



EWG 11 2019A: Accommodating Disruptive Technology into RE&EE Policies for Energy Security

58th Meeting of APEC Expert Group of Energy Efficiency and Conservation (EGEE&C 58)

31 March 2022

Co-sponsoring APEC economies

United States; Japan; Chinese Taipei; Hong Kong, China

Contractor & Team members

Chiang Mai Rajabhat University (CMRU)

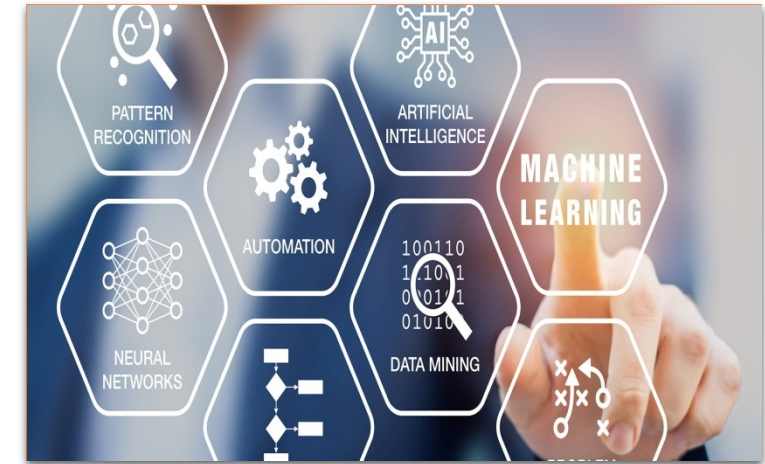
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• Objective

- To review the impact of disruptive technologies on the power generation and distribution, transport, and buildings sector
- To share best practices on RE&EE policies to accommodate the disruptive technologies
- To build capacity on integration of the disruptive technologies for energy security

• Current status

- Waiting for APEC Sec. approval the final report



• Deliverables

- **Final report with policy recommendation** on accommodating disruptive tech on RE&EE policies

• Cooperation between RE&EE experts

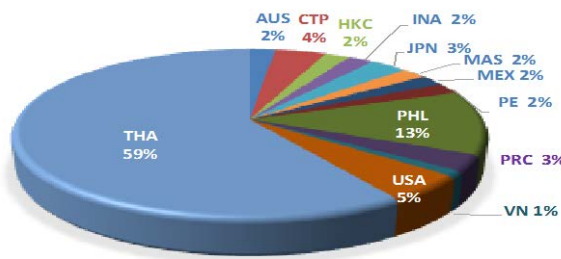
- **Support draft RE&EE polices** to integrate disruptive tech toward APEC RE&EE goals

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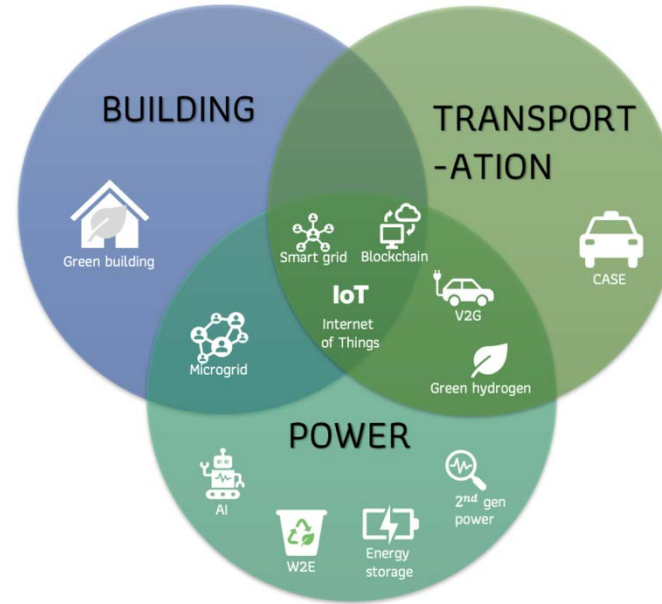


98 participants from 13 Economies

Female 32%
Male 68%



WS organized (virtual) on 29-30 Apr 2021



Key Takeaway from Workshop

- “There’s no disruption without value creation”
- Policy support for large scale adoption
- Required regulation & standards
- Market support/community readiness
- Data security and protocol
- Prepare waste management from disruptive technology ie. battery

Disruptive Technology in 3 Energy Sectors

Analysis Factor

- Technology
- Challenge/Key success factors
- Policy need/ Driving Mechanism
- Market/ Future Trend

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Recommended RE&EE Policies for Accommodating Disruptive Technologies

Disruptive Technology	Policy Trajectory	Early Stage		Middle Stage		Implementation Stage		
		Research & Demonstration	Promotion & Awareness	Infrastructure Regulations	Standardization	Incentives	New Business Regulations	Market Regulations
<ul style="list-style-type: none"> - 2nd Gen Power - Microgrid - Smart Grid - Green Building - W2E - Green Hydrogen - Energy Storage - V2G - CASE - IoT - Blockchain - AI 	<p>Policy launched in series</p> <p>Investment & implement by utilities and private sectors</p> <p>Regulation and supervisory role for promoting safe, efficient, and cost-effective electricity transmission and exchange</p>	<p>Demonstration projects by utilities around the world</p> <p>Grid-independent application in developing economy communities</p> <p>Incentives to participate in pilot projects as data providers</p> <p>Funding for research, development, and demonstration projects</p>	<p>Quality and reliability of consumer supply/ services due to smart grid projects</p> <p>Enable funding of research and development of AI applications</p> <p>Funding grants on energy converted from waste</p>	<p>Renewable Energy</p> <p>Smart Meter</p> <p>EVs</p> <p>Energy Storage</p> <p>V2G</p> <p>Grid Modernization</p> <p>Ensure algorithms comply with existing power sector regulation, or adapt, where necessary</p> <p>Battery waste is required policy for management system</p>	<p>Interconnection standards</p> <p>Security on data transfer/connection between devices to grid</p> <p>Tele communications</p> <p>The V2X Charger, Vehicle to Home/Building/</p> <p>Grid and provides bi-directional charge and discharge power conversion for EVs</p> <p>Develop accounting, billing and metering methods for large-scale grid-connected battery storage systems</p>	<p>Incentives for smart grid investment by utilities and private sector</p> <p>Financial subsidizing, tax reduction, and feed-in tariff on energy converted from waste</p> <p>Partial Exemptions of grid charges, taxes and levies for electrolyzers</p> <p>Facilitate access to low-cost renewable electricity</p>	<p>Dynamic pricing policies</p> <p>Legal and licensing provision for private sector to generate, distribute and sell electricity to consumers</p> <p>Regulation for the interaction of new blockchain-based trading and evolution of existing electricity trading regulations</p> <p>Prosumers to freely sell power generated from residential distributed energy resources to other grid-connected consumers</p> <p>Organize payment rules for use of the DSO electricity grid and the use of the TSO grid</p>	<p>Enable electricity exchange between consumers and prosumers (for P2P trading applications)</p> <p>Enable electricity exchange between prosumers and system operators (for grid transactions)</p> <p>Customer support and empowerment, through efficient price signals</p> <p>A free retail market that enables innovative business model for consumers</p> <p>Promote appropriate markets and product-service definitions to value flexibility in operation of generation fleet</p>

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- Each disruptive technology has **different policy stages** and varies across the APEC economies
- The disruptive technologies interlinks with each other:
 - The earlier disruptive technologies focus on **infrastructure and standardization** which have high investments (i.e., 2nd Gen Power, Microgrid, Smart Grid, Green Building, Energy Storage)
 - Newer disruptive technologies focus on **new energy business opportunities** with market driven (i.e., V2G, CASE, IoT, Blockchain, AI)
- **Way forward** for APEC is to use the dynamics and fast development of disruptive technologies to facilitate the RE&EE goals and Carbon Neutrality Goals.
- The policy studies could serve as a reference for the policy makers in the APEC Economies to prepare for the surge of disruptive technology in the energy market.
- For example, Thailand: Develop National Energy Plan which combined from 5 existing plan (PDP + AEDP + EEP + Gas Plan + Oil Plan) > Carbon Neutrality
 - Grid Modernization, prosumer, biofuel, EV, RE, EE