ARCAM Dialogue on Smart Grid Interoperability Standards

Report to the Committee on Trade and Investment

The APEC Regulatory Cooperation Advancement Mechanism on Trade-related Standards and Technical Regulations (ARCAM)[1] held a dialogue on Smart Grid Interoperability Standards on May 12-13, 2011. The dialogue brought together trade officials, regulators, and private sector stakeholders, with the goal of providing input on actions that APEC and its member economies can take to prevent trade barriers related to Smart Grid interoperability standards. The CTI will use the outcomes developed through the dialogue to agree on set of recommendations by the end of the year. This report contains a set of consensus outcomes developed by participants in the dialogue and provides brief summaries of the presentations and discussions.

1. Outcomes of the ARCAM Dialogue

The participants of the dialogue put forward the following outcomes for consideration.

The Stylized Facts

- Many APEC economies are currently promoting, or are considering promoting, the development and deployment of electrical Smart Grids as a primary means towards achieving the critical policy objectives of increasing energy efficiency, increasing the use of renewable sources of energy, reducing greenhouse gas emissions, mitigating climate change and building a sustainable economy.

- A Smart Grid is an "intelligent" electricity network -- a system of systems -- that overlays digital technology to deliver electricity from suppliers to consumers and includes two-way communications between the grid and consumers.

- Smart Grid deployment carries tremendous significance for trade and investment in the APEC region. The compatibility of the Smart Grid technologies across APEC economies will be largely determined by the degree of the interoperability in the underlying technical standards deployed by each economy.

- Interoperability standards for the Smart Grid will play a critical enabling role in expanding product markets and promoting vendor competition as well as preventing premature obsolescence and facilitating future upgrades of equipment and technologies. Harmonized interoperability standards can save costs and facilitate trade and investment.

[1] See 2011/SOM1/CTI/015 and 2010/SOM2/012anx5.

- Choices made by domestic regulators on interoperability standards in the deployment of domestic Smart Grids will have a profound impact on the extent to which product markets and associated technologies are able to expand to their full potential. Further, the challenges of developing and deploying Smart Grid are bigger than any one economy can meet.

- Collaboration is essential for success, and will further promote trade and investment in the region.

Preventing Unnecessary Technical Barriers to Trade

- Domestic coordination among regulatory authorities, standards bodies and trade officials can produce win-win outcomes by increasing understanding of the larger trade and investment impact of regulatory and policy actions, as well as opening channels of information on international standards and conformity assessment activities that can assist national authorities in meeting their regulatory and policy objectives.

- Greater transparency of work programs for standards development related to Smart Grid, at the national and international levels consistent with the WTO Code of Good Practice, can provide the basis for greater collaboration on standards development.

- Commitment to use relevant international standards wherever possible, and to participate in the development of international standards, will facilitate the development of global technological solutions, global product markets, and competitive opportunities for small and large companies across all APEC members.

Specific Recommendations

- Consumer Demand Response: APEC members should cooperate through a variety of venues, including through the Pacific Area Standards Congress, to propose and develop international Smart Grid standards that enable interoperability at the interfaces for home energy management.

- Renewable Energies: APEC members should cooperate, including through the Pacific Area Standards Congress, to propose new work items and to advance the development of international interoperability standards for integration of renewable technologies into the Smart Grid.

- Electric Vehicles: APEC members should explore the development of an APEC vision statement on harmonized standards for EV charging and for battery swapping.

- Conformity Assessment: APEC members should outline a vision for collaborative methods to facilitate reuse of conformity assessment results based on international standards, as well as to facilitate recognition of third party certifiers, to reduce the potential for redundant or costly conformity assessment activities.

Opportunities for Collaboration and Engagement

- APEC members should encourage participation by their relevant stakeholders – regulators, standards bodies, trade officials, the business community, researchers, etc -- in the following activities:

    - The plenary meeting of the Smart Grid Interoperability Panel in Montreal, Canada, July 12-14, 2011
    - World Smart Grid Standards Conference in Seoul, Korea, September 7-8, 2011
    - The State Grid/IEEE Smart Grid World Forum in Beijing, China, September 27-29, 2011
    - The World Forum on Energy Regulation meeting in Quebec City, Canada, May 13-16, 2012
    - Upcoming meetings of the International Smart Grid Action Network
    - Upcoming meetings of the International Electro-technical Commission's Strategy Group 3
    - Upcoming meetings of IEEE Standards Association
    - Upcoming meetings of SAE International

- APEC members should consult with the Pacific Area Standards Congress regarding possible opportunities for collaborative actions by the national standards bodies to promote APEC member participation in Smart Grid related work in international standards development.

- APEC members should encourage participation by their stakeholders in the APEC Energy Working Group's upcoming projects on Advanced Metering Infrastructure, Electric Vehicles and Consumer Demand Response.

- APEC members should advance discussion on Smart Grid at the upcoming APEC Energy Ministers Meeting at SOM3 in San Francisco.

- APEC members should collectively work to strengthen the consumers' voice in guiding standards development, including through sharing use cases studies and information from consumer education studies and pilot projects.

- APEC members should consider developing and collaborating on APEC project proposals on issues identified in this dialogue.

The Value Add Proposition for APEC

- APEC members should outline a vision to promote greater collaboration and coordination across standards developing organizations at all levels – national, regional and international – to ensure that interoperability standards and conformity assessment procedures will support applications across technologically complex systems. This vision should also promote the

value of "connection events," "plug fests" and other collaborative simulation exercises in ensuring interoperability across key interfaces in the Smart Grid.

- APEC members should develop best practices and models to guide information exchange (including on use cases and demonstration projects); to facilitate the involvement of regulators in the development and adoption of international standards and conformity assessment procedures; and to enable greater collaboration across standards setting organizations in the development and adoption of globally relevant standards.

- APEC should consider how to strengthen the ongoing exchange of information between technical experts, policy makers, regulators, researchers, the business community and other stakeholders to share best practices and identify opportunities for greater harmonization.

2. Summary of the Panel Sessions

Opening Keynote

- LIN Hongyu, Director, State Grid Corporation of China

Mr. Lin provided an overview of State Grid Corporation of China (SGCC) strategy in Smart Grid development and implementation. The theme of SGCC's effort is called Strong and Smart Grid and has five focus areas – Strong and Reliable, Clean & Environmental Friendly, Friendly and Interactive, Open and Transparent, and Economical & Efficient. SGCC is the largest utility in the world and it provides electricity to 88% of China's territory and has five regional power grid companies, 26 provincial electrical power companies, and 28 affiliates. Mr. Lin highlighted SGCC's strategy in Smart Grid including background, concepts, practices, and cooperation. He stressed the importance of international collaboration as construction of Smart Grid is common choice – and hoped to enlarge communication and cooperation in the field of technological innovation.

Session 1: Regulatory and Policy Approaches to Smart Grid Interoperability Standards

- Paul CENTOLELLA, Commissioner, Public Utilities, Commission of Ohio, United States
- Tom BARRY, Department of Resources, Energy and Tourism Australia
- Dae Kyeong KIM, National Standards Coordinator for Smart Grid, KATS/KERI, Korea
- Abel HERNANDEZ, Manager of Norms, National Association of Norms and Certifications, Mexico

In the Opening Keynote and Sesssion 1, speakers reported on Smart Grid efforts in the United States, China, Korea, Australia and Mexico. All speakers identified Smart Grid as a key endeavor being undertaken by their economies to achieve overarching policy goals related to energy, environment and economic development. Speakers relayed a number of common

challenges in their efforts to develop and deploy Smart Grid in their economies. These challenges related to geographic differences, legacy issues, regional needs, and consumer education. A critical focus of all efforts related to the need to find ways to successfully integrate renewable sources of energy, such as solar, hydroelectric and wind sources, into the Smart Grid.

In these presentations, it was clear that solutions developed to meet specific challenges encountered by one economy – such as China and ultra-high voltage transmissions – can benefit other economies. China is developing standards for ultra high voltage transmissions to meet the challenge of delivering energy from its eastern generation sources to consumers in its western provinces, and this technology may also have applications in enabling new cross border export markets. In this regard, Mexico noted that its grid currently exports energy to the United States.

All presenters stressed that regulatory and other authorities in their jurisdictions are moving quickly to implement Smart Grid. Consequently, standards must be developed in short order to meet their needs. While all presenters recognized that international standards are the first reference point to meet their needs, they noted that regulators in their jurisdictions are not always aware of the work underway at the international level, or standards at that level are yet to be developed. They noted that a key challenge is encouraging domestic regulators to know about what is going on at the international level, and understand how these standards can be used to meet their goals. They cited the need for more frequent and robust exchanges of information to enable cooperation on standards that must be developed and deployed quickly.

For the United States, Smart Grid provides a response to the global energy challenges including economic security, energy security, and environmental security. Smart Grid is a U.S. national priority. The Energy Independence & Security Act of 2007 outlined the Federal policy to support grid modernization. Ohio has significant Smart Grid deployments and programs in efficiency, demand reduction, and advanced energy standards. Energy regulation in the U.S. includes many players including the Federal Energy Regulatory Commission, State and Local Commissions. The National Institute of Standards and Technology (NIST) is coordinating the development of Smart Grid Interoperability Standards and has established the Smart Grid Interoperability Panel (SGIP) to provide a venue for open, transparent, and inclusive participation. Its objective is to achieve sufficient consensus and international standards collaboration on standards development to ensure interoperability across the Smart Grid. Early success may be achieved where significant investments are being made to build out or modernize the power system. Utility regulators are central to ensuring interoperability.

In Australia, the Australian Government is funding pilot projects and collecting data including commercial scale projects. Australia's electricity market structure includes separate companies for generation, transmission, distribution and retail. Some companies are regulated; others function in competitive markets. The Smart Grid, Smart City (SGSC) project is a government-funded infrastructure effort that focuses on four objectives – test business case, obtain buy-in from industry, gather information and data to inform a broader industry rollout of Smart Grid and investigate synergies with other infrastructure networks. The SGSC regulatory and policy approaches to Smart Grid interoperability standards are: 1) to facilitate existing standards groups to streamline development and adoption of standards, 2) to focus on assisting the adoption of

Smart Grid, and 3) to inform decision-making processes and make recommendations concerning standards. The SGSC formed a Standards Working Group to develop and Smart Grid Standards Roadmap.

The Korean government has set national targets to increase the energy efficiency and reduce CO2 emissions. Smart Grid is considered a key enabler of those two targets. Various policies and regulations have been developed to promote the realization of Smart Grid. The Smart Grid promotion law approved in 2011 provides a framework for sustainable Smart Grid project with industry participation. It contains a master plan for Smart Grid development, deployment and commercialization of Smart Grid technologies. Korea's Ministry of Knowledge Economy (MKE) is responsible for licensing of businesses for Smart Grid, for individuals wishing to initiate a business to support Smart Grid. The master plan includes development of national interoperability standards framework and major sector key standards, and promoting international standards activities. The Standardization Forum has committees related to policy and five domains, with participation mostly from industry. The Standards Coordinator System is managed by KATS. Korea advanced suggestions to consider, including 1) the need to understand technical regulations, 2) standards can have positive and negative effects on competition and international trade, and 3) global interoperability standards can make a new trade barrier.

Mexico's Smart Grid effort started in 2006 and is based on a model with several elements. The North American Grid is the largest in the work and Mexico has several connections to the U.S. and has the ability to export energy to the U.S. The Smart Grid implementation approach in Mexico focuses on value chain integration as well as system integration using IEC Common Information Model (CIM) standards. Pilot projects are being conducted. The challenges to Smart Grid include renovating existing infrastructure, integrating renewable energy, and reducing the cost of energy. The Mexican Plan for Development addresses sustainability and includes new laws on use and financing schemes relating to renewable energies and energy sustainability. The goals are to increase use of renewables and reduce CO2 emissions 50% by 2050. Smart Grid is key to renovating the whole energy industry – saving energy, increasing efficiency and smarter use. The role of standards is to enable stakeholders to work together to accelerate adoption of technology and provide a commercial platform.

Consumer protection is important as Smart Grid is changing the relationship between utilities and consumers. Further, consumer education is crucial to the success of the Smart Grid since they need to know how the technologies work and the benefits. Standards could play a role in CO2 reduction by targeting energy efficiency, renewable energy, and other factors. There are avenues for exchanging information on standards development such as participation in multinational forums (SGIP, ISGAN, etc.) and close collaboration. Regional economy integration of standards can facilitate trade and investment flows. International standards can help expand the market and enable economies of scale. Regulations are often viewed as a domestic issue, but there are international implications that should be considered.

Session 2: Landscape of Interoperability Standards Development

- John D. MCDONALD, NIST Smart Grid Interoperability Panel (SGIP) Governing Board Chair and Director, Technical Strategy & Policy Development, GE Digital Energy, United States
- Charleston ADAMS, Past President, IEEE Standards Association
- Richard SCHOMBERG, Chair, Strategy Group 3 on Smart Grid, IEC
- Jinyun ZHANG, MERL Fellow, Mitsubishi Electric Research Laboratories, JAPAN

In this session, speakers emphasized the importance of interoperability standards to enabling market competition, facilitating upgrade paths, and reducing risks to consumers. A common theme was that proprietary or unique standards do not fit into the type of integrated solutions needed for Smart Grid. Speakers noted that many standards developing organizations are involved in writing standards for the Smart Grid, and stressed that the current paradigm for standards development in support of Smart Grid differs radically from the way standards were developed a decade ago.

First, the "system of systems" nature of Smart Grid requires that standards be developed within overarching frameworks or architectures in order to ensure that the resulting standards incorporate requirements of the larger systems in which they will operate. Further, determining the requirements at the intersections of these larger systems is complex. Robust stakeholder participation, cooperation across standards developing organizations, partnerships and information exchange must be used to make the best technology solutions available on a global basis. However, as one speaker noted, in order to have architecture, you have to know what you're doing, and different countries are at different places. By looking at the use cases (eg, specific studies of how users interact with the system), experts are still finding gaps in the potential architecture.

Many speakers noted that, because Smart Grid involves a range of components in integrated solutions, it will depend on many suppliers. Smart Grid will enable new opportunities for both small and large companies to participate in global markets to support solutions. It was noted that the wide range of technologies and solutions that characterize Smart Grid translate into the need for many "ecosystem partners" around specific interfaces. In particular, speakers expected that interoperability standards carry the potential to open up the global marketplace for SMEs. One speaker noted that Smart Grid is expected to generate as much as $30 trillion in possible business opportunities over the next two decades, and global standards are the foundation of enabling those opportunities.

Standards technology development, integration, and facilitation will encourage global technology transfer, paving the way for economic development and trade. Speakers noted that a sense of urgency exists, and the global standards community must expeditiously build on prior efforts focused on planning and requirements definition to ensure standards development and deployment progresses within a coherent architecture. The Asia-Pacific community is an integral partner in this effort, which will enable Smart Grid technology to be the catalyst for future development and trade. In this regard, it is essential to ensure interoperability of products from multiple vendors, because no single vendor can build the entire Smart Grid. Standards ensuring

interoperability is very important. If interface among facilities is standardized, production cost can be reduced and advanced functions can easily be implemented.

Harmonization and consistency of relevant standards must be achieved to avoid overlaps. This requires complementary and cooperative work between standards developing organizations, particularly IEC and IEEE. Collaborative work between IEC, which is national membership based, and IEEE, which is basically individual membership based, will result in easy-to-use standards as well as acceleration of the standardization development. In order to expedite adoption of the Smart Grid standards in the market, testing and certification methods should be developed.

Keynote Address

- Osamu ONODERA, New Energy and Industrial Technology Development Organization (NEDO), Japan

Mr. Onodera described elements of the "low carbon economy and society," in which reductions in CO2 emissions are to be achieved through non-fossilization of the energy supply, improvements in energy efficiency, and increases economic growth. He noted that technologies to enable increases in energy efficiency and greater use of renewable source of energy are central to achieving overall goals of CO2 reduction by 2050. Mr. Onodera stressed the urgency of the development and deployment of these technologies, as world energy demand is expected to increase by 1.45 times from 2006 through 2030. He explained Japan's Smart Community Concept, as well as the challenges that Japan's power sector is facing as it moves from the current grid to a smarter grid. These challenges relate to large-scale intermittent and distributed energy sources. He noted that Japan sees the development of technology and a regulatory framework as the solution to these challenges.

Mr. Onodera emphasized that standardization is the key to ensuring that this transition is achieved in a cost efficient manner, and described Japan's initiatives to contribute to international standardization --- notably the creation of a "Study Group on International Standardization for Next Generation Energy Systems." The study group released a road map in January 2010, which identified 26 focus areas in the system of systems. Through a public-private partnership, Japan Smart Community Association, Japan's stakeholders are active in IEC, IEEE, SGIP and other international standardizing activities.

Session 3: Case Study – Consumer-Side Demand Management Systems

- Terry COLLINS, Energy Efficiency and Conservation Authority, New Zealand
- Tom BARRY, Department of Resources, Energy, and Tourism, Australia
- Koon Seok LEE, Principal Research Engineer, LG Electronics, Korea
- CHAN Eng Kiat, Project Director, Intelligent Energy System Pilot Project, Energy Market Authority, Singapore

The home energy management ecosystem is complex and has many stakeholders including utilities, utility regulators, technology vendors, standards developing organizations, and most importantly, consumers. Mr. Collins noted that the Energy Efficiency and Conservation Authority of New Zealand supports the development of a home energy management ecosystem that provides consumers with better information and allows retailers to better manage consumer demand. The home energy market is still emerging but has been under a period of exciting development. There are new products on the market that could be deployed for consumers. For consumers, the value proposition of home energy management products should be beyond just saving energy or reducing demand but also enabling other functionalities beyond energy management. In New Zealand, consumers' interest in home energy management products has been limited.

In Australia, Mr. Barry noted that the Smart Grid Smart City Demonstration Project has a focus on the consumer-side demand management system. Consumer engagement and education is crucial to the success of demand-side management (DMS). Customer-side DMS could have many applications including renewable energy, micro generation, electric vehicle, and battery storage. There are many customer feedback technologies such as standards in home display, home area network, and smart meters. Potential benefits of smart technologies for consumers include real time usage data. Work is being done to review testing outcomes of consumer-centric technology, to gather empirical data on usage and proof of concept, as well as integrating the customer with network technologies and applications.

Smart appliances play an important role in consumer-side demand management. Mr. Lee noted that Smart Grid in Korea has five domains including Smart Place, Smart Renewable, Smart Transportation, Smart Electricity Market, and Smart Utility Network. LG is leading a consortium within the demonstration project in Jeju Island to develop and verify a business model on customer-oriented energy efficiency. Both American and Korean consumers are largely not aware of Smart Grid technology functionalities and benefits. The challenges for consumer involvement include raising the awareness of Smart Grid and its role in environmental conservation. Appliances are a huge part of consumers' daily lives and can provide awareness to consumers on Smart Grid while providing a means for demand response & load control.

Singapore's Smart Grid initiative is called the Intelligent Energy System. Since Singapore has a highly reliable electrical grid, its Smart Grid targets are slightly different than other economies and are geared towards addressing issues relating to the high price of energy and distributed generation. The Intelligent Energy System provides consumers with choices in accessibility and flexibility. The key drivers include retail products and services, management of distributed energy resources, integration of electric vehicles, and integration of the outage management system. The consumer-side demand management includes residential and industrial consumers with time of use (TOU), smart systems, and demand response applications. The benefits include smoothing out demand, incentivizing consumer to manage energy usage, and reducing peak demand. The vision is to have a centrally managed intelligent communication network with interconnected Smart Grid technologies.

Consumers are very important in the Smart Grid and, participation by consumers in standards development can facilitate consumer-oriented applications. There are different ways to increase consumer receptivity to Smart Grid technology, such as engaging consumers and conducting trials, using education institutions to test out technologies, and working with retailers to shape functionalities to offer to consumers. In addition, information from demonstration projects can lead to use cases. These can inform the development of interoperability standards able to take into account both the communication needs in the network and the features that the consumer wants. Coordination among appliance manufacturers and utilities is needed to implement demand response and price signals. Smart Grid has a social reengineering aspect, and consumer trust regarding the security of the system is very important. Finally, sharing of information is extremely valuable especially learning about different economies' approaches to Smart Grid.

Luncheon Keynote

- Vint CERF, Vice President and Chief Internet Evangelist, Google, United States

Dr. Cerf described his role in the development of the internet, indicating similarities between those efforts in the 1970's, 80's and 90's and the current efforts underway to develop and deploy Smart Grid systems. He stressed the critical importance of interoperability, and advised on risks that must be taken into account in the development and deployment of Smart Grid, including cybersecurity, privacy and other issues.

Session 4: Case Study – Renewable Energy Integration

- Ken KOZLIK, Chief Operating Officer, Independent Electricity System Operator, Canada
- Jianbin FAN, Director, State Grid Corporation, China
- Yi-Shuo HUANG, Industrial Technology Research Institute, Chinese Taipei

Globally, many economies are looking to renewable sources of energy, such as wind and solar, to provide clean, sustainable power. Due to the variable, intermittent nature of the power from renewable sources, positive integration into the power grid is a challenging task. Smart Grid is the solution. By using the Smart Grid to coordinate these variable power sources with power loads, these resources can be an effective source of electricity. Mr. Kozlik from Canada described two major challenges of integrating renewable, which are providing support for two way power flow (while protecting voltage and frequency levels) and balancing demand with renewable output (using demand response). The power quality requirements for renewable connection are important, according to Mr Huang. Parameters of concern include short circuit current, voltage fluctuation, DC injection, power factor and total harmonic distortion. All need to be kept within acceptable levels.

Dr Fan described the challenges faced by China not only due to variable nature of renewables, but having to transfer the energy over long distances. A key enabler for integrating renewable sources of energy into the Smart Grid in China will therefore be large storage technology. All three speakers in this panel emphasized the need for internationally harmonized standards, such

as those for connecting renewables to the grid, managing power quality, and communicating with utilities' demand response systems.

Several participants provided important points during the discussion. First, there is a need to prioritize the development of standards. Global standards will help equipment manufacturers by reducing the need for reengineering to enter different markets, reduce the complexity of Smart Grid systems. Not only should transmission side renewable generation be considered, but small scale distributed generation that resides on the distribution side is important and has unique technological and standards requirements. Finally, the cost of integrating renewable energy in the grid needs to be considered thoroughly.

Session 5: Case Study – Electric Vehicles

- Richard SCHOMBERG, Chair, Smart Grid Strategic Group 3, IEC
- Jianbin, FAN, Director, State Grid Corporation of China
- Ernest LI, Senior Engineer, Electrical and Mechanical Services Department, Hong Kong, China
- Jack POKRZYWA, Director Ground Vehicle Standards, SAE International

Electric vehicle (EV) technology has a high potential to replace petroleum fuels with electricity in light-duty vehicles, and to decouple vehicles from the energy source, providing flexibly in future energy generation for vehicles. EVs can help reduce CO2 emissions, decrease energy usage, and combat climate change. The two main hurdles to EV adoption are battery technology and charging infrastructure. The diversity of charging methods today includes AC charging, DC charging and battery swapping, and may include wireless charging in the future. Dr. Fan noted the tradeoffs of the different charging approaches including charging time, battery life, customer convenience, grid impact and cost. By supporting a variety of vehicle charging interactions stakeholders can choose which one meets their specific needs.

To encourage EV adoption many regions are promoting the use of EVs. Mr. Li described Hong Kong, China's funding of charging station installation and EV demo projects, government purchases of EVs, and incentives for consumer purchases of EVs -- all designed to drive EV adoption. Mr. Schomberg discussed how the deployment of electric vehicles at a global scale will depend on the coordinated collaboration between all the relevant players in the field including different standards development organizations worldwide. EV to grid interaction can have a positive or negative influence both on the consumers experience and on grid operations. To enable the successful adoption of EVs worldwide, standards that support the diverse charging methods, business and consumer needs and government policies are needed.

To this end, two worlds -- automotive and utility -- for the first time must join together in launching technology to achieve this goal. Mr. Pokrzywa mentioned that, although different standards are required to meet differing requirements, interoperability and harmonization of standards on an international scale (and therefore the standards development organizations) are needed. This will open economic markets, reduce costs and improve reliability. This

cooperation between SDOs is pushing the boundaries of how SDOs operate and will require adjustment and improvement of the standards development process.

During the discussion, participants noted that communication among stakeholders on EV standards is a challenge. Email exchanges alone may not be enough and since information exchange is more effective in face-to-face setting. Periodic meetings for information exchange among between APEC members will be useful. By looking at the why (policy/business goals) and the what (use cases), the APEC economies can help the standards experts develop the how (systems and supporting standards). A comparison of national and regional policies, business goals and use cases to find commonality will be useful, particularly if done in a timely fashion to help technical experts make decisions in the development of supporting international standards.

Other points raised in the discussion include that safety needs to be built in to standards, and be not an afterthought. An example is the incorporation of safety interlocks that enable termination of charging in the event of a system failure. It was stressed that APEC economies produce a significant share of the automobiles sold in the global market, so the policy directions of APEC members can carry weight in the global dialogue. Coordination on policy directives would have important benefits and should be considered.

Session 6: Conformity Assessment

- Gordon GILLERMAN, Director, Standards Services, National Institute of Standards and Technology, United States
- John O'NEILL, Senior Project Manager, Canada Standards Association, Canada

Not only are supporting standards required o implement a successful Smart grid, but devices and systems that compose the Smart Grid must be tested both against the standards and each other. This conformity assessment demonstrates that specified requirements relating to a product, process, or system are fulfilled.

Mr. Gillerman explained that a balance must be obtained between overly exhaustive assessment (costs too much) and overly simplistic assessment (too little confidence). Arrangements that facilitate trade by providing sufficient confidence at a reasonable cost are critical in the success of testing and conformance programs for the Smart Grid. Both first party or supplier's declaration and third party certification can be used together to provide the requisite balance.

With specific reference to the Smart Grid, Mr. O'Neill pointed out that the utility and consumer expectations vary; utilities need to test their specific implementations against their use cases, while consumers will just expect end use devices within the home to interact with the Smart Grid systems without requiring additional testing.