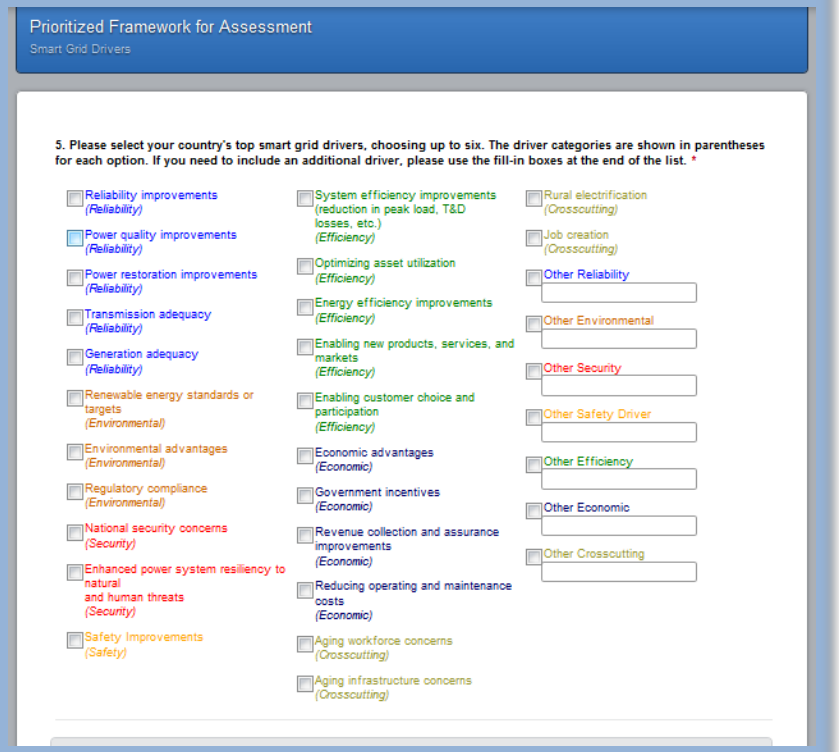
# Developed a Web-based Survey Tool for Prioritized Assessment Framework

## Web-based survey tool for use by each country:

- Top 1-6 motivating drivers
- Top 1-5 smart grid technologies contributing to each top-ranked driver

*Up to 5 surveys allowed to reflect stakeholder/geographic diversity*




**Using survey results to identify driver and technologies that are top-ranked by countries for cooperation in qualitative and quantitative assessments**

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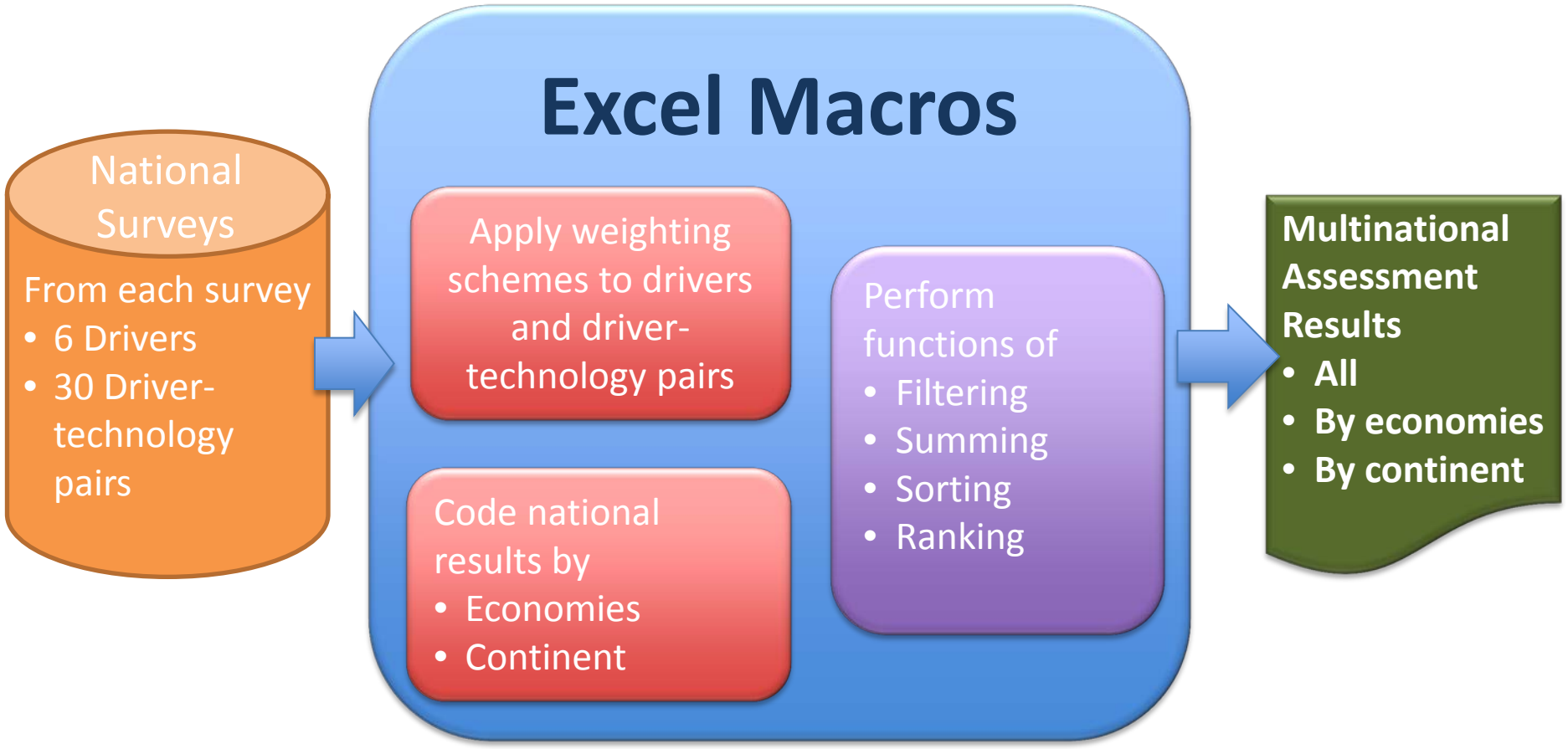
# Survey Completion and Validation

## Status, as of September 30

| Survey Status | # of Surveys | # of ISGAN Countries |
|---|---|---|
| Completed | 35 | 21 |
| **Validated** | **27** | **19** |
| To be validated | 3 | 3 |
| Rejected | 5 | 3 |

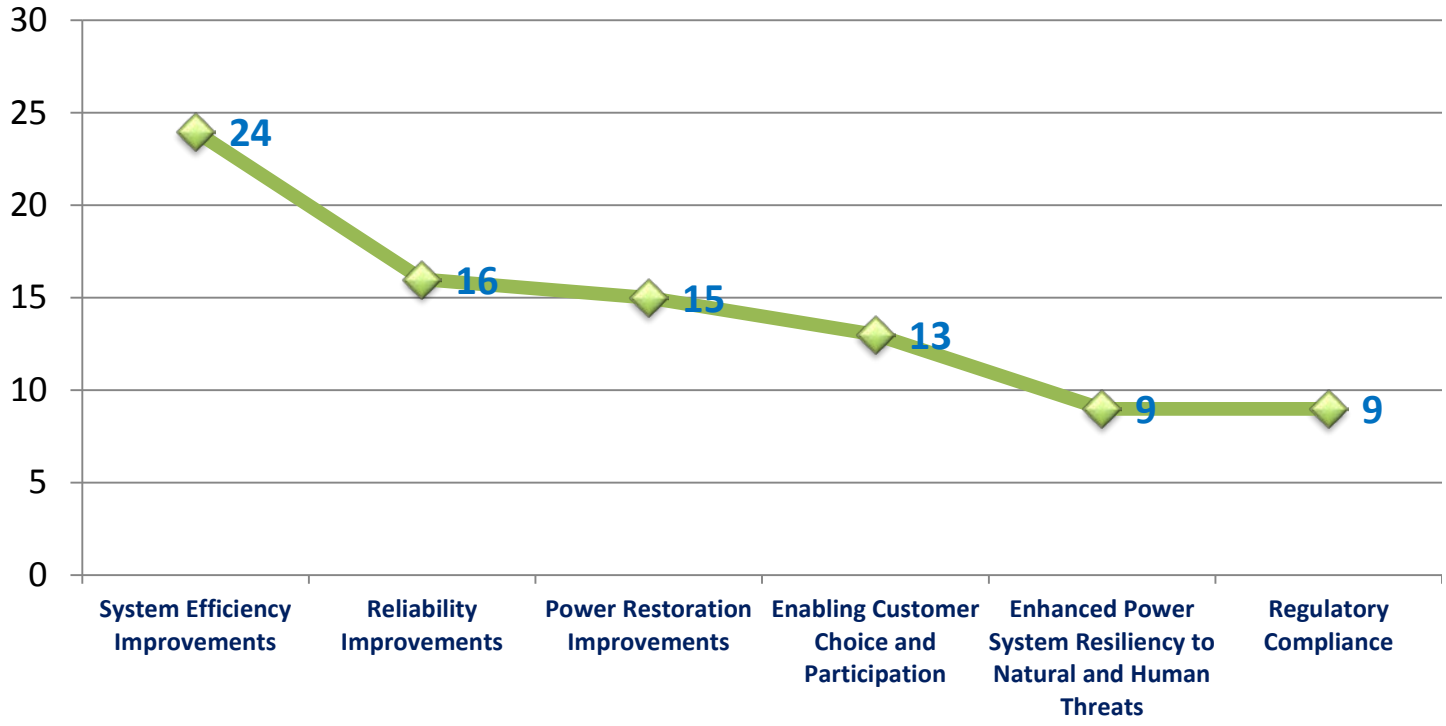
- **7 countries with multiple surveys**
  (5 validated surveys being the most from a country)

# Developed an Excel Tool for Survey Analysis



# National-Level Assessment Results from the U.S.: Composite results of 5 surveys

## Top 6 Ranked Drivers



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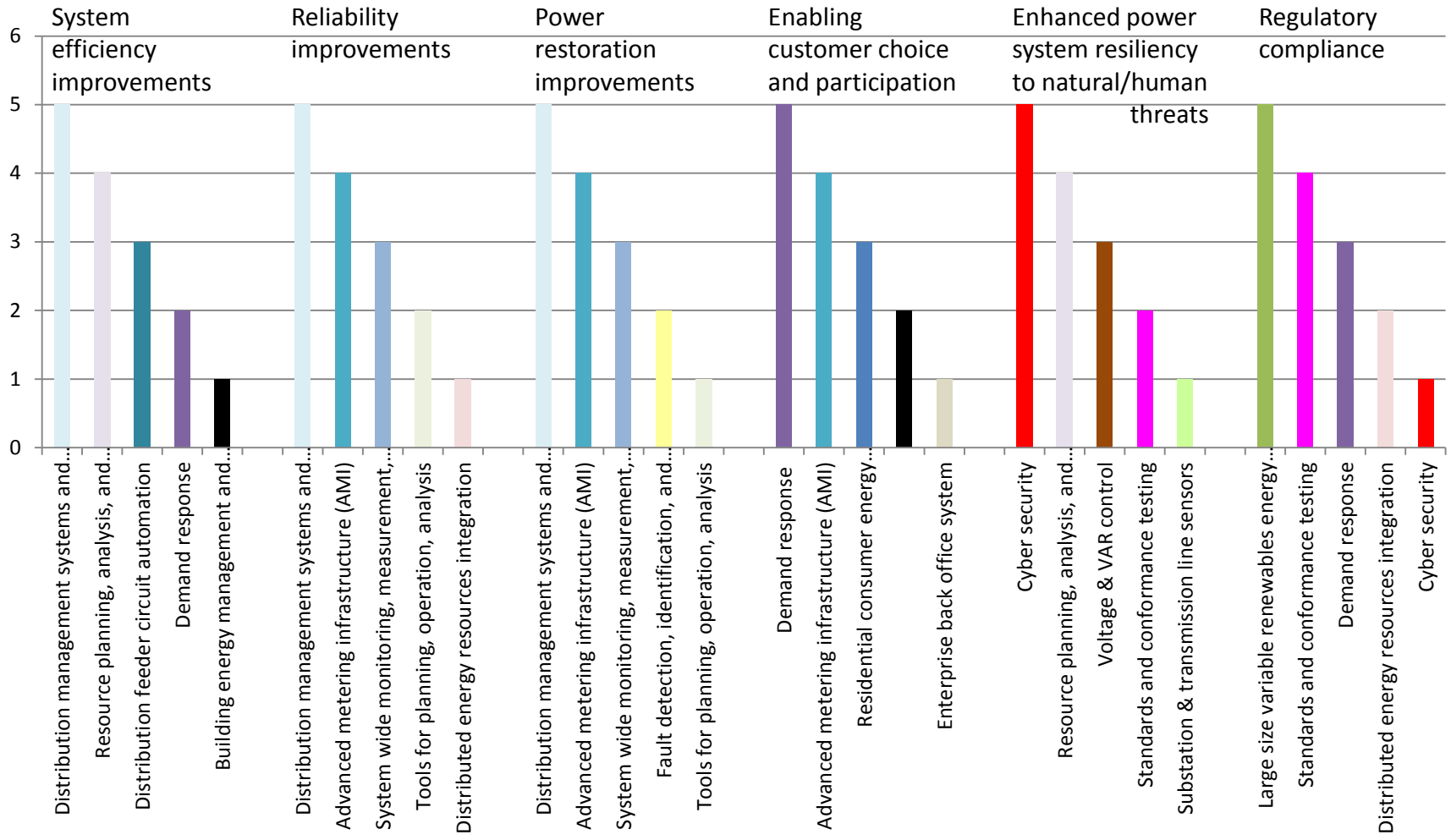
# National-Level Assessment Results from the U.S.: Composite results of 5 surveys

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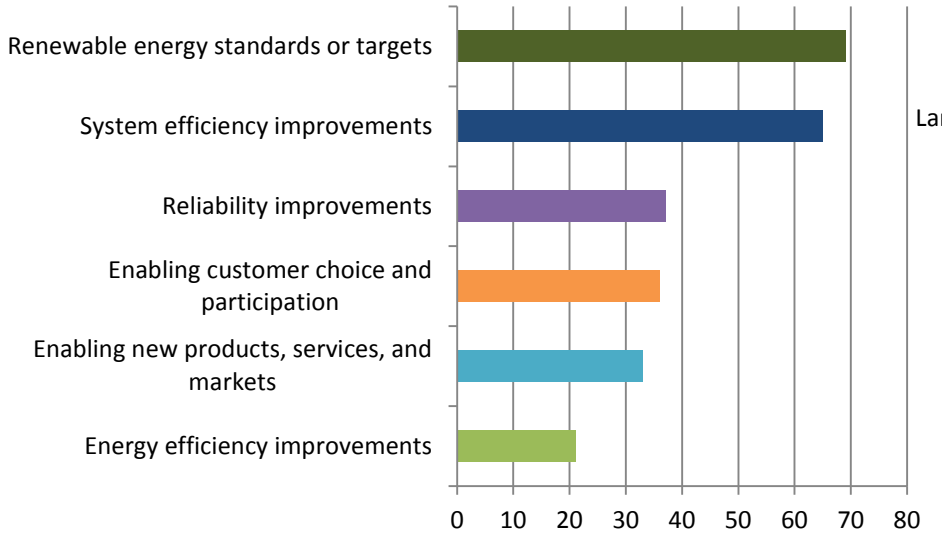
# Completed Task 1 with Delivery of Summary Report of Analysis Results

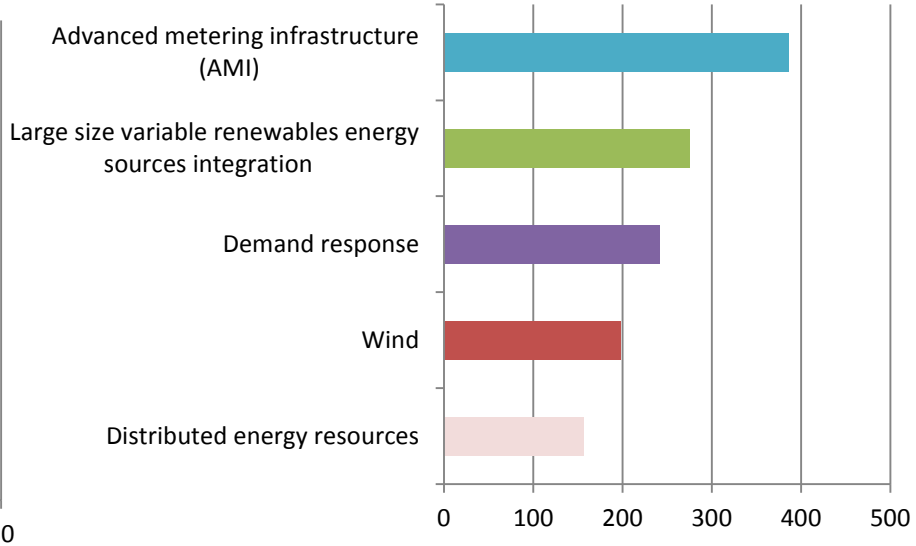
**Documented prioritized assessment of smart grid motivating drivers and technologies by 19 ISGAN countries**

**Documented multinational-level analysis results of all 19 countries, developed and developing economies, and 4 continents**

## Top 6 Ranked *Drivers* of 19 Countries




## Top 5 Ranked *Technologies* of 19 Countries

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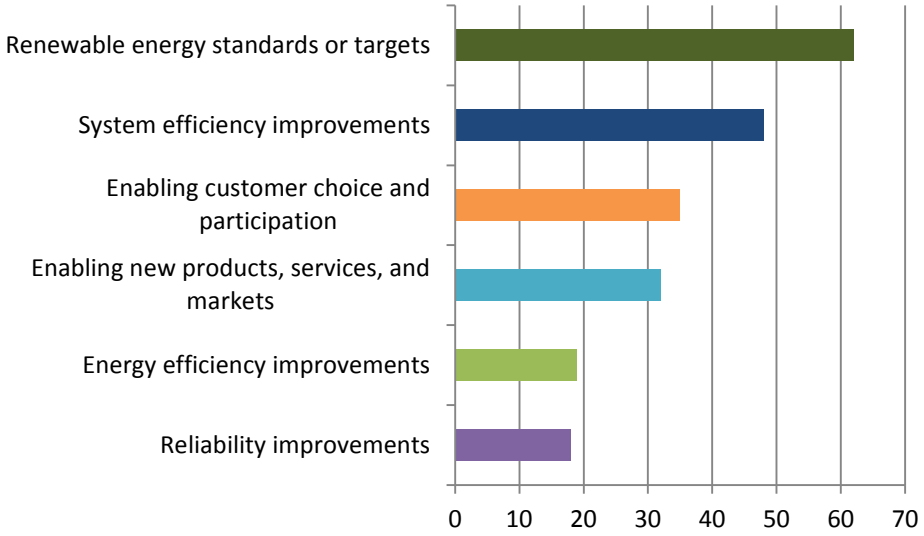
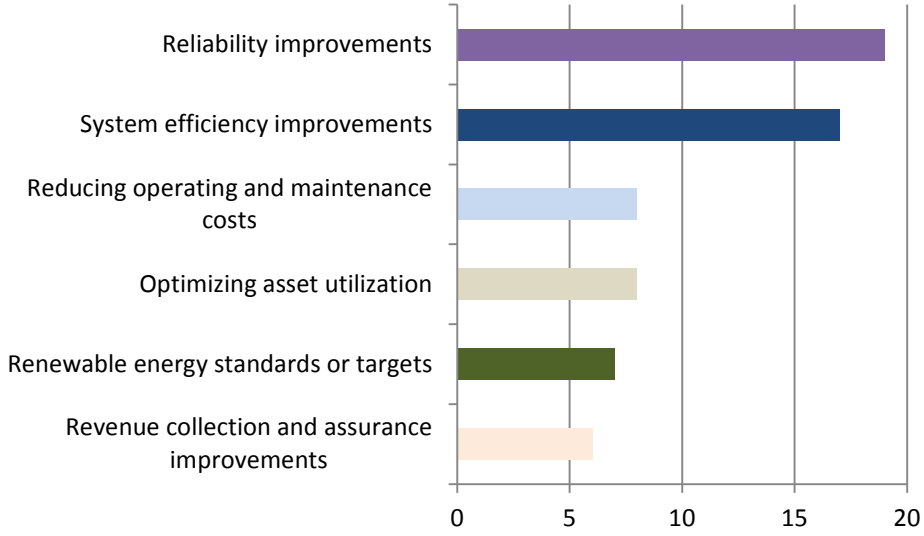
# Clustering of Validated Survey Results: by economies

## Top 6 Ranked Drivers

### 15 *developed* economies




### 4 *developing* economies




- **Common motivating drivers**:
  Renewable energy standards or targets, System efficiency improvements, and Reliability improvements
- **Other motivating drivers of priority**:
  - *Developing*: lean toward current operational improvements
  - *Developed*: lean toward enabling characteristics of smart grid

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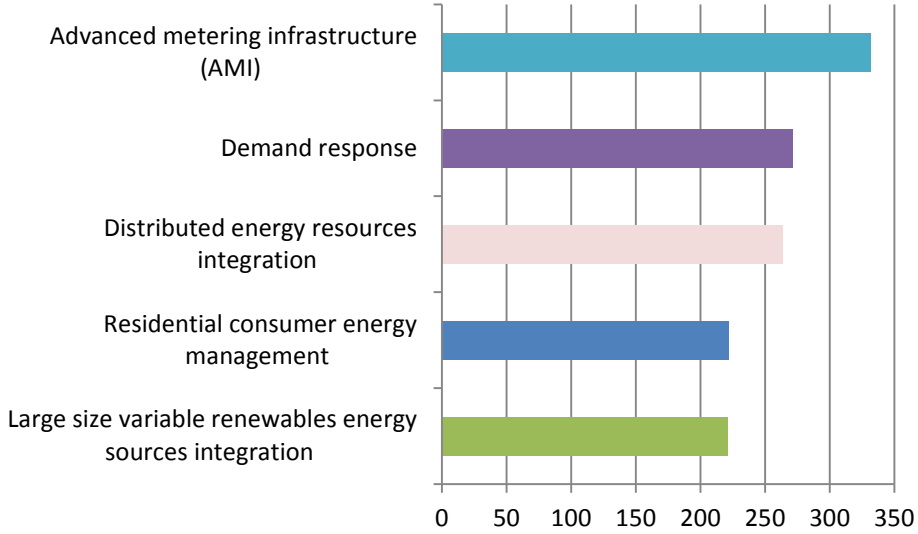
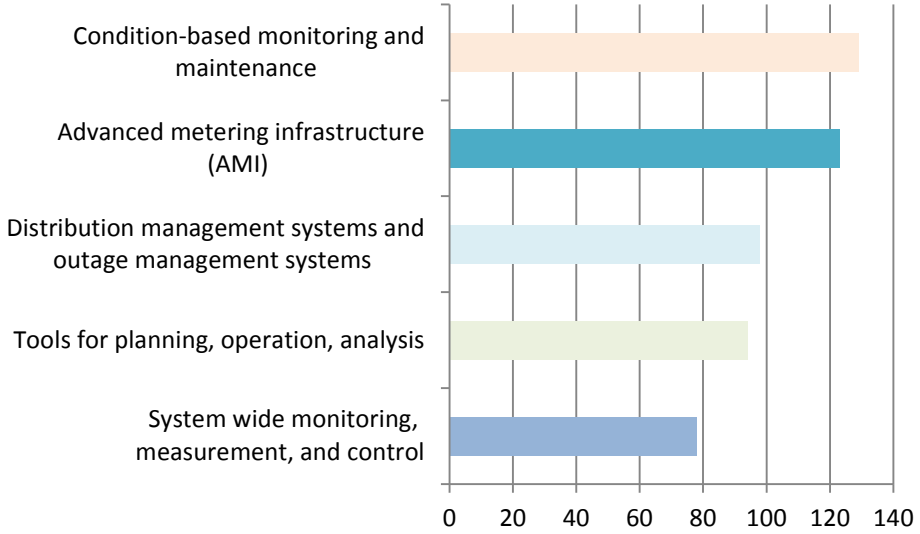
# Clustering of Validated Survey Results: by economies

## Top 5 Ranked Technologies across All Drivers

### 15 *developed* economies




### 4 *developing* economies




- **Common technology of priority**: AMI
- **Other technologies of priority**:
  - *Developing*: supporting current operational improvements
  - *Developed*: supporting enabling characteristics of smart grid

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# Task 2: Web-based Project Inventory

## ID of Inventory Projects

- Selection criteria
- List of ≤10 projects from each country

## Build and Management of ISGAN Project Inventory

- Template for inputting project data & information
- Input of project information
- Analysis and reporting

# ID of Inventory Projects

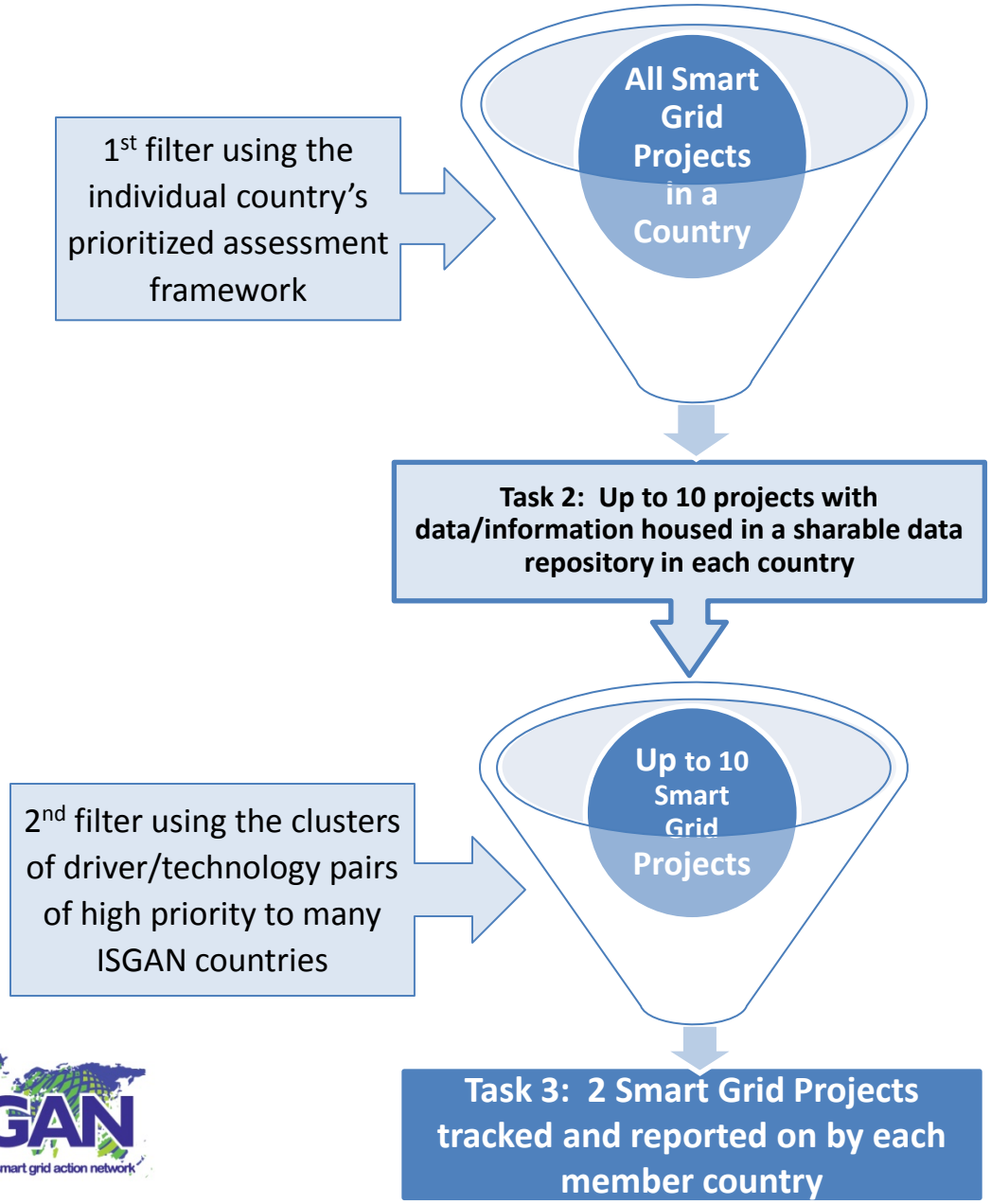
## Developed Project Selection Criteria

- Demonstration and/or deployment
- Supported by Government or regulator
- Supporting drivers and technologies of national priority
- Addressing ISGAN focus areas
- Near term (w. c/b analysis by 2017)

## Compiling lists of projects

- Project lists from 12 countries received
- Lists from the remaining 10 countries to be submitted

# Application of Analysis Results



# Questions & Contact Information

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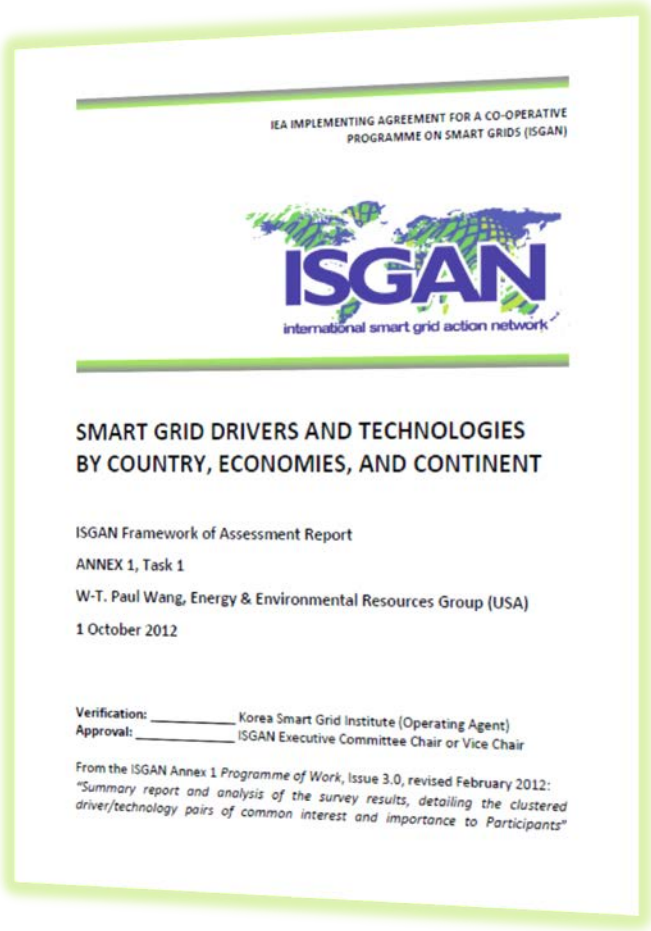

IEA IMPLEMENTING AGREEMENT FOR A CO-OPERATIVE PROGRAMME ON SMART GRIDS (ISGAN)

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SMART GRID DRIVERS AND TECHNOLOGIES BY COUNTRY, ECONOMIES, AND CONTINENT

ISGAN Framework of Assessment Report

ANNEX 1, Task 1

W-T. Paul Wang, Energy & Environmental Resources Group (USA)

1 October 2012

Verification: _____ Korea Smart Grid Institute (Operating Agent)
Approval: _____ ISGAN Executive Committee Chair or Vice Chair

From the ISGAN Annex 1 *Programme of Work*, Issue 3.0, revised February 2012:
*"Summary report and analysis of the survey results, detailing the clustered driver/technology pairs of common interest and importance to Participants"*

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