Asia-Pacific Economic Cooperation

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

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

56th Meeting of APEC Expert Group of New and Renewable Energy Technologies (EGNRET 56)

7 April 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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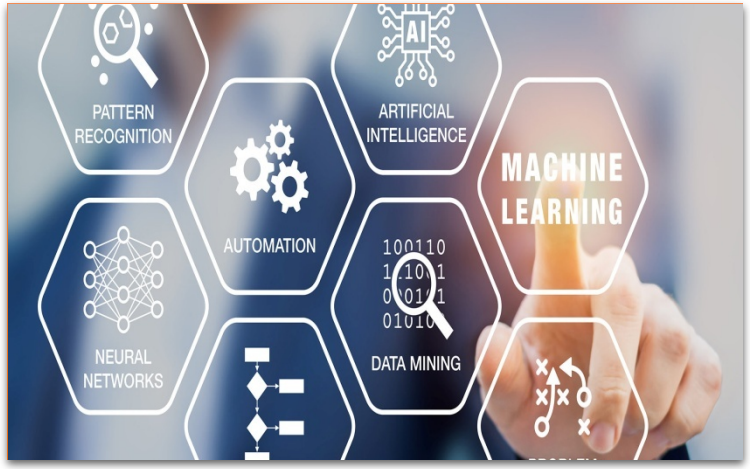
- Objective
  - To review the impact of disruptive technologies on the power generation and distribution, transport, and buildings sector
  - To share best practices on RE&EE policies to accommodate the disruptive technologies
  - To build capacity on integration of the disruptive technologies for energy 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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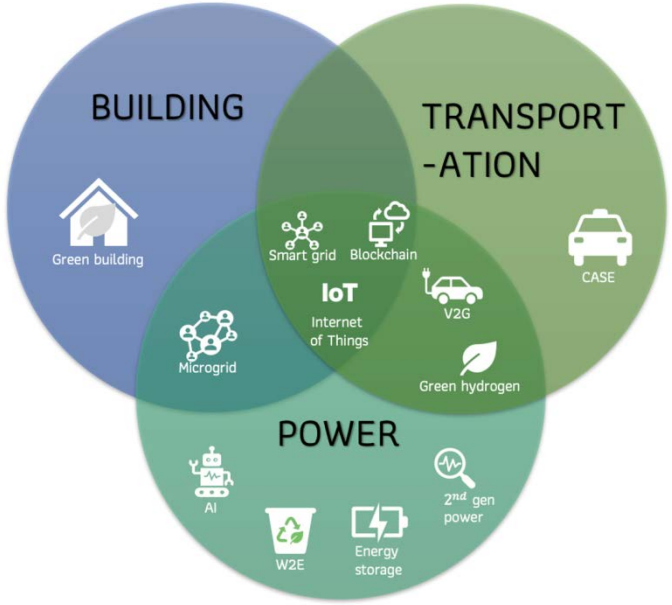
WS organized (virtual) on 29-30 Apr 2021

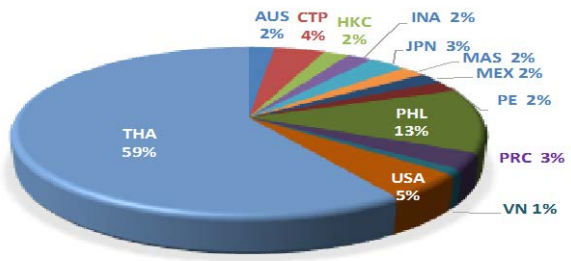


Key Takeaway from Workshop

- "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

98 participants from 13 Economies

Female 32%
Male 68%



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
- 2nd Gen Power - Microgrid Smart Grid -Green Building -W2E -Green Hydrogen -Energy Storage -V2G -CASE -IoT -Blockchain -AI	Policy launched in series Investment & implement by utilities and private sectors Regulation and supervisory role for promoting safe, efficient, and cost-effective electricity transmission and exchange	Demonstration projects by utilities around the world Grid-independent application in developing economy communities Incentives to participate in pilot projects as data providers Funding for research, development, and demonstration projects	Quality and reliability of consumer supply/ services due to smart grid projects Enable funding of research and development of AI applications Funding grants on energy converted from waste	Renewable Energy Smart Meter EVs Energy Storage V2G Grid Modernization Ensure algorithms comply with existing power sector regulation, or adapt, where necessary Battery waste is required policy for management system	Interconnection standards Security on data transfer/connection between devices to grid Tele communications The V2X Charger, Vehicle to Home/Building/ Grid and provides bi-directional charge and discharge power conversion for EVs Develop accounting, billing and metering methods for large-scale grid-connected battery storage systems	Incentives for smart grid investment by utilities and private sector Financial subsidizing, tax reduction, and feed-in tariff on energy converted from waste Partial Exemptions of grid charges, taxes and levies for electrolyzers Facilitate access to low-cost renewable electricity	Dynamic pricing policies Legal and licensing provision for private sector to generate, distribute and sell electricity to consumers Regulation for the interaction of new blockchain-based trading and evolution of existing electricity trading regulations Prosumers to freely sell power generated from residential distributed energy resources to other grid-connected consumers Organize payment rules for use of the DSO electricity grid and the use of the TSO grid	Enable electricity exchange between consumers and prosumers (for P2P trading applications) Enable electricity exchange between prosumers and system operators (for grid transactions) Customer support and empowerment, through efficient price signals A free retail market that enables innovative business model for consumers Promote appropriate markets and product-service definitions to value flexibility in operation of generation fleet

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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