

# Energy Smart Communities (ESCI) and APEC Smart Grid Initiative (ASGI) Update

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EGEEEC 44

Beijing, China

October 20-21, 2014



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# The Energy Smart Communities Initiative (ESCI) was Launched in November 2010 by U.S. President Obama and Japan's Prime Minister Kan

- ▶ The ESCI is meant to help realized APEC Leaders' goal to reduce the energy intensity of their economies by 45% by 2035
- ▶ The ESCI contains two crosscutting elements and four pillars
  - Cross-Cutting elements
    - Knowledge Sharing Platform (KSP)
      - ◆ Draft website at: <http://esci-ksp.org> (revised release at EWG 43)
    - Low Carbon Model Towns (LCMT)
      - ◆ San Borja, Peru has been chosen for the next LCMT

# Low Carbon Model Town Related Projects (1)

- ▶ The Comprehensive Analysis and Research of Key Technologies and Commercial Model of Low Carbon Model Town Applied in Yujiapu CBD EWG (EWG 11/2012A) (China) EGNRET
- ▶ Research on the Application of Physical Energy Storage Technology to Enhance the Deployment of Renewable Energy in an APEC Low Carbon Town (EWG 16 2012A) (China) EGNRET
- ▶ APEC Low Carbon Model Town (LCMT) Project Phase 3 (EWG 20 2012A) (Canada; Japan; Korea; Chinese Taipei; United States ) EWG



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## Low Carbon Model Town Related Projects (2)

- ▶ APEC Low Carbon Model Town (LCMT) Promotion through Eco-Point Program (LCMT-EPP) (EWG 10 2013A) (Thailand) EWG
- ▶ APEC Low-Carbon Model Town Development Model and Tool Kit Study (LCMT-DMTK) (EWG 13 2013A) (China) EGNRET
- ▶ APEC Low Carbon Model Town Capacity Building Development (LCMT-CBD) (EWG 05 2013A) (China) EGNRET
- ▶ APEC Low Carbon Model Town (LCMT) Project Phase 4 (EWG 18 2013A) (Japan) EWG



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# Low Carbon Model Town Related Projects (3)

- ▶ APEC Low-Carbon Model Town Energy Management System Development and Application Research (EWG 20 2013A) (China) EGNRET
- ▶ APEC Low Carbon Model Town Building Index System Research (EWG 23 2013A) (China) EGNRET
- ▶ APEC Low-Carbon Model Town Heating System Application Model and Best Practices (EWG 25 2013A) (China) EGNRET



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# Energy Smart Communities

- ▶ District Energy Systems Development Roadmap Study in APEC Economies (EWG 24 2013A) (China) EGNRET
- ▶ APEC Conference on Energy Smart Communities (EWG 4 2014S) Chinese Taipei (EWG)
- ▶ Clean and Efficient Use of Energy and Water Resources - Initiating an APEC Road Map and Best Practices for the Energy-Water Nexus (EWG 03 2014S) USA (EWG)



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# The Energy Smart Communities Initiative has Four Pillars (1)

## ▶ Smart Transportation

- Energy-Efficient Urban Transport Network
  - CEEDS: Phase 3: Energy Efficient Transport for Smart Communities
  - APEC Vehicle Fuel Efficiency Labelling Schemes Review and Recommendations (EWG 5 2014A) New Zealand (EGEEC)
- Energy-Efficient Freight Transport Network
- Electromobility Survey and Road Map



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# The Energy Smart Communities Initiative has Four Pillars (2)

## ▶ Smart Buildings

### ■ Low Energy Buildings Network

- **EWG 14/2011T** Energy Performance Evaluation Methodology Development and Promotion in APEC Economies (*China*)
- **EWG 12 2012A** – APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners: Phase 1 (*Japan*)
- **EWG 14 2012A** – Workshop to support the development of national lighting design centers in the APEC (*US*)
- **EWG 03 2013A** - Building Code Harmonization in Energy Smart Communities (2<sup>nd</sup> APEC Workshop on Net Zero Energy Building & Community)



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# The Energy Smart Communities Initiative has Four Pillars (3)

## ▶ Smart Buildings

### ■ Materials Testing and Rating Centers

- APEC Efficient Building Envelope Stakeholders Meeting and Workshop (*US, Thailand*)

### ■ Cool Roof Demonstrations

### ■ Low Energy Window Demonstrations

- Energy Saving Window Thermal Performance Simulation Training (*Thailand*)



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# The Energy Smart Communities Initiative has Four Pillars (4)

## ▶ Smart Grids

### ■ Interoperability Survey and Road Map

- See ASGI Interoperability activities

### ■ Smart Grid Test Bed Network

- U.S. sponsored APEC-ISGAN Smart Grid Test Bed Network Workshop January 24-25, 2012 in Washington, DC
- See additional ASGI smart grid test bed activities



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# The Energy Smart Communities Initiative has Four Pillars (5)

- ▶ Smart Jobs and Consumers
  - Energy Efficiency Training Curricula
  - Energy Efficiency School Curricula
  - Sister Schools Program



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# Instructions from Energy Ministers at EMM-9

- ▶ The Fukui Declaration from the Ninth Energy Ministers Meeting (EMM-9), June 2010, states that “**smart grid technologies**, including advanced battery technologies for highly-efficient and cost-effective energy storage, can help to integrate intermittent renewable power sources and building control systems that let businesses and consumers use energy more efficiently, and they can also help to enhance the reliability of electricity supply, extend the useful life of power system components, and reduce system operating costs.”
- ▶ EMM-9 instructed the Energy Working Group (EWG) “to start an **APEC Smart Grid Initiative (ASGI)** to evaluate the potential of smart grids to support the integration of intermittent renewable energies and energy management approaches in buildings and industry.”



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# Suggested Elements of the Smart Grid Initiative

- ▶ Element 1 – Survey of Smart Grid Status and Potential
- ▶ Element 2 – Smart Grid Roadmap
- ▶ Element 3 – Smart Grid Test Beds
- ▶ Element 4 – Development of Smart Grid Interoperability Standards

The Smart Grid Initiative is being led by the U.S, Korea, and Chinese Taipei



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# Element 1 – Survey of Smart Grid Status and Potential

- ▶ A recently completed report “Using Smart Grids to Enhance Use of Energy-Efficiency and Renewable-Energy Technologies” (EWG 01/2009S), evaluated the potential of smart grid technologies in APEC economies to enhance the use of renewable energy and energy efficient buildings, appliances and equipment
- ▶ A related project, “Addressing Grid-interconnection Issues to Maximize the Utilization of New and Renewable Energy Resources” (EWG 02/2009) was led by Japan and completed in late 2010

<http://www.egnret.ewg.apec.org/>



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# Two projects were implementation in 2012 and 2013

- ▶ Piloting smart/micro grid projects for insular and remote localities in APEC economies (EWG 15/2011A Russia)
- ▶ Small Hydro and Renewables Grid Integration Workshop (EWG 07/2012A Vietnam)



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## Element 2 – Smart Grid Roadmap

- ▶ Organize workshops to elaborate a roadmap for advancing smart grid technologies in APEC
- ▶ Due to the wide range of electric grids in place, APEC members can work together to learn from others and develop suggested procedures that will be useful in developing economy specific road maps
- ▶ The roadmap process would be developed in coordination with the International Smart Grid Action Network (ISGAN)
- ▶ The roadmap process also supports the APEC Leaders endorsed Energy Smart Communities Initiative



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# Eight projects related to different aspects of road mapping were implemented in 2013 and 2014 (1)

- ▶ Urban Development Smart Grid Roadmap: Christchurch Recovery (EWG 08/2012 New Zealand)
- ▶ Combined Heat and Power (CHP) Technologies for Distributed Energy Systems (EWG 9 2012A, China )
- ▶ Research on the Application of Physical Energy Storage Technology to Enhance the Deployment of Renewable Energy in an APEC Low Carbon Town (EWG 16 2012A, China)
- ▶ Promoting Stable and Consistent Renewable Energy Supply by Utilizing Suitable Energy Storage Systems (EWG 22 2012A, China)



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# Eight projects related to different aspects of road mapping were implemented in 2013 and 2014 (2)

- ▶ Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework (EWG 24 2012A, China)
- ▶ APEC Photovoltaic Application Roadmap and Model Study (PVARM) (EWG 11 2013A, China)
- ▶ APEC Photovoltaic System Best Practices and Latest Development Comparative Study (PV-BPLD) (EWG 03 2014A, China) EGNRET
- ▶ Capacity building for installers and system designers for solar PV rooftop installations (EWG 22 2013A, USA)



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## Element 3 – Smart Grid Test Beds

- ▶ Establish a network of test beds to provide operational data on emerging smart grid technologies
- ▶ Economies may also wish to offer smart grid test beds for use by grid operators, electric power suppliers, and manufacturers of energy efficient building systems and equipment
- ▶ APEC test beds would become part of a Smart Grid International Research Facility Network (SIRFN) to be coordinated by the International Smart Grid Action Network (ISGAN)
- ▶ U.S. sponsored APEC-ISGAN Smart Grid Test Bed Network Workshop January 24-25, 2012 in Washington, DC



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# Smart Grid Test Beds Activities: Jeju Island in Korea



- Begin in 2009 with the goal of becoming the world's largest smart grid community that allows the testing of advanced technologies
- Expected investment of US\$ 50 million public funds matched by US\$150 million private investment from 2009-2013



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# Smart Grid Test Beds Activities: Distributed Energies Technology Laboratory (DETL) at Sandia National Laboratories

Reconfigurable infrastructure simulates a variety of real-world scenarios and scaled portions of utility feeders and the transmission infrastructure

- Electric Grid Integration of Renewable Energy Sources
- Advance Power Electronics
- Interoperability, Communications & Security
- Solar Technology & Grid-Related Standards & Codes



Cornerstone facility for DOE program on Solar Energy Grid Integration Systems (SEGIS)

Tests & evaluates new power conversion and energy management technologies

# One new project is being implementation in 2013-2014

- ▶ APEC Smart DC Community Power Opportunity Assessment (EWG 06 2013A, Thailand)



# Element 4 – Smart Grid Interoperability Standards

- ▶ Discuss interoperability standards for Smart Grid technologies under the APEC Regulatory Cooperation Advancement Mechanism on Trade-Related Standards and Technical Regulations (ARCAM) in 2011
- ▶ Based on the discussions, consider follow-up steps to develop interoperability standards across the APEC region and globally through ISGAN



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# Elements of ARCAM Interoperability project

- ▶ U.S. develops a paper presented at CTI 1 (SOM1) in Washington, DC that outlined smart grid interoperability standards
- ▶ ARCAM smart grid dialogue held at CTI 2 (SOM2) in Big Sky, Montana
- ▶ Thirteen smart grid recommendations are developed for SCSC 2 (SOM3) in San Francisco, CA across three areas:
  - Promote Transparency, Collaboration and Global Solutions in the Development of Smart Grid Interoperability Standards
  - Enable Competition and Innovation in Specific Markets for Smart Grid
  - Integrate ARCAM Outcomes into Cooperative Work on Smart Grid Interoperability Standards in APEC and Other Fora



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# ARCAM Interoperability project- 2012

- ▶ Workshop on Regulatory Approaches to Smart Grid Investment/Deployment
  - Project led by the U.S. under the Committee on Trade and Investment/Subcommittee on Standards and Conformance (CTI/SCSC)
  - Associated with the World Forum on Energy Regulators
    - Quebec City, Canada, May 16-17, 2012
  - Participants included central and sub-central regulatory authorities, and officials from ministries responsible for technology, trade, and import policy as well as private sector representatives
  - Workshop included panels on Interoperability Standards and the Role of Energy Regulators and International Standards Development



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# ARCAM Dialogue on Electric Vehicle (EV) Standards -2014

- ▶ Will build on discussions and recommendations from the 2011 ARCAM Smart Grid Interoperability Standards Dialogue
- ▶ May 7, 2014, Qingdao, China
  - Session 1 – Overview of APEC Economies' EV Regulations
  - Session 2 – Challenges of Convergence in International Standards for EVs
  - Session 3 – EV Technical Areas of Harmonization and Alignment
  - Session 4 – Overview of Efforts in International Fora to Harmonize EV Standards
  - Session 5 – What can APEC do to align EV regulations and promote harmonization of EV international standards?



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Thank you for your attention!

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