Coal demand falls as Asia shifts to renewables

However, actual coal consumption is still likely to increase in at least nine Asia Pacific economies

Asia Pacific’s energy demand is expected to increase by 22% through 2050 in a world with a business as usual (BAU) scenario. However, despite this overall energy demand growth, coal demand (TPES) is projected to drop by 15%, according to the APEC Energy Demand and Supply Outlook. The absolute decline in coal is consistent with the slowing demand for it.

However, the declining trend is not consistent across all economies. In nine of the 21 APEC economies, coal consumption is expected to increase from 2016 to 2050. Coal demand (TPES) will rise almost threefold in Southeast Asia from 124 million tonnes of oil equivalent (Mtoe) in 2016 to 344 Mtoe in 2050. For China, the largest coal-consuming economy, domestic policies will see coal demand peak and then fall to 25% lower in 2050 than in 2016.

“The BAU scenario traces a trajectory for coal demand to 2050 should the world continue to develop with limited additional policy interventions,” according to the Asia Pacific Energy Research’s (APERC) Coal Report 2020. “Two alternative scenarios outline what’s required to meet the challenge of a lower emitting, lower pollution, energy system: the APEC Target scenario assumes that APEC economies increase their efforts to reduce energy intensity by 45% between 2005 and 2035 and double the share of renewables in the energy mix from 2010 to 2030.”

In that scenario, APEC energy demand will increase by 7% out to 2050 as opposed to 22% in the BAU. The lower overall energy demand and an increased share of renewables means that coal is displaced, particularly in the power sector, declining by 28% in 2050, relative to 2016.

Coal consumption in Asian countries

Japan’s coal consumption will gradually decrease through 2040, the Energy Information Administration (EIA) said. Japan is the largest coal consumer in OECD Asia, accounting for nearly half or approximately 5 quadrillion Btu of the region’s total coal consumption in 2012. Coal use in Japan in year 2012 was split almost evenly between the electric power and industrial sectors, which together accounted for nearly all of the coal consumption in the region.

Despite a temporary increase in coal use following the shutdown of nuclear power plants after the Fukushima disaster in 2011, a shift towards renewable energy and natural gas for electricity generation has reduced the electric power sector’s demand for coal after 2015. Industrial sector use of coal will begin to drop after 2020 mainly as a result of reductions in steel output as Japan’s population and domestic demand decline.

China’s coal consumption has been slowing down since the peak of 2012

Meanwhile, South Korea’s coal consumption will increase from 3 quadrillion Btu in 2012 to more than 4 quadrillion Btu in 2040. Coal consumption will rise steadily in the country’s industrial sector, driven by steel production.

Further, coal consumption in the electric power sector, which accounted for 62% of total coal consumption in 2012, will advance strongly as a result of significant growth of the coal-fired generating fleet in response to the government’s focus on thermal power expansion. As nuclear and renewable power capacity grows, coal consumption for electricity generation will decrease in the medium term before recovering gradually after 2030, when the nuclear power expansion tapers off.

Meanwhile, China and India are the top two coal consumers in non-OECD Asia. India, the second largest coal user in the region, will account for nearly half of the increase in coal consumption from 2012 to 2040, whilst China will contribute less than one-third to coal consumption.

China is the leading consumer of coal in the world, having used 76 quadrillion Btu of coal in 2012—one-half of the world’s coal consumption and more than four times as much as the United States.

After rapid growth from 2003 to 2011, China’s coal consumption began to slow in 2012. The slowing trend continues into the
projection period as the country’s economy and energy system undergo a number of structural changes.

Economic deceleration, industry restructuring, and new energy and environmental policies have slowed the growth of coal consumption in China, leading to more centralised and cleaner use of coal. Despite rapidly rising coal prices, China’s coal consumption increased by an average of 9% per year (based on energy content) from 2003 to 2011.

In 2012 and 2013, leaps in coal consumption were between 1% and 2%. In 2014, coal consumption based on energy content was largely the same as in 2013 and coal consumption in physical units dropped for the first time since 1998 as the average heat content of the coal consumed increased after years of decline.

The coal imports of China also declined in 2014 for the first time since 2009, when China became a net coal importer. The sustained slowing of coal consumption growth contrasts the sustained falling of coal prices since 2012, which led to prices in 2014 that were 35% lower than prices in 2011.

The trends continued into 2015, signifying that fast-paced growth in China’s coal use may not return, and suggesting that the pattern of growth in China’s coal consumption can be changing gradually, although not necessarily implying an imminent peak in coal consumption.

**Thermal and metallurgical coal**

Coal has two primary uses: thermal or steam for power generation and heating applications and metallurgical for steel production. According to APERC, thermal coal is still a reliable, affordable energy source for most countries in the APEC region. The share of thermal coal in the overall electricity generation mix is beginning to decline, but this is not in all economies, due to a story of relative prices—the price of thermal coal relative to alternative power and heat generation technologies.

Technological change, particularly for alternative generation technologies, and climate change mitigation are the main factors influencing these relative prices and constraining growth in the demand for thermal coal.

Meanwhile, relative prices are less influential in the metallurgical coal market. This is because there are no viable, at-scale alternatives for metallurgical coal in the production of steel. Some of the demand for steel is met through the supply of scrap metal. But most of the demand for steel requires new production, and a steady supply of metallurgical coal.

Thermal coal production in APEC reached 2,389 Mtoe in 2017, said APERC. Demand, as approximated by total primary energy supply (TPES), was lower at 2,316 Mtoe, implying that APEC is a net exporter of thermal coal to the rest of the world.

The APEC region accounted for 76% of world coal demand (TPES) in 2017. This remained steady for more than a decade, though it is considerably higher than the 62% share in 1990. In absolute terms, global coal demand (TPES) increased by 1.3% (0.9% increase in APEC) in 2017.

Economic growth and increasing urbanisation are two key demand drivers for both thermal and metallurgical coal in rapidly emerging economies like India and China, and regions like Southeast Asia.

Meanwhile, thermal coal financing is becoming increasingly difficult to secure in many economies. Certain jurisdictions are also instituting legislated phase outs of thermal coal-fired power plants. The economics of both thermal and metallurgical coal will continue to be affected by interventions that attempt to account for the cost of carbon dioxide (and equivalent) emissions and pollution.

**Road to 2040**

Coal remains the second largest energy source worldwide—behind petroleum and other liquids—until 2030, the EIA said in the International Energy Outlook 2016 (IEO2016) reference case. From 2030 through 2040, coal will be the third largest energy source, behind both liquid fuels and natural gas. World coal consumption rises from 2012 to 2040 at an average rate of 0.6% per year, from 153 quadrillion Btu in 2012 to 169 quadrillion Btu in 2020 and to 180 quadrillion Btu in 2040, the study added.

EIA’s estimates do not include the effect of the recently finalized Clean Power Plan (CPP) regulations in the United States, which will reduce world coal consumption to 165 quadrillion Btu in 2020 and to 176 quadrillion Btu in 2040 (about 2.5% in both years), based on EIA’s analysis of the CPP proposed rule.

Over the 2012–2040 projection period, total coal consumption in the non-Organization for Economic Co-operation and Development (OECD) countries will increase by an average of 0.8% per year, compared with an average climb of 0.1% per year in the OECD countries without the US CPP and a decrease of 0.3% per year in the OECD countries with the US CPP.

Throughout the projection, the top three coal-consuming countries are China, the United States, and India, which together account for more than 70% of world coal use. China accounted for 50% of world coal consumption in 2012, and its coal use continues to grow through 2025 before beginning a decline along with slower overall growth in energy consumption. In 2040, China’s share of world coal consumption will fall to 46%.

As a result of the slower growth and decline in China’s coal use, the world coal share of total primary energy consumption will drop steadily, from 28% in 2012 to 22% in 2040—in contrast to its sustained growth from 24% in 2001 to 29% in 2009, primarily as a result of increasing coal use in China. Although coal consumption in China will not change much from 2012 to 2040, coal use in India and the other countries of non-OECD Asia is expected to rise. India’s coal use will surpass the United States’ total around 2030, and its share of world coal consumption will advance from 8% in 2012 to 14% in 2040.

EIA projects that world coal production will increase from 9 billion tonnes in 2012 to 10 billion tonnes in 2040,103 with much of the growth occurring in India, China, and Australia, added EIA. Their combined share of total world coal production will grow from 60% in 2012 to 64% in 2040, but the share of the world’s leading coal producer, China, will decline from 48% in 2012 to 44% in 2040.

In addition, the initial drop in world coal trade from 2013 to 2020 can also be attributed to projected declines in import demand for both China and India, where substantial expansion of domestic coal supplies reduces the need for imported coal.