

APEC ENERGY DEMAND AND SUPPLY OUTLOOK 2002¹

PRESS RELEASE

STUDY OBJECTIVES

This Outlook is intended to foster member economies' understanding of energy demand and supply trends and developments in the region, thereby helping them formulate their energy policies.

MAIN FINDINGS

- **Energy demand** within APEC is projected to rise almost 60 percent between 1999 and 2020, **a rate slightly above two percent per annum.**
- **Electricity demand** is projected to rise **at a rate of 3.2 percent per annum**, mainly driven by rising incomes and increasing electrification in developing economies.
- Similarly, rising incomes and improving standards of living will result in rapid increases in **transport energy demand**, projected to grow **at 2.7 percent per annum.**
- The APEC region is self-sufficient, or almost so, in all types of energy except for oil. **Increasing demand for oil** (2.1 percent per annum) is not likely to be met by increased production within APEC (projected to be only 0.5 percent per annum), and **dependence on imports** is seen increasing **from around 36 percent now to 54 percent in 2020.**
- More notably, the **oil dependence on imports of APEC economies in Asia**, now around 60 percent, is seen rising to almost **80 percent by 2020.** This, together with a likely increase in dependence on supplies from the Middle East, raises significant issues of security of supply for the APEC Asian economies in particular.
- Projected increases in demand for electricity and gas, and to a lesser extent oil and coal, present significant challenges to both governments and the private sector in respect of **the huge investment needed in energy infrastructure, estimated at \$2.2-2.8 trillion in the next two decades.**
- Greater demand will also present **huge challenges in respect of environmental sustainability**, particularly concerning carbon emissions and (urban) living conditions, a situation in which the better living standards that result from increased energy consumption may be adversely affected by deteriorating environmental conditions.

¹ The report and Energy Balance Tables can be found on the APERC website: <http://www.ieej.or.jp/aperc/>

OUTLOOK BY FUEL TYPE

Over the forecast period, **oil** is projected to grow from 2,023 Mtoe in 1999 to 3,107 Mtoe in 2020, an annual growth rate of 2.1 percent. Oil is expected to maintain the highest share in total primary energy supply (TPES) of APEC at around 36 percent throughout the outlook period. The transport sector will lead oil demand growth, contributing 72 percent to incremental oil demand growth in 1999-2020. The oil import dependency of the APEC region is forecast to increase from 36 percent in 1999 to 55 percent in 2020. For APEC economies in Asia including Oceania it will rise from an already high 60 percent in 1999 to 80 percent in 2020, most of which will be sourced from the Middle East. In other words, APEC Asia will become more vulnerable to oil supply disruptions.

Figure 1: Primary energy demand in the APEC region

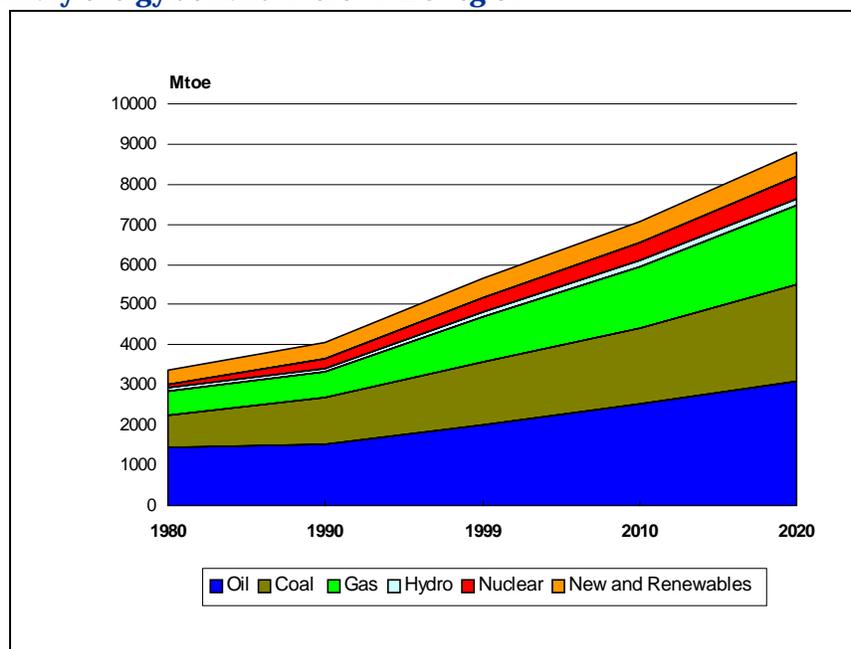


Table 1: Primary energy demand in the APEC region (1999, 2010 and 2020) (Unit: Mtoe)

	Coal	Oil	Gas	Hydro	Nuclear	NRE	Total
1999	1,540	2,023	1,135	106	379	478	5,659
2010	1,905	2,522	1,537	146	425	539	7,074
2020	2,402	3,107	1,949	185	537	595	8,777
Average Growth Rate (%)							
1999-2010	2.0%	2.0%	2.8%	2.9%	1.0%	1.1%	2.0%
2010-2020	2.3%	2.1%	2.4%	2.4%	2.4%	1.0%	2.2%
1999-2020	2.1%	2.1%	2.6%	2.7%	1.7%	1.1%	2.1%

(Source) APERC (2002)

The second-largest energy source in TPES is projected to be **coal**, maintaining a 27 percent share throughout the outlook period. Coal shows annual growth of 2.1 percent (1999-2020). Most of the increase in coal demand will come from power generation, accounting for 83 percent of incremental growth. By region, China is expected to continue to be a major coal consumer in the APEC region, accounting for 41 percent of TPES for coal in 2020. This is driven by coal's cost competitiveness relative to other fossil fuels, and to its availability.

Coal production in the APEC region is concentrated in the six economies with the largest reserves, Russia, USA, China, Australia, Canada and Indonesia. These six economies account for almost 99 percent of APEC's total coal reserves and production. Coal demand has increased substantially in recent years, a rise matched by increased production. However, APEC is expected to change from being a net coal exporter in 1999 to a marginal net importer of coal by 2020.

Natural gas is projected to constitute the third-largest part of TPES increasing from 20 percent to 22 percent over the forecast period. In the first half of the period it will experience faster growth at 2.8 percent per annum, followed by growth of 2.4 percent yearly in the second half. The Asian region, including Northeast Asia, Southeast Asia and China, is expected to see growth in natural gas demand of 4.6 percent per year. The current share of natural gas in TPES of Asia is low at 8 percent compared with North America (24 percent), Latin America (19 percent) and Oceania (18 percent). Rising per capita income combined with ease-of-use will be the key factor in its expansion. In future, technological development and environmental concerns will have a major influence on natural gas consumption.

To meet growing demand for natural gas, massive investment in supply infrastructure is crucial – transport either by pipeline or as LNG and distribution networks for industrial and residential use.

NRE (new and renewable energy) is defined to include biomass, solar, wind, tidal and wave energy. In the APEC region, the residential sector in rural areas of less-developed regions relies heavily on biomass for cooking and heating. The current share of biomass accounts for almost all of the NRE consumed in the APEC region. Over the coming two decades, NRE is expected to grow at 1.1 percent per annum, which is lower than the annual growth rate of TPES at 2.1 percent per annum. The share of NRE is expected to fall from 8.4 percent in 1999 to 6.8 percent in 2020 due to a shift to commercial fuel sources as a result of socio-economic development.

The share of **nuclear** energy in TPES is expected to decline slightly from 6.7 percent in 1999 to 6.1 percent in 2020. In terms of growth rate, nuclear power will expand at an annual rate of 1.7 percent per year. Northeast Asia (Japan, Korea and Chinese Taipei) will contribute to 70 percent of total incremental growth of nuclear power (1999-2020) to meet the rising electricity demand. By contrast, North America will see a decline in nuclear power of 0.3 percent per annum as a result of the retirement of existing reactors.

Hydropower shows the fastest growth in TPES at 2.7 percent per annum (1999-2020), though its share is expected to be low at two percent for the entire forecast period. Endowed with the largest potential for hydropower, China will see the fastest annual growth of 6.9

percent, accounting for around 70 percent of the total incremental growth of hydropower in APEC.

OUTLOOK FOR ELECTRICITY

Electricity generation is projected to increase by 82.4 percent, or a rate of 2.9 percent per annum, between 1999 and 2020. This is a lower growth rate than 3.2 percent per annum for final electricity demand, as transmission and distribution losses are projected to fall from 17.1 percent of generation in 1999 to 12.8 percent in 2020. China is expected to account for 30 percent of the increase in demand, with the USA accounting for 24.2 percent. Russia is projected to account for 9.9 percent of the increase and may compete with Japan as the third-largest electricity consuming economy in APEC by 2020.

Natural gas should become the fuel of choice for electricity generation, given a combination of price, thermal efficiency and environmental considerations. It increases from 373 Mtoe in 1999 to 873 Mtoe in 2020, a growth rate of 4.1 percent per annum. Its fuel share is projected to increase from 17.8 percent in 1999 to 24.8 percent in 2020, at the expense of oil and nuclear. Coal's fuel share should remain stable at just over 47 percent. In many economies it is the preferred fuel based on price and availability. It will get the largest absolute increase in input energy, increasing from 989 Mtoe in 1999 to 1,659 Mtoe in 2020.

ENERGY SECURITY

Energy security has been one of the most important energy issues facing APEC member economies, and it will be increasingly so in the years to come. The APEC Outlook 2002 indicates that oil import dependency in the APEC region will continue to increase particularly in Asia, where most of the supply may come from the Middle East. In view of the growing demand for fossil fuels, environmental challenges are becoming an indispensable part of broadly defined energy security as well. Therefore, APEC economies look at energy security from the short and long-term perspectives. The former focuses on preventing and mitigating against interruptions of supply as a consequence of contingencies such as accidents, war or terrorism. The latter encompasses policies and measures to enable flexible and sustainable energy supply with the minimum of environmental impacts.

ENVIRONMENTAL IMPACT AND MITIGATION

Coal is forecast to remain the dominant fuel in the power generation sector, despite impressive increases in demand for natural gas. Demand for oil will remain strong in the transport sector, with increasing private car ownership in populous economies being a key driver. This expected large growth in fossil fuel consumption could have very serious environmental impacts. One of the critical factors, in this context, is the extent of acceptability of environmental impacts to both local and global communities. Increasing wealth has led historically to increasing demand for clean air and water, and a general increase in environmental awareness. Over time, public pressure will accelerate the adoption and active implementation of appropriate policies, measures, and technologies by the APEC member economies to mitigate environmental impacts.

INVESTMENT REQUIREMENT

Increases in energy demand indicated in this Outlook will require substantial infrastructure to extract, transport and receive energy and process it into a consumable form.

This requires massive investments. Governments and the private sector will need to ensure that investment and regulatory environments are equitable and transparent in order for this needed investment to be realised. Energy supply at levels demanded will not be sustainable without massive investments.

Total investment needed in energy infrastructure between 2000 and 2020 is estimated to be roughly in a range of \$2.2-2.8 trillion. In annual terms, this represents a requirement of \$130 billion to \$170 billion.