Asia Pacific Economic Cooperation (APEC)
Expert Group on New and Renewable Energy Technologies (EGNRET)
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APEC Energy Demand & Supply Outlook: 6th Edition

High Renewables Scenario and Renewables Heating & Cooling project

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Outline

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- Investment in the High Renewables Scenario
- Improved Efficiency Scenario
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Presentation Outline

- APEC High Renewables Scenario
- Investment in the High Renewables Scenario
- Improved Efficiency Scenario
- Impact of Alternative Scenarios on CO_2 Emissions
- Renewables for Heating & Cooling in APEC
- Conclusion

1. APEC High Renewables Scenario

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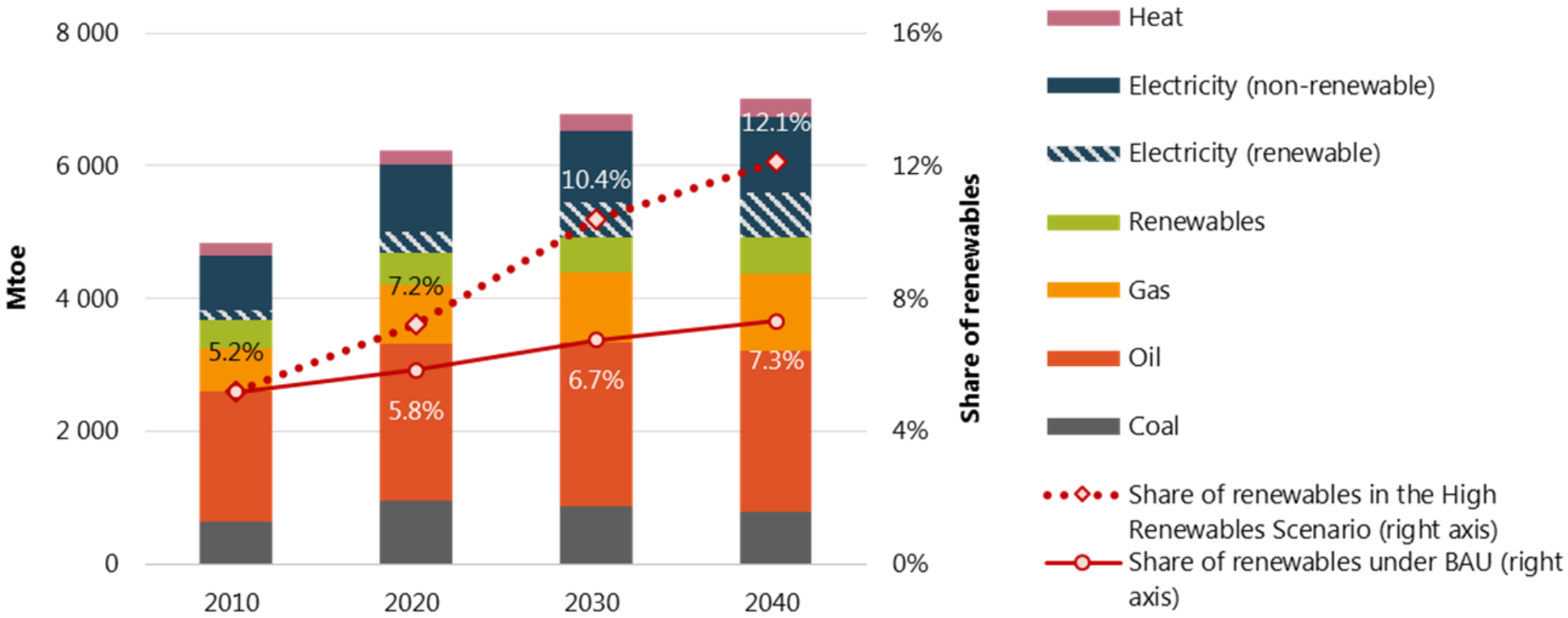
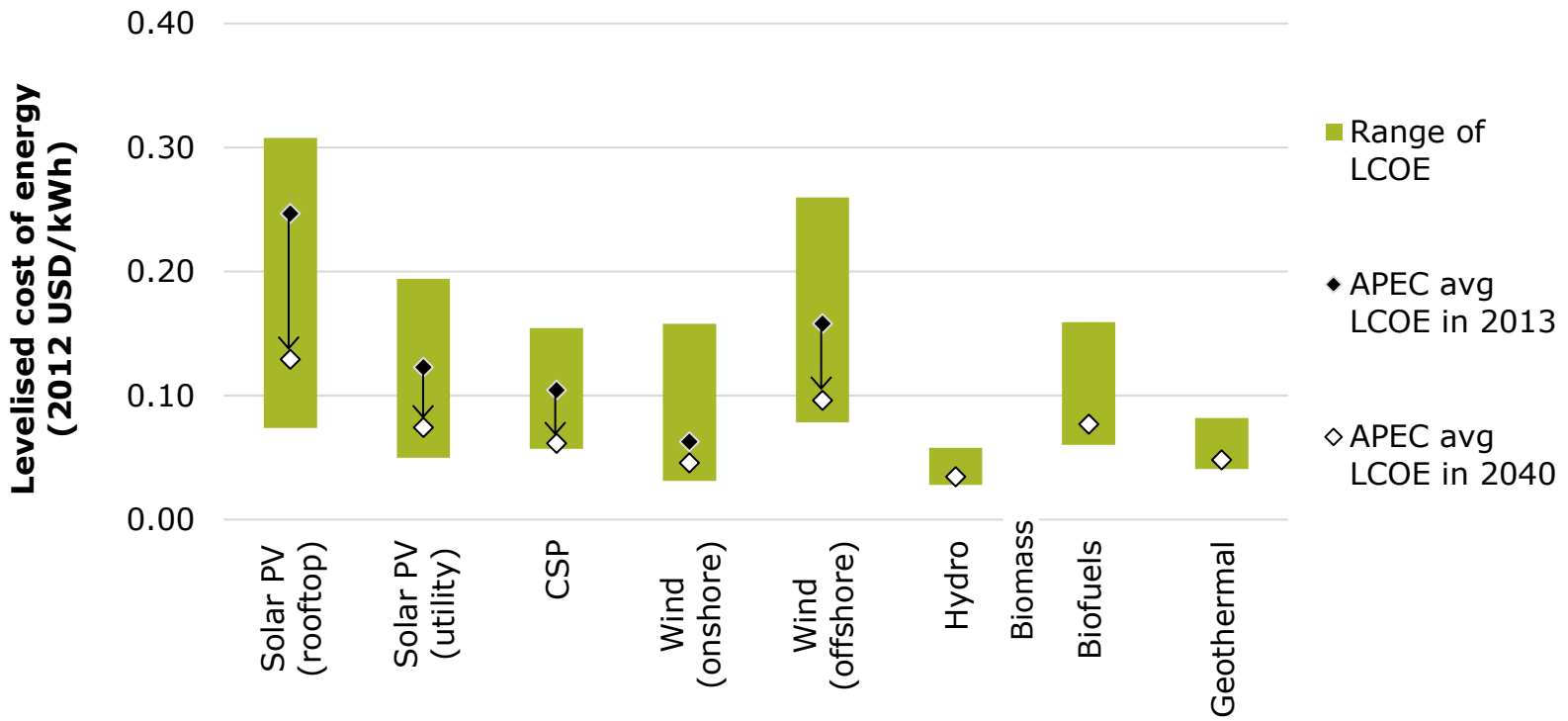
APEC Renewable Energy Share in Total Final Energy Demand



The APEC's Renewable Doubling Goal is not met under BAU, but would be met in the High Renewables Scenario.

Source: IEA (2015) and APERC (2016).

APEC Renewable Technologies Costs



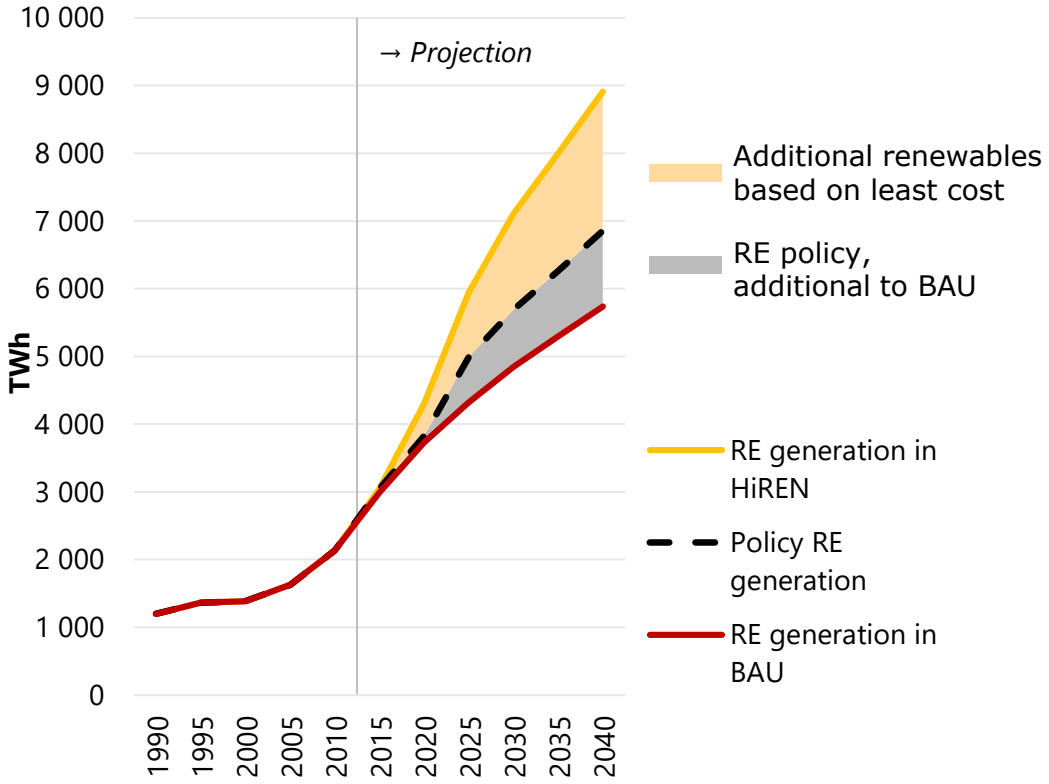
Access to technologies, renewable resource and land availability lead to lower LCOEs in China, Mexico and the United States.

Hydro, biomass and geothermal have low LCOE mainly due to long lifetime, thus sensitive to discount rate.

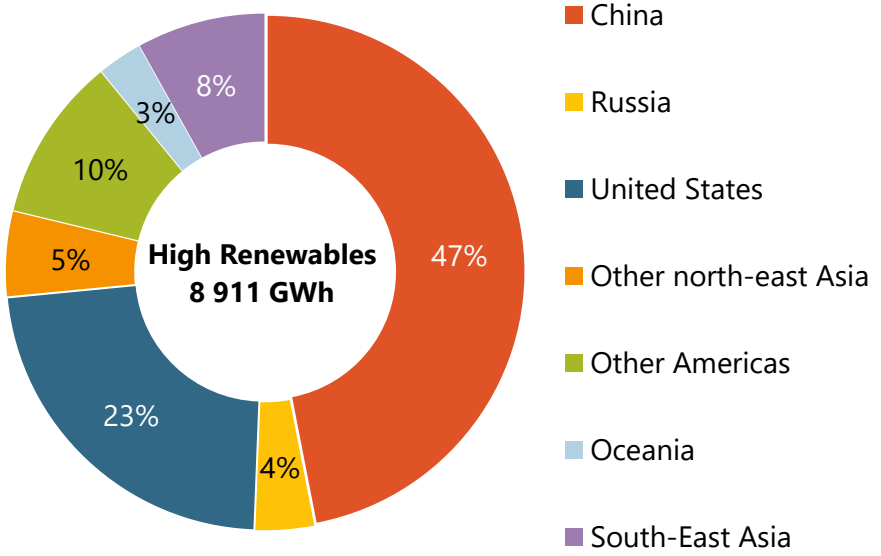
Source: IEA (2015) and APERC (2016).

Renewable power - current renewables plans and targets are expected to result in falling short of the doubling target

Renewable generation by scenario



Renewable generation by sub-region

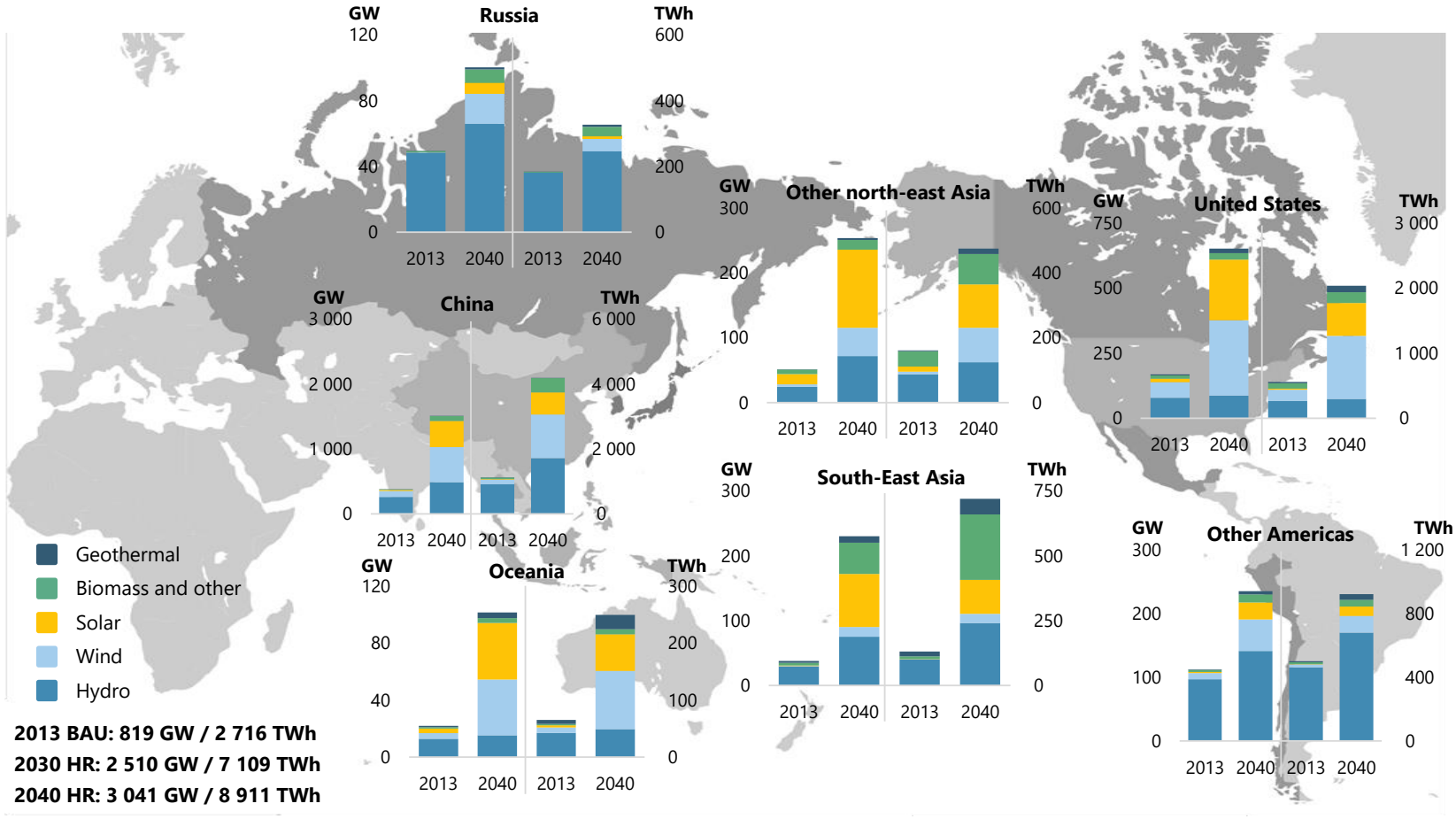


Renewables expand greatly in China, the United States and South-East Asia. An average of 100 GW of new capacity should be added annually in 2013-2030.

Note: **Oceania** (Australia, New Zealand and PNG), **Other Americas** (Canada, Chile, Mexico and Peru), **Other north-east Asia** (Hong Kong, Japan, Korea and Chinese Taipei), **South-East Asia** (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam).

Source: IEA (2015) and APERC (2016).

APEC Renewable Power in the High Renewables Scenario



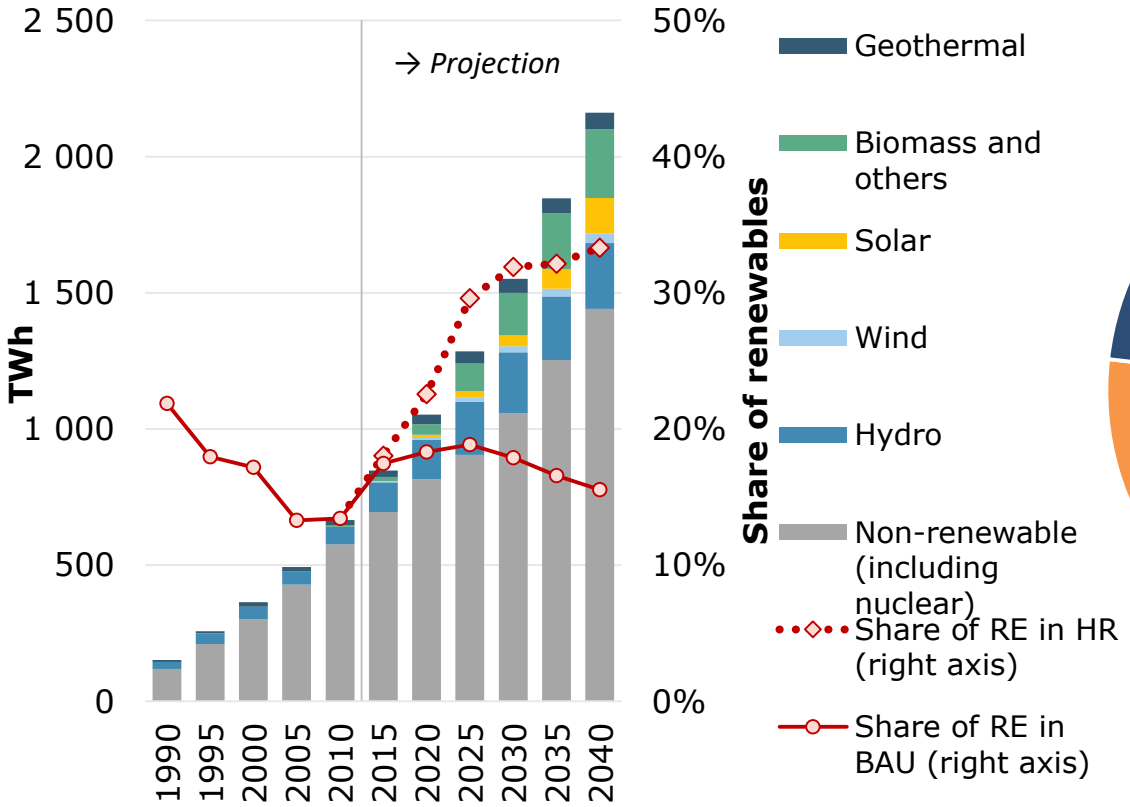
Major growth of solar in Asia, the United States and Oceania

Note: this map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory,
Oceania (Australia, New Zealand and PNG), **Other Americas** (Canada, Chile, Mexico and Peru), **Other north-east Asia** (Hong Kong, Japan, Korea and Chinese Taipei), **South-East Asia** (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam),
BAU *= Business-as-usual,* ***HR*** *= High Renewables*

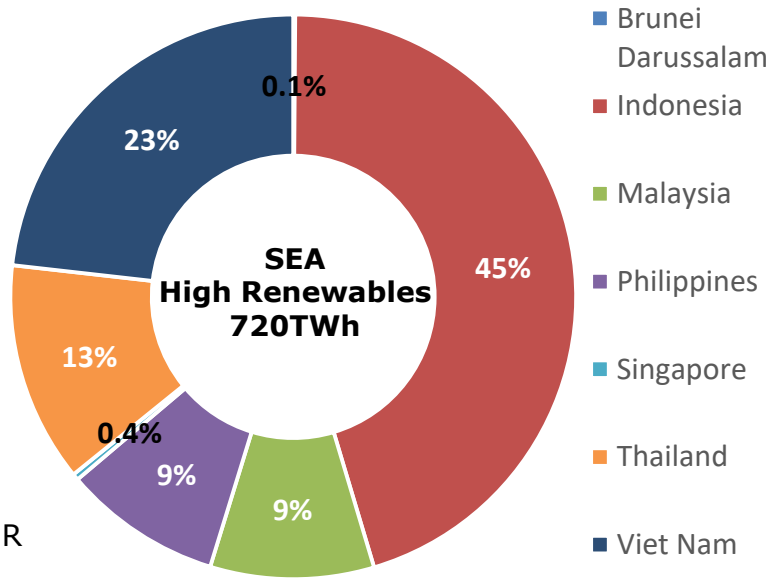
Source: IEA (2015) and APERC (2016).

Renewable power in South-East Asia

Renewable generation by scenario



Renewable generation by economy



Renewables expand greatly in Indonesia, Thailand and Viet Nam.

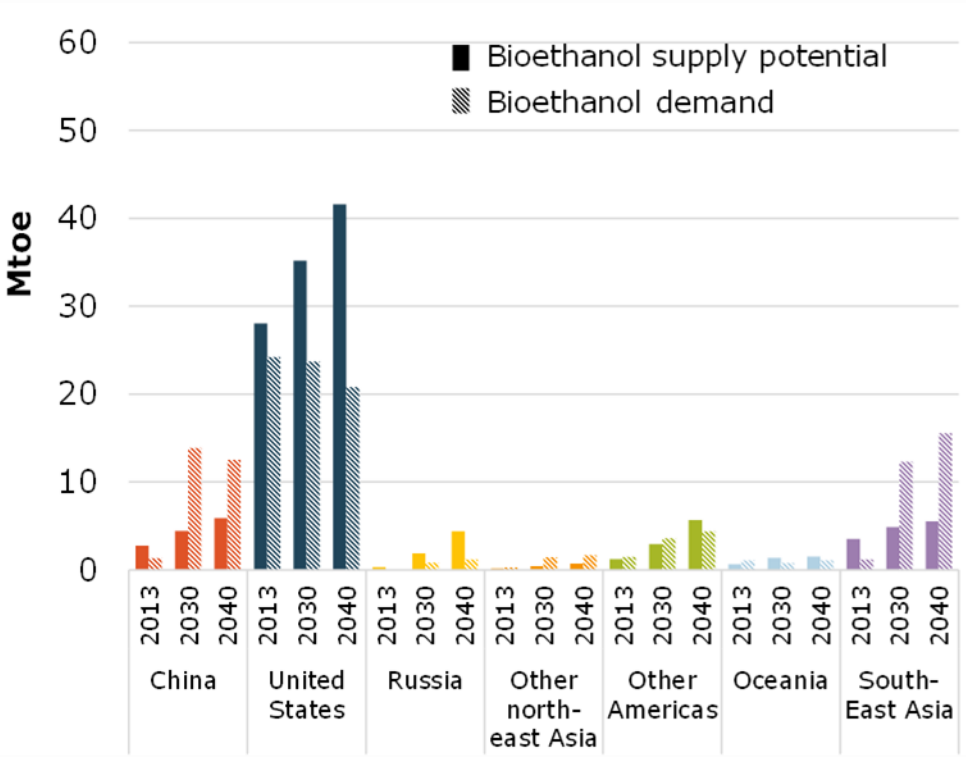
An average of 6 GW of new capacity should be added annually in 2013-2030, and 8GW of new capacity in 2030-2040.

Note: **South-East Asia** (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam), ***BAU*** = *Business-as-usual,* ***HR*** = *High Renewables*

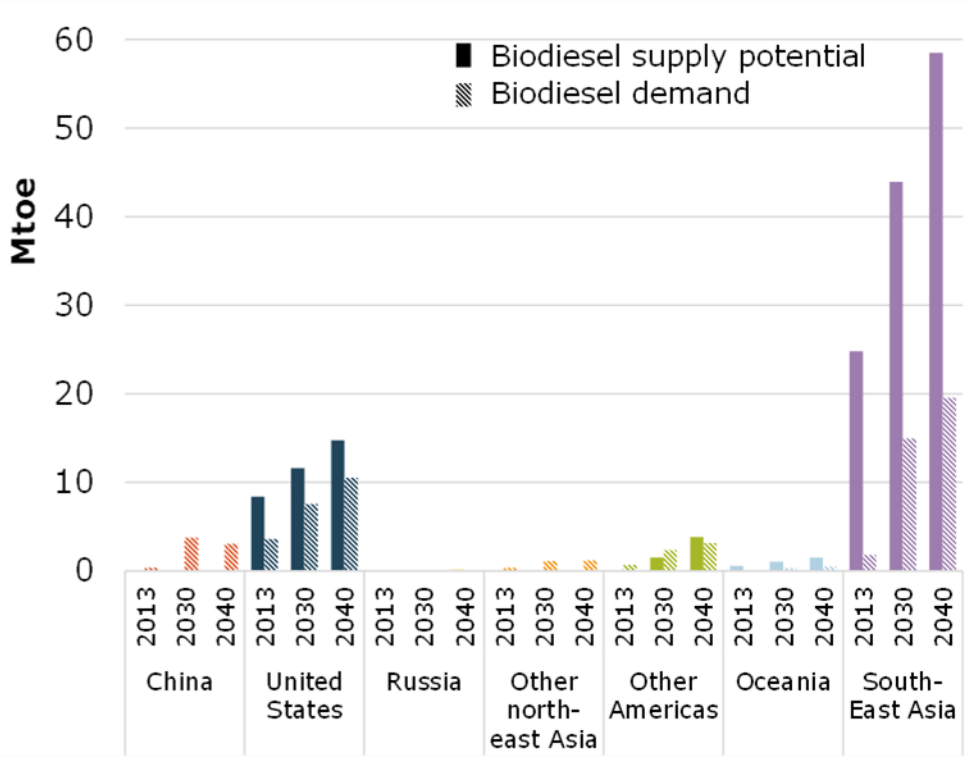
Source: IEA (2015) and APERC (2016).

APEC Biofuels Supply Potential in the High Renewables Scenario

APEC bioethanol supply potential and demand



APEC biodiesel supply potential and demand



Biofuel supply growing 2.7%/yr could meet over 5% of transport demand. Regional biofuels surpluses and deficits provide great trading opportunity.

Sources: IEA (2015) and APERC (2016).

2. Energy Investment in the High Renewables Scenario

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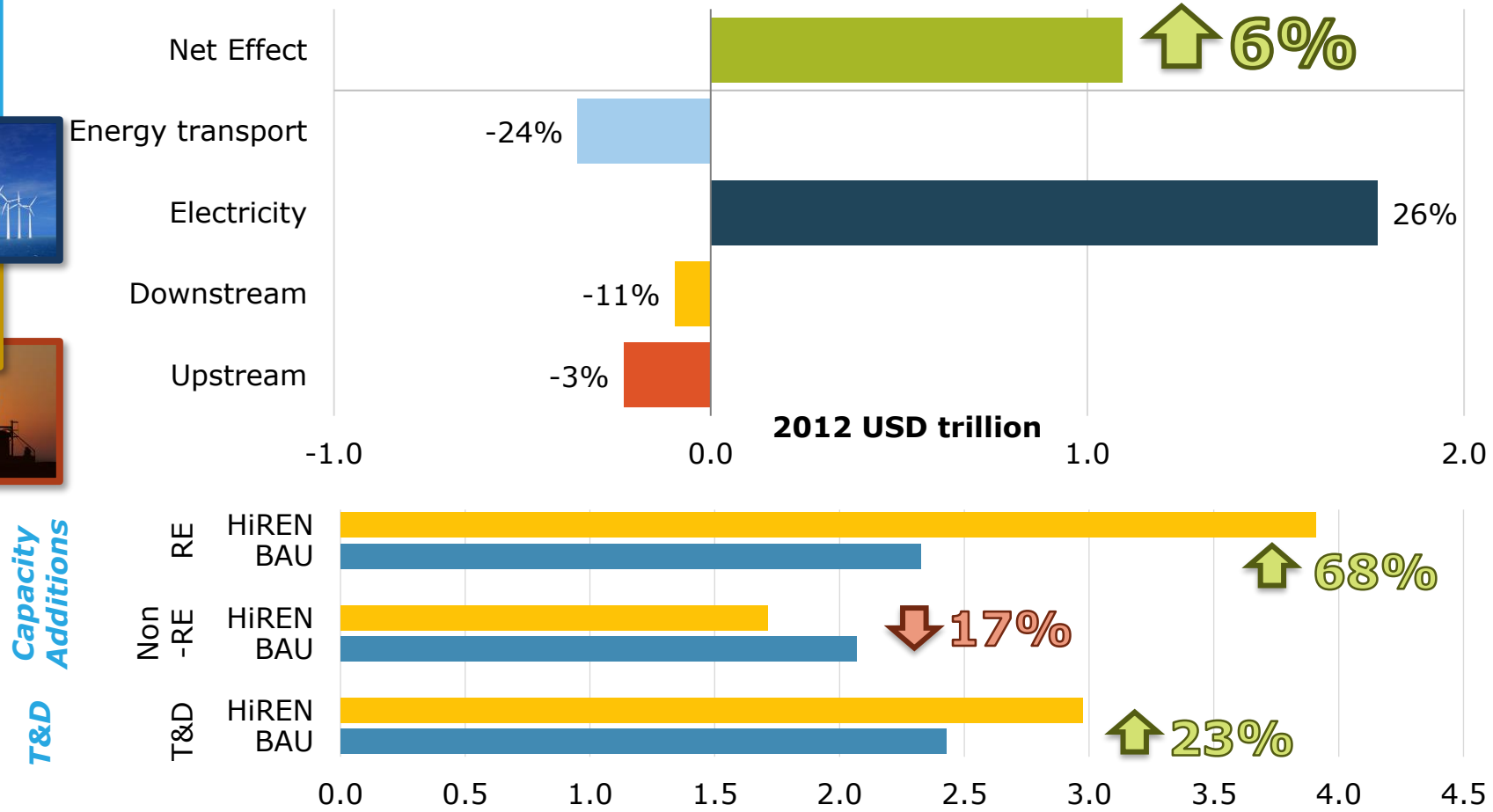
The High Renewables Scenario requires a small increase in investment

Change in investment under the High Renewables Scenario from BAU, 2015-40



The High Renewables Scenario is 6% (USD 1.1 trillion) higher than the BAU. RE capacity and T&D investments only partially offset by lower non-RE investments.

3. Improved Efficiency Scenario

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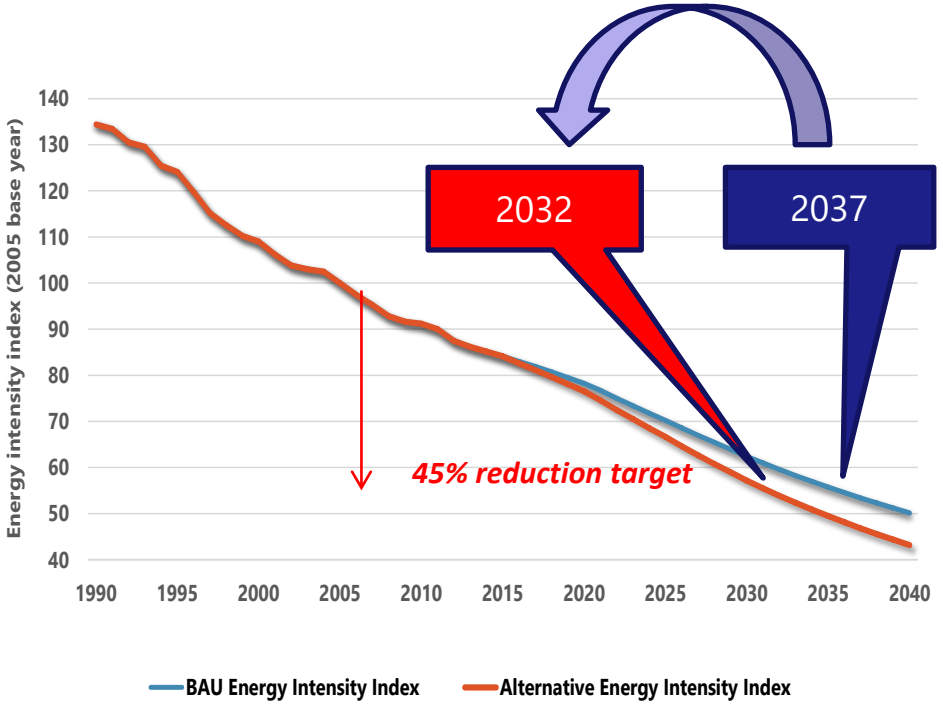
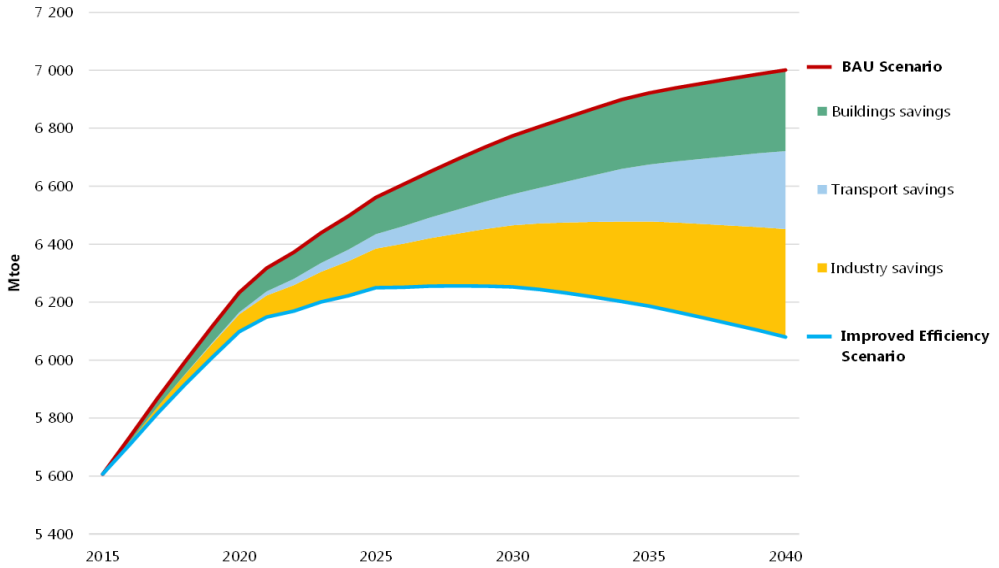
Improved Efficiency Scenario

APEC Energy Intensity target



Overall results

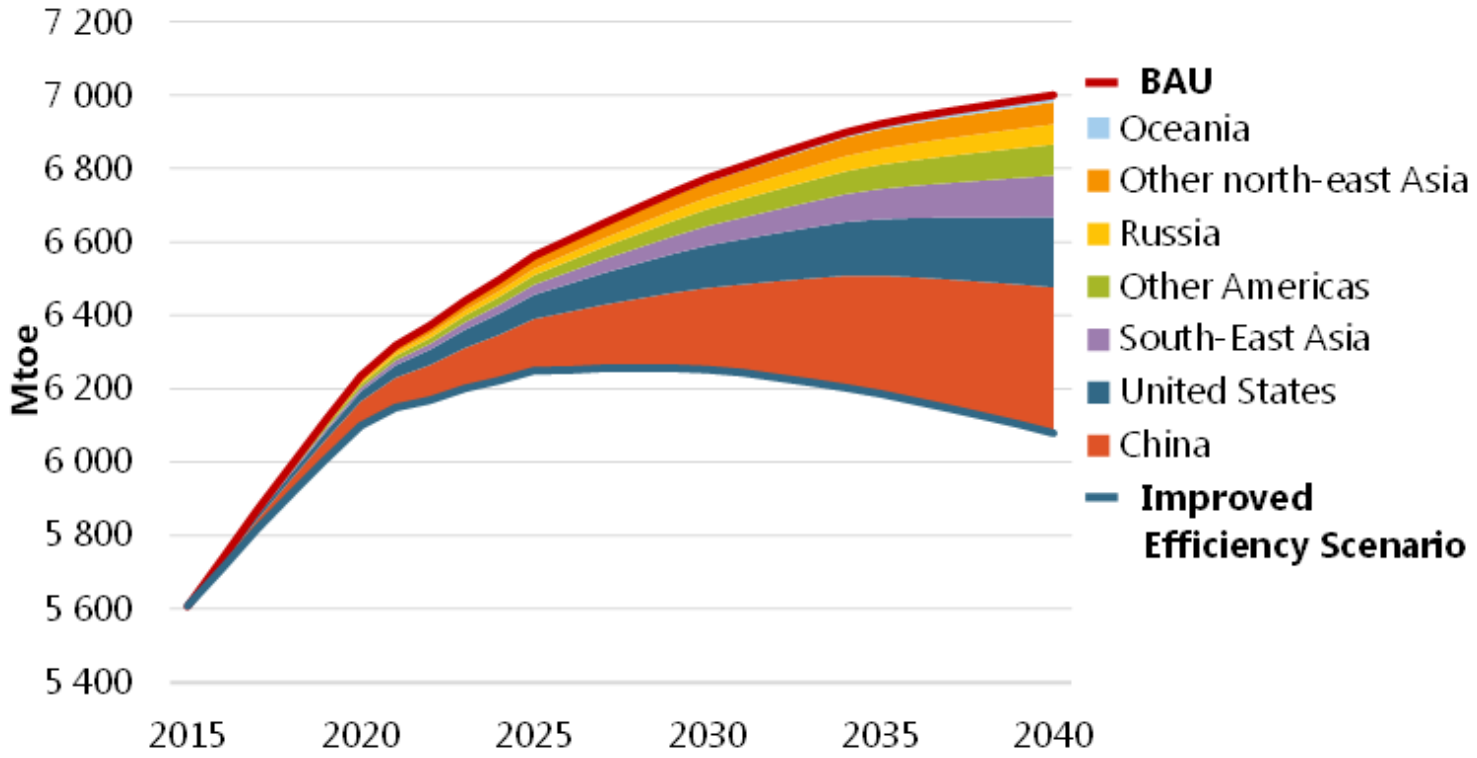


Total savings of 921 Mtoe equivalent to the combined current demand of Russia, Japan and Korea.

Sources: IEA (2015) and APERC (2016).

China and the US account for 64% of energy savings

Energy savings in the Improved Efficiency Scenario by regional grouping, 2015-40



China has the largest saving potential: it delivers 43% of total APEC savings. The United States follows with 21%.

Note: **Oceania** (Australia, New Zealand and PNG), **Other Americas** (Canada, Chile, Mexico and Peru), **Other north-east Asia** (Hong Kong, Japan, Korea and Chinese Taipei), **South-East Asia** (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam).

4. Impact of Alternative Scenarios on CO_2 Emissions

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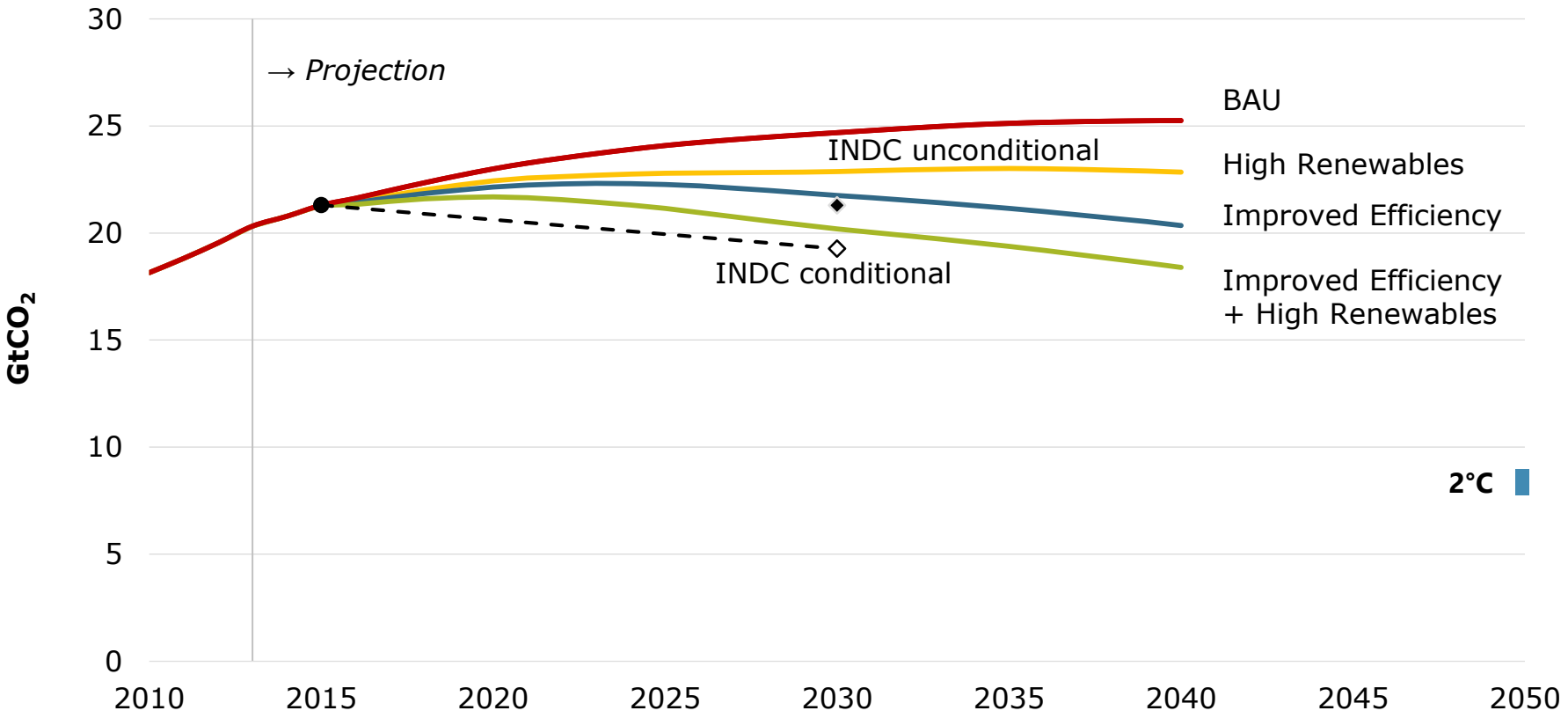
APEC Energy-related CO_2 Emissions in APERC Scenarios and INDCs



APEC energy related emissions can peak by 2020 if both energy efficiency and higher shares of renewables are pursued.

APEC economies need to raise INDC ambitions, as well as energy targets if the global climate goal is to be achieved.

5. Renewables Heating & Cooling project

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Renewables Heating & Cooling project background

The High Renewables Scenario outlines a pathway to accomplishing APEC's Renewables Doubling Goal. Achieving this will require the following actions:

- Formulate a comprehensive, APEC-wide Renewables development plan;
- Renewables policy should cover power, transport, buildings and industry;
- Provide R&D support for current and next generation RE technologies;
- Strengthen and improve the power grids for VRE integration;
- Support Renewables market access, e.g. easier power grid connection;
- Provide fiscal and non-fiscal incentives, e.g. FiT, RPS, PPAs,
- Enhance biofuels trade among APEC member economies; and
- Accelerate the development and standardization of advanced biofuels to address possible shortfalls of bioethanol and promotion of flex-fuel vehicles.

Thank you for your attention!

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