

APEC ENERGY DEMAND AND SUPPLY OUTLOOK, 7TH EDITION

Accounting for around 60% of world energy demand, the 21 economies that make up the Asia-Pacific Economic Cooperation (APEC) region are at the forefront of addressing the rapid changes underway in global energy systems.

The 7th Edition of the APEC Energy Demand and Supply Outlook:

- Describes the APEC energy outlook to 2050.
- Identifies major challenges and opportunities facing the region's energy sector and discusses the role of APEC cooperation and trade.
- Assesses the impact of current trends and policies and alternative scenarios on the region's fuel mix, investment requirements, trade patterns and carbon dioxide (CO₂) emissions.
- Includes detailed projections of energy production, supply and demand for each of the 21 APEC member economies.

FINAL ENERGY DEMAND CONTINUES TO GROW

In the Business-as-Usual (BAU) Scenario, which reflects existing policies and extends current trends, aggregate APEC demand rises by 21% between 2016 and 2050. Population growth in south-east Asia and economic growth in China are key contributors to this increase.

While industry remains the largest energy-consuming sector in APEC, it is the slowest growing over the Outlook. Domestic transport and buildings, the second and third largest consumers in 2016, grow more rapidly as rising standards of living lift demand for personal and public transport, appliances and floor space. Existing efficiency policies are therefore critical to softening demand growth across the region.

FOSSIL FUELS REMAIN THE FOUNDATION OF APEC ENERGY SYSTEMS THROUGH 2050

Representing at least half of final energy demand, fossil fuels continue to meet most of the energy demand across the Outlook. However, natural gas increasingly replaces coal, particularly in industry, as growing production and trade increase the price competitiveness of this lower-carbon alternative.

Oil use continues to grow steadily in the BAU—mainly in transport where fossil fuels are difficult to displace. Despite rising deployment of electric vehicles and greater use of public transport, the share of electricity in transport final energy demand only reaches 5% in the BAU. Likewise, in industry fossil fuels continue to provide an important source of process heat and feedstock.

In buildings, fossil fuels become less important despite energy demand continuing to grow. Implementing minimum energy performance standards to complement standards and labelling schemes for appliances, and air conditioning in particular, is essential to mitigating growth over the Outlook.

THE FUTURE IS INCREASINGLY ELECTRIC

Electricity demand rises in all scenarios because of the two-fold effects of increasing income and structural change in APEC economies. Growing incomes drive higher demand for space cooling, appliances, and modern cooking while the economic importance of the service sector continues to grow compared to industry, particularly in China. Electrification of transport also contributes, again mostly in China.

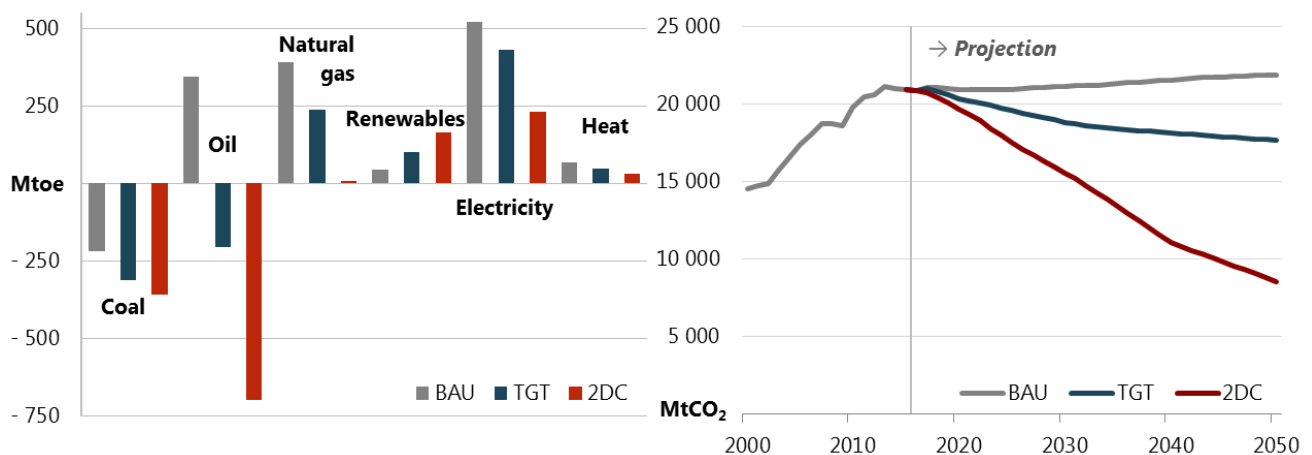
Investment and power systems operation become even more important through 2050. To meet growing demand, in the BAU more than 3 200 gigawatts of new power plant capacity are deployed between 2016 and

2050. In response, improving the flexibility of the power system becomes an increasingly important challenge. Enhancing supply-side ramping capability, deploying grid-scale storage solutions, strengthening transmission and distribution networks, and expanding demand-side management are all essential to maintaining stable electricity supply across the region.

THE APEC ENERGY INTENSITY GOAL IS MET BUT THE RENEWABLE SHARING GOAL IS NOT

The APEC Target Scenario (TGT) sets a pathway outlining what additional effort beyond the BAU is required to meet the APEC goal of doubling the share of renewable energy. This is achieved through greater efficiency and standards regulation, mainly in demand sectors, and increased policy support for renewables, mainly in transformation sectors. However, despite meeting the aspirational goals in the TGT, APEC falls well short of achieving the nationally determined contributions agreed to at the COP 21 Paris Agreement in 2015.

Left: Change in final energy demand by fuel and scenario. Right: APEC CO2 emissions by scenario.



EFFICIENCY, RENEWABLES, NUCLEAR AND CCS ARE ALL REQUIRED FOR COP21 GOALS

The 2-Degrees Celsius Scenario (2DC) outlines a pathway for APEC to follow, as part of a global effort, that reduces CO₂ emissions sufficiently to achieve the COP21 goal of creating a 50% chance of constraining global temperature increases to less than 2°C. Across APEC, energy related CO₂ emissions decrease from 20 900 million tonnes in 2016 to 8 600 million tonnes in 2050 in the 2DC.

While all sectors contribute to the 2DC pathway, it is most cost-effective for electricity generation to undergo the greatest emissions reductions. The APEC electricity sector therefore achieves near-decarbonisation in the 2DC via significant renewables and nuclear growth and widespread deployment of CCS for new and existing plants. Achieving commercial viability of CCS technology for fossil fuel and bioenergy generation by 2030 and reversing the trend of nuclear retirements, particularly in developed economies, is paramount to moving APEC towards a 2DC pathway.

Demand sectors, like transport, industry and buildings, are difficult to decarbonise. They rely on drastic improvements in efficiency and increased electrification rather than higher renewables penetration. This highlights the importance of the electricity sector, which is in effect required to absorb emissions reductions from end-use demand sectors as they become further electrified.

The report, along with detailed tables of the model results, is available from: <https://aperc.iej.or.jp/>