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New Challenges to APEC Energy Security

Purpose: Consideration
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13.f. New Challenges to APEC Energy Security

The 58th Meeting of APEC Energy Working Group (EWG)
Antofagasta, Chile; 16-17 October 2019

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Old and new challenges to APEC energy security

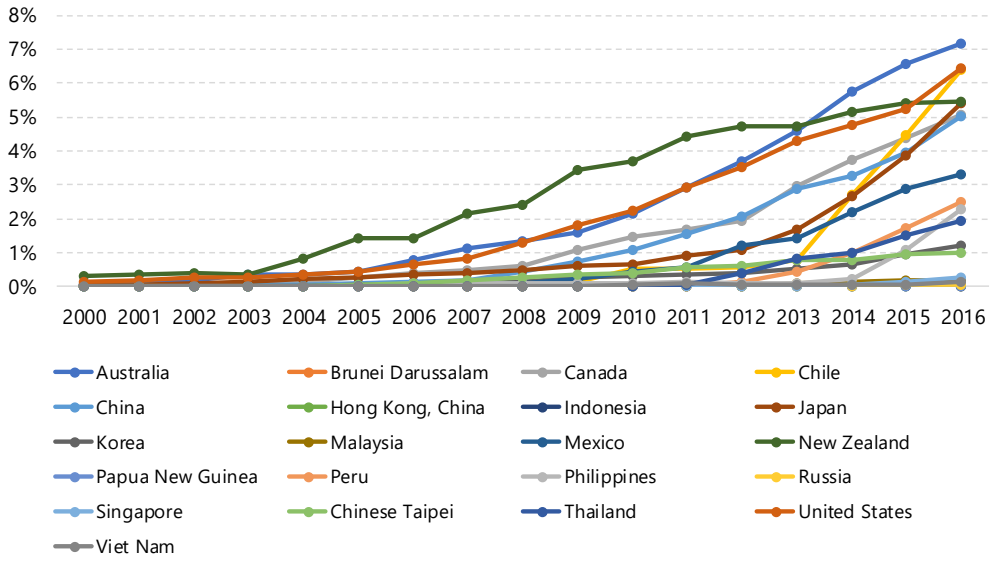
Old challenges to APEC energy security (identified in ESI)	New challenges to APEC energy security
1. Short-term measures to address energy supply disruptions • Improving transparency and reliability oil market data • Maritime security • Implementing a real-time emergency information sharing system • Encouraging member economies to have emergency mechanisms and contingency plans in place 2. Long-term measures to facilitate investment, trade and technology cooperation in: • Energy infrastructure • Natural gas (including LNG) • Energy efficiency • Clean fossil energy • Renewable energy • Hydrogen and fuel cells	1. Effect of renewable electricity increase on electric grid stability 2. Underinvestment in liberalized electricity markets 3. Rising cyber threats in energy sector 4. Impact of natural disasters on the energy supply-chain 5. Uncertainty about energy policies

New challenges to APEC energy security

1. Effect of renewable electricity increase on electric grid stability

- Recent VRE developments in APEC
  - Australia; US; Chile; New Zealand; Japan; China; Canada
- Challenges on power grid stability
  - Duck curve – timing imbalance between peak demand and VRE production
  - System operators need to have greater flexibility
  - Conventional power plants are required to adjust output to meet demand
  - Lack of transmission line capacity causes congestion in the system

Percentage of VRE of total electricity generation in APEC economies



Source: IEA System Integration of Renewables: An update on Best Practice 2018 and EGEDA Energy Database.

New challenges to APEC energy security

2. Underinvestment in liberalized electricity markets

- Challenges for conventional thermal power plants – merit order effect
  - Decline in capacity factor of conventional thermal power plants
  - Decline in wholesale electricity price
- Some APEC economies have already or are considering introducing capacity mechanism
  - Canada
  - Japan

New challenges to APEC energy security

3. Rising cyber threats in energy sector

- What is cyber risk?
- Cyber attack includes physical attack and non-physical attack.
- Cyber attack incidents in energy sector are growing and were more than other sectors in the US in 2013-15.
- Cyber threat examples (malware/hacking in power plants, viruses in computer systems)
- Impacts of cyber risks in energy sector (market disruption, physical infrastructure damage, national security, human harm, network effects, financial loss)

New challenges to APEC energy security

4. Impact of natural disasters on the energy supply-chain

- Natural disasters and natural hazards are different
  - Even when a natural hazard occurs, a natural disaster may not occur if no vulnerabilities exist.
  - Hazards include volcanic eruptions, earthquakes, typhoons, snowstorms, tsunamis, etc.
- Security of energy supply and natural disasters
  - Hurricanes in the US
  - Forest fires in the US and Canada
  - Hydroelectric power generation during a drought in Brazil
  - Coal production during torrential rains and flood in Australia
  - Energy supply-chain loss because of an earthquake or tsunami in Japan
- Recognition of risks among power and public utility operators

New challenges to APEC energy security

5. Uncertainty about energy policies

- Review of energy policies through change in governing party
  - Australia, US
- Changes in policy lagging behind changes in circumstances
  - Germany's nuclear power policy
- Opposing views among the citizens toward ongoing projects
  - Chinese Taipei's nuclear power policy
  - Korea's nuclear power policy
  - Indonesia's construction of coal-fired power plants
  - Pipeline construction in the US

What shall we do with the new challenges?

New challenges to APEC energy security	Recommended measures
1. Effect of renewable electricity increase on electric grid stability	• Optimisation of grid operation • Demand side energy management • Promote R&D on power storage systems • Upgrade transmission lines
2. Underinvestment in liberalized electricity markets	• Introduce new electricity market design such capacity mechanism
3. Rising cyber threats in energy sector	• Develop cyber security program for energy system
4. Impact of natural disasters on the energy supply-chain	• Develop climate change adaptation program
5. Uncertainty about energy policies	• Build policy on scientific evidence and involve stakeholders in policy making process

Source: IEEJ analysis.

Closing thoughts

- Next step for ESI?
- Should we incorporate the new challenges to APEC energy security and update the Energy Security Initiative?

Thank you for your kind attention.

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