Asia-Pacific
Economic Cooperation

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Agenda Item: 10b

APEC Energy Demand and Supply Outlook - 7th Edition Results and 8th Vision

Purpose: Information
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Asia-Pacific Economic Cooperation

APERC Asia Pacific Energy Research Centre

10.b. Outlook 7th Edition results and vision for the 8th Edition

The 57th Meeting of APEC Energy Working Group (EWG)
Taguig City, Philippines, 23-24 May 2019

David Wogan, Assistant Vice President

APEC Energy Demand and Supply Outlook

Investigates challenges faced by APEC economies:

- Affordably meeting growing energy demand
- Reducing negative energy-related environmental impacts
- Enhancing energy security and resilience

7th Edition Outlook investigates provides analysis and insight on:

- Impact of existing and alternative policies on energy demand, supply, emissions and investments through 2050
- APEC energy intensity and renewables doubling goals
- Sectoral transitions that support Paris climate ambitions

Scenarios

Business-as-Usual (BAU)	APEC Target (TGT)	2-Degrees Celsius (2DC)
Recent trends and current policies.	Pathway that achieves APEC-wide goals to • reduce energy intensity 45% by 2035 • double the share of renewables by 2030.	Pathway that provides a 50% chance of limiting average global temperature rise to 2°C.
Provides a baseline for comparison.	Explores implications of alternative scenarios and identifies gaps to overcome.	

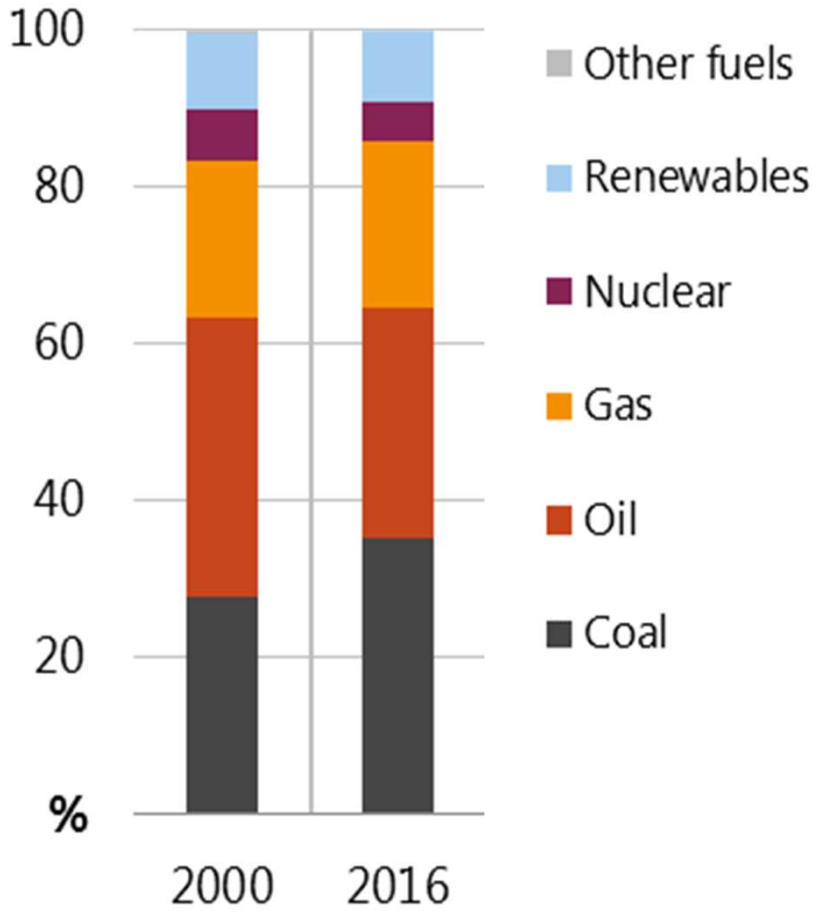
Key APEC-wide trends through 2050

- Final energy demand continues to grow, driven by transport and buildings.
- Electricity demand rises in all scenarios.
- APEC Target Scenario achieves intensity and renewable doubling goals at a net cost savings.
- 2DC scenario requires large-scale deployment of renewables and CCS technologies, also at net cost savings.
- Fossil fuels continue to represent at least half of FED and TPES in 2050, across all scenarios.

1. BAU Scenario

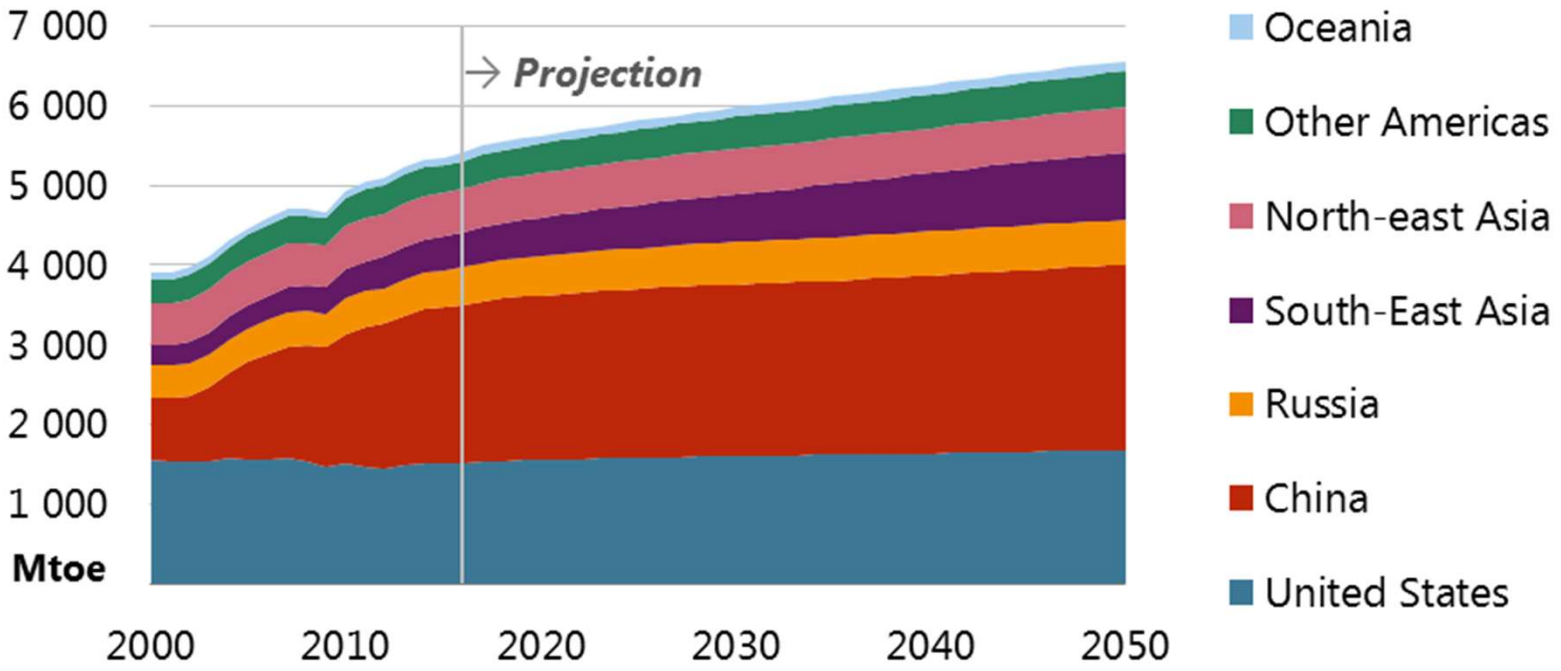
Background

- As of 2016,
  APEC represented 39% of global population and 54% of global GDP.
- APEC's total primary energy supply (TPES) has grown 27% since 2000.
- The energy supply mix is currently dominated by fossil fuels.



Final Energy Demand increases 21% in 2050

Final energy demand by region in BAU, 2000-50

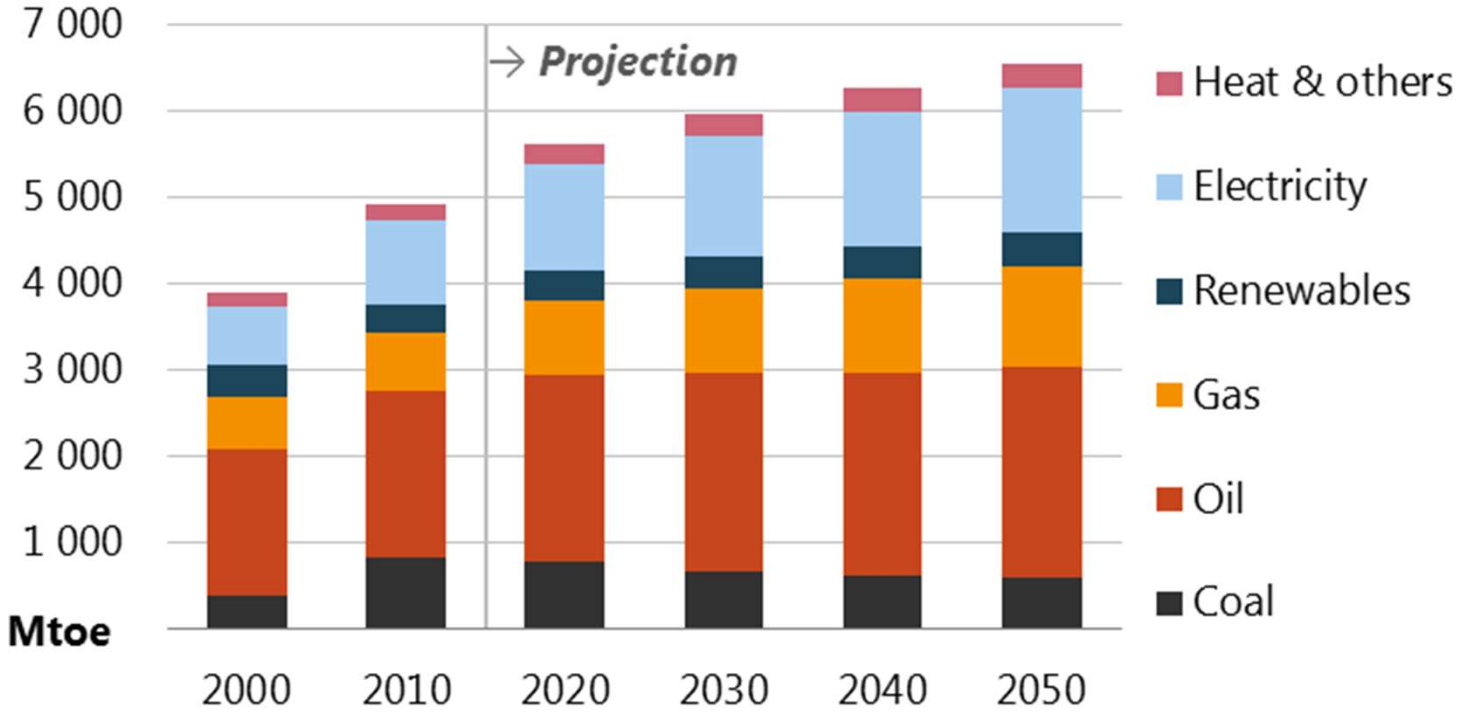


Sources: APERC analysis and IEA (2018a).

FED grows to over 6 500 Mtoe in 2050, driven primarily by GDP and population growth in south-east Asia.

Final Energy Demand increases 21% in 2050

Final energy demand by fuel in BAU, 2000-50

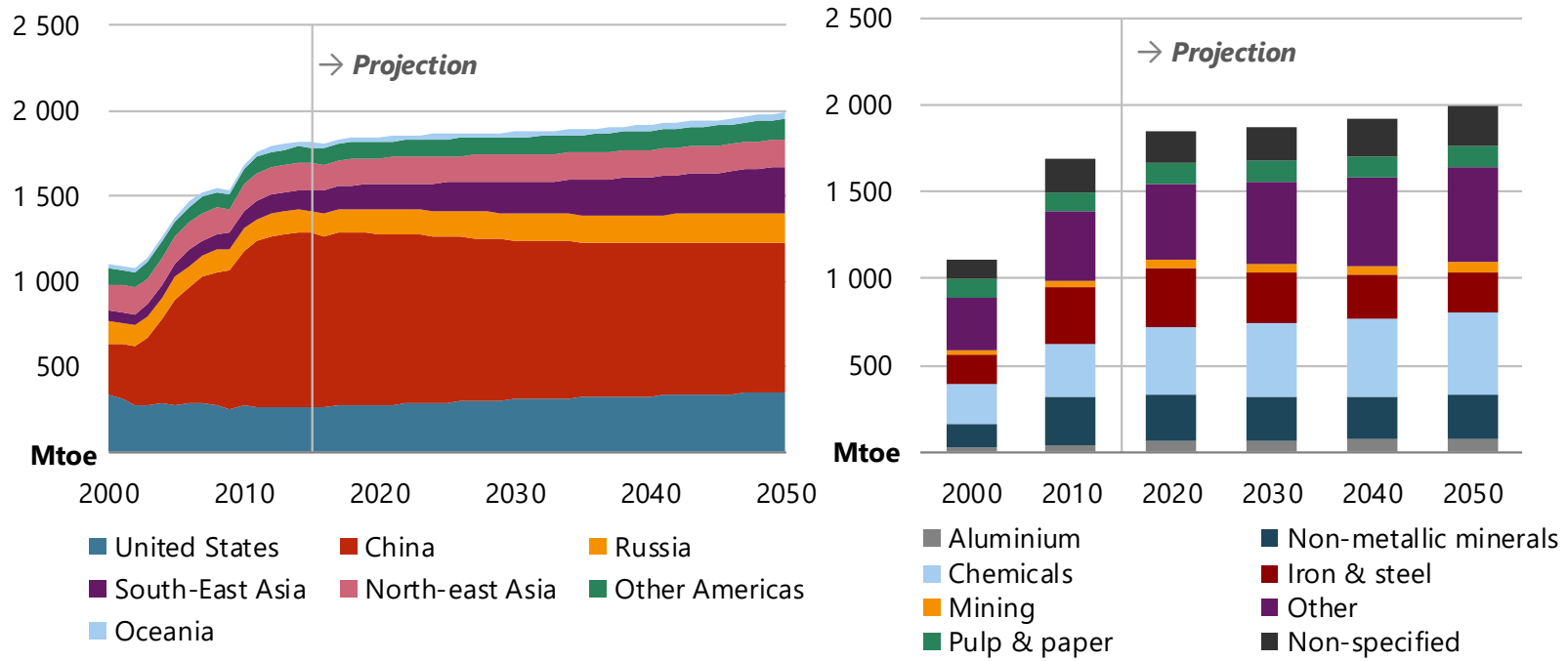


Sources: APERC analysis and IEA (2018a).

Electricity grows to 26% of FED as use in buildings and transport increases.

Industry is the largest sector but growth is slow

Industry final energy demand by region and subsector in BAU, 2000-50

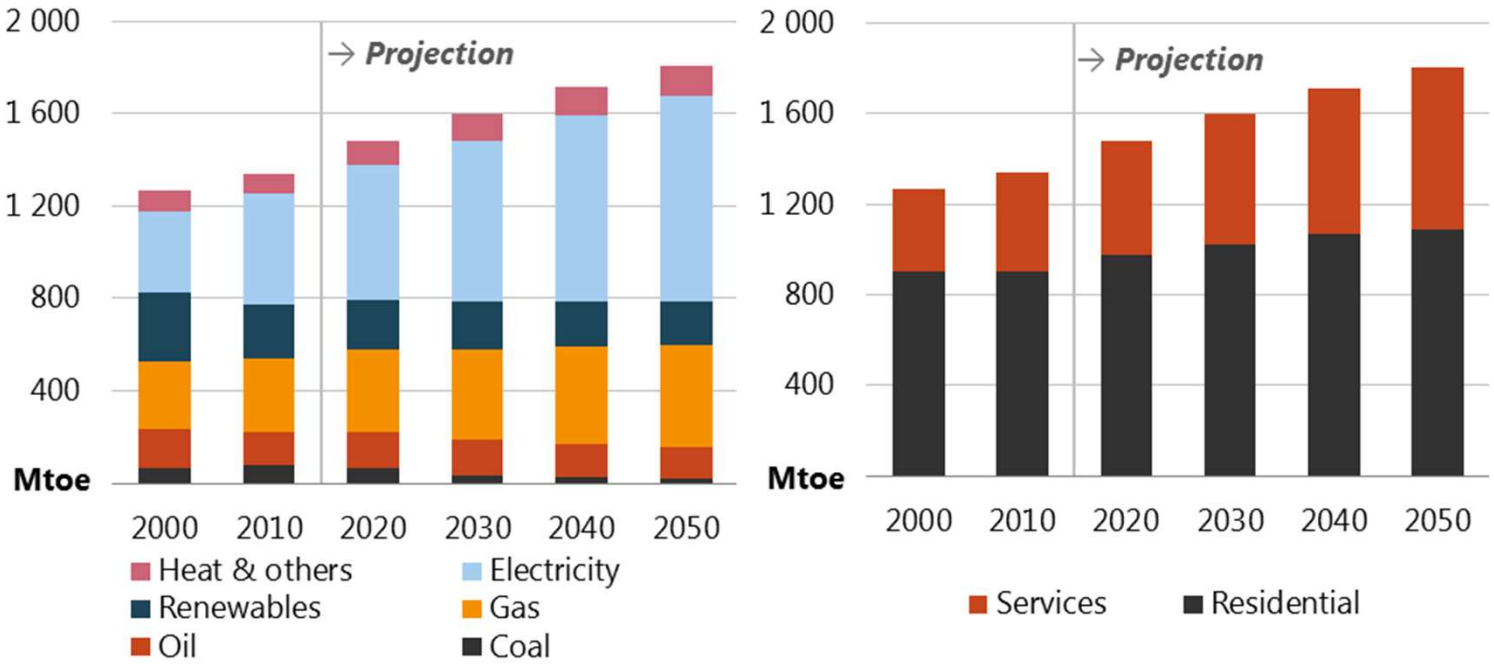


Sources: APERC analysis and IEA (2018a).

Industry demand grows gradually due to shift towards high value-added manufacturing in China, associated with shifting economic structure.

Buildings FED increases by 28% in 2050

Buildings final energy demand by fuel and subsector in BAU, 2000-50

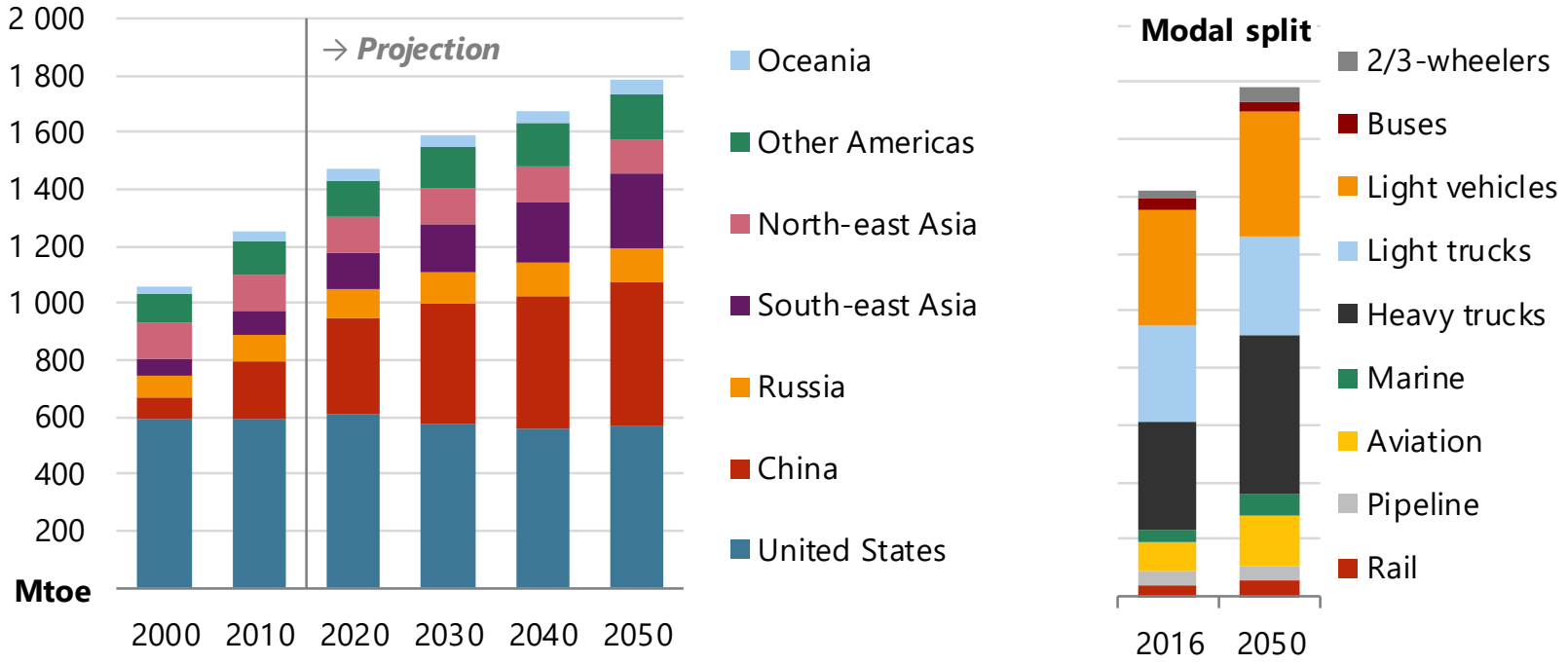


Sources: APERC analysis and IEA (2018a).

Buildings accounts for 28% of FED in 2050. Space cooling is the fastest-growing source of energy demand in buildings.

Transport FED grows by 25% in 2050

Transport demand by region and mode in BAU, 2000-50

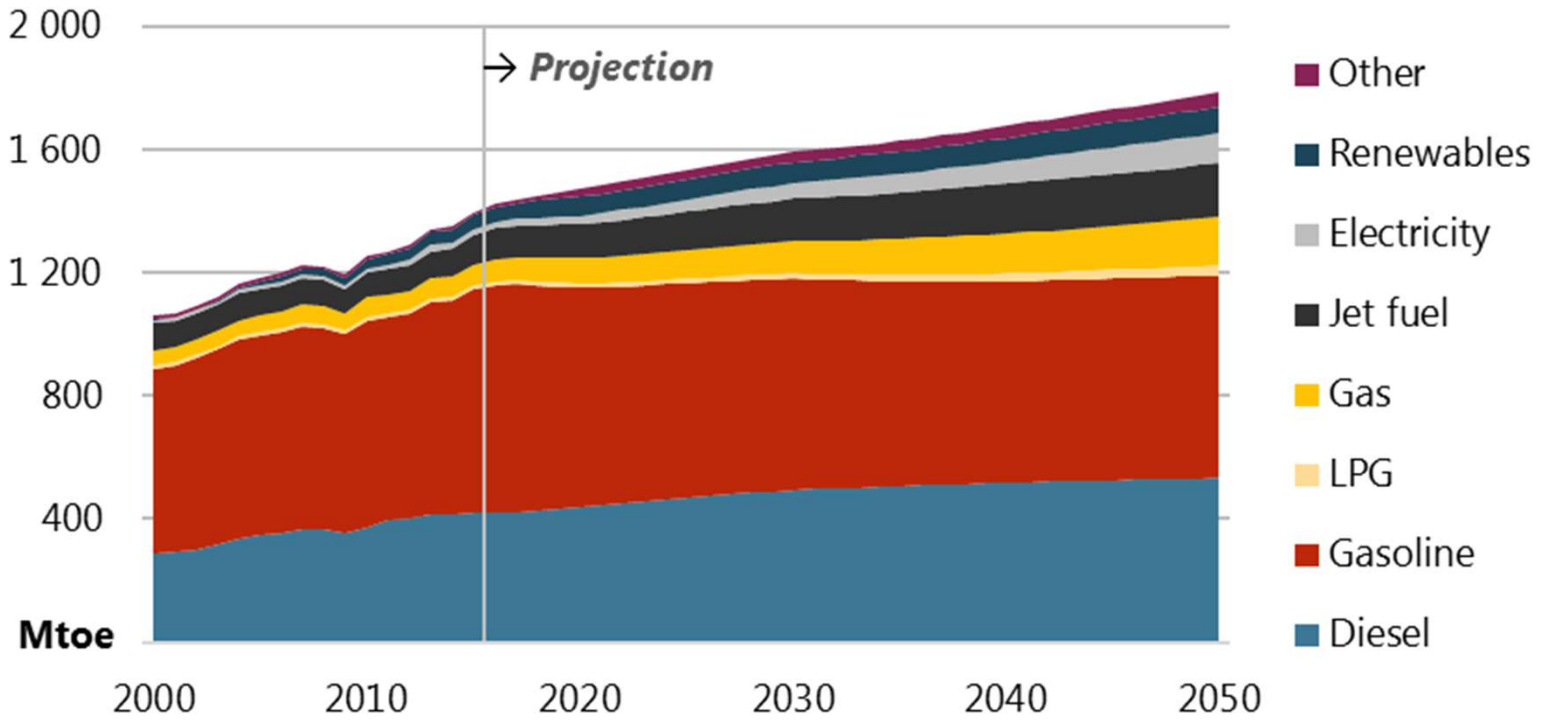


Sources: APERC analysis and IEA (2018a).

South-east Asia demand more than doubles. In China, demand increases by 70%.

Transport FED grows by 25% in 2050

Transport fuel demand in BAU, 2000-50



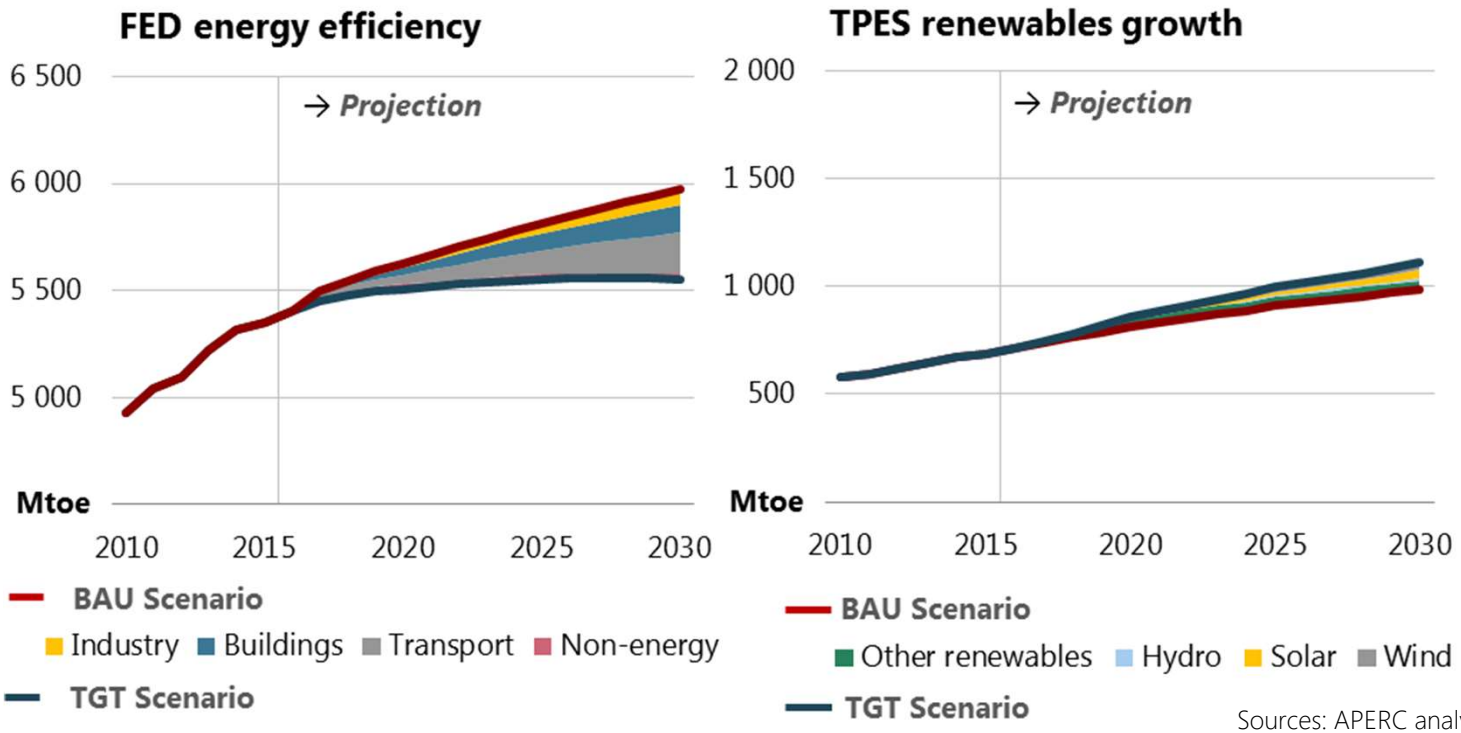
Sources: APERC analysis and IEA (2018a).

Fossil fuels remain dominant, but growth slows due to fuel efficiency standards. Electricity increases but remains a minor fuel.

2. Alternate scenarios

Slightly more renewables in the TGT Scenario

Energy efficiency and renewables in the BAU and TGT, 2010-30



Sources: APERC analysis and IEA (2018).

Final energy demand falls (mainly transport), but renewable supply increases (mainly solar), which has a two-fold impact on the doubling goal.

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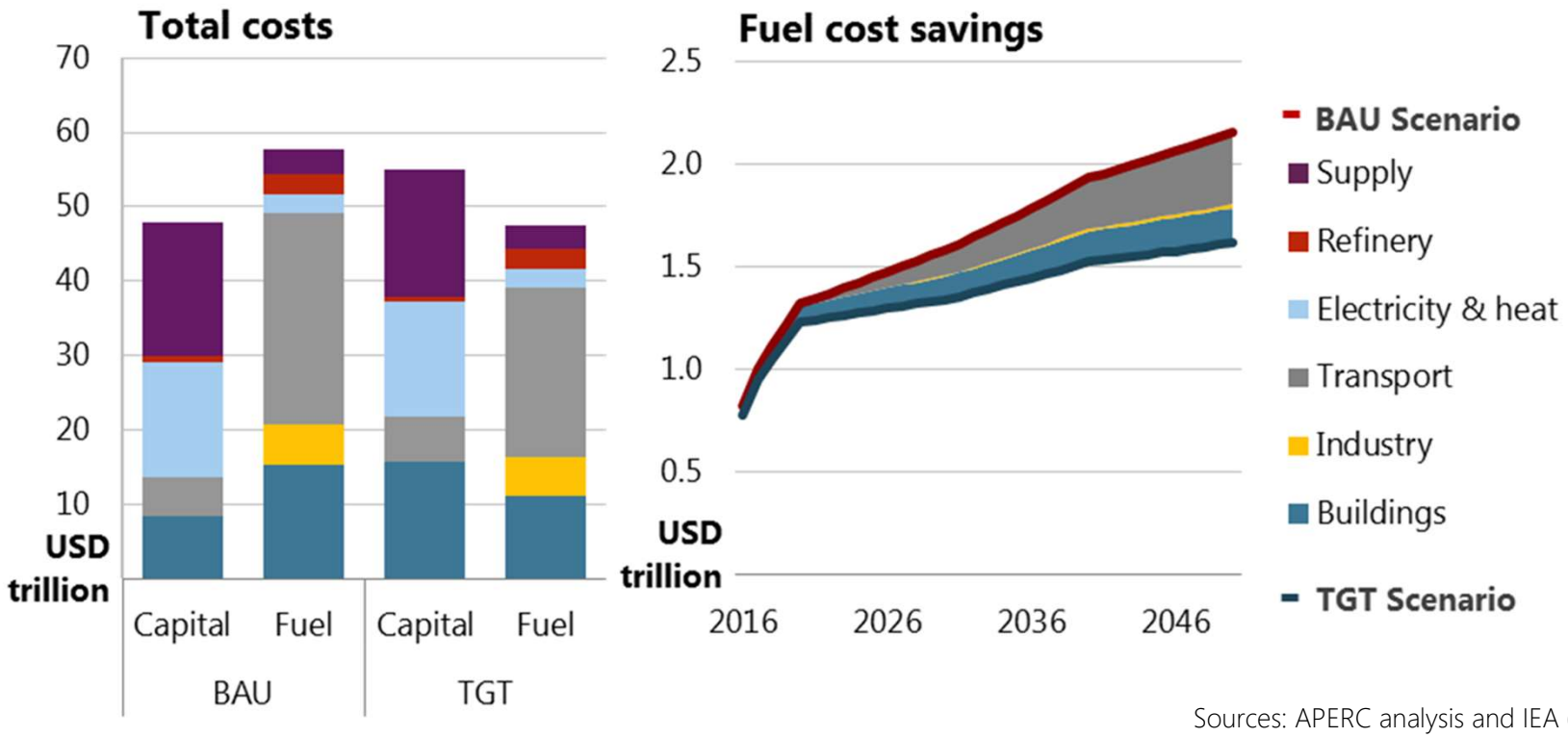
An additional USD 7 trillion needed to satisfy APEC targets

Capital investments and fuel expenditures in TGT compared with BAU, 2016-50

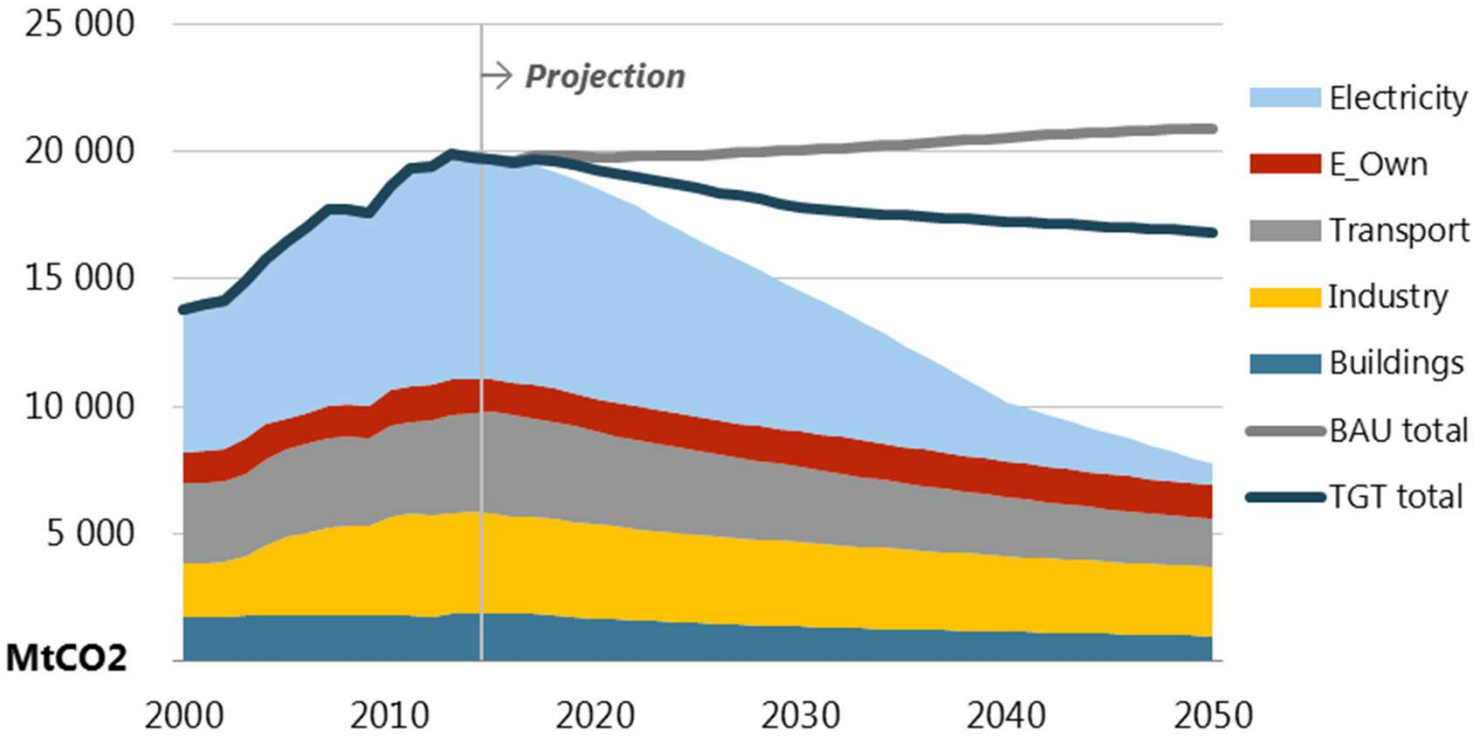


Sources: APERC analysis and IEA (2018)

Fuel savings from efficiency gains more than offset additional investment by 45%.

In 2DC, CO_2 emissions fall below 2016 levels

Total CO_2 emissions by sector in the 2DC, 2016-50

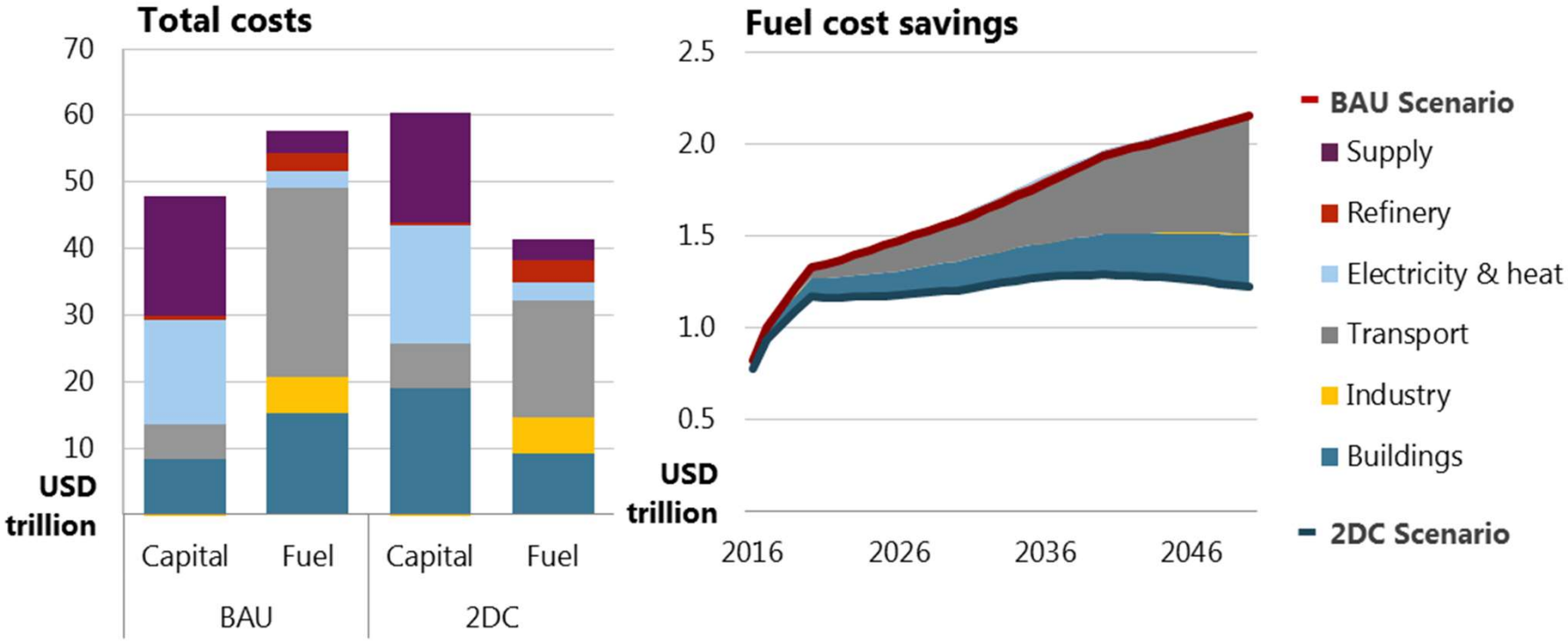


Sources: APERC analysis, IEA (2016 and 2018), IPCC (2018) and UNFCCC (2018).

Electricity sector decarbonisation drives a 2.6% per annum decrease in CO_2 emissions. Industry decarbonisation is challenging.

Capital outlays rise to USD 60 trillion in the 2DC

Cumulative investment and fuel cost savings by sector in the BAU vs 2DC, 2016-50



Sources: APERC analysis and IEA (2018)

Fuel savings offset additional fuel expenditures for total outlays of USD 102 trillion.

Summary

- While demand grows in the BAU, APERC modelling shows that efficiency standards can substantially reduce demand.
- Electrification in buildings, transport, and industry increases and key to reducing demand and CO_2 emissions.
- Efficiency, renewables, and CCS are required to achieve deep emissions reductions.
- Efficiency and low-carbon capital investments lead to a net gain from fuel savings.
- Fossil fuels remain the foundation of the APEC energy system.

Vision for the 8th Edition Outlook (1)

- New name: APEC Energy Outlook, 8th edition
- Current intention is to include three core scenarios:
  - **BAU**: as with past editions, this scenario will include existing policies and provide a baseline for comparison
  - **APEC Target (TGT):** this scenario will explore policies and pathways to meet APEC's aspirational goals + opportunities for increasing ambition
  - **Climate Change:** explore decarbonisation policies and pathways to support economy commitments under the Paris Climate Agreement
- … and several side cases
  - High/low fuel prices
  - High / low resource availability
  - Topic focus (e.g., trade, technology, etc)

Vision for the 8th Edition Outlook (2)

- Update modelling infrastructure
  - Objective: improve start-to-finish run-times and usability
  - Provide a platform for Outlook and other APERC research projects
  - Make available APERC modelling tools to economies

- Update modelling methodologies
  - Adopt open-source frameworks and components
  - Further introduce price and quantity linkages among sectors
  - Represent transformation and supply sectors as cost optimisations

Thank you for your kind attention.

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