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### **The role of coal in energy balance of APEC economies for the period till 2035**

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#### **Abstract:**

#### **Background**

With the primary objective of the Asia Pacific Energy Center (APEREC) to conduct researches to foster understanding among APEC members of regional energy outlook, market developments and policy issues, in 2013 APEREC has completed the 5th edition of the APEC Energy Demand and Supply Outlook, representing a 25 year look-ahead (2010-2035) assuming business-as-usual and several alternative cases.

This study summarizes findings of the Outlook on development of coal industry and it includes an economy-by-economy projection of APEC's energy demand and supply for the years 2010 to 2035 in the business-as-usual case and the role of coal in energy balance. 'Business-as-usual' means no major changes in policy except for changes required by existing law.

#### **Results**

Despite recent economic turbulence, APEC is expected to achieve fairly high economic growth in the long run. The growth will generally be higher for the developing APEC economies and lower for the mature economies, but the region faces some significant energy challenges including increasing energy demand in Asia, constraints on infrastructure to deliver energy sources to the market, geopolitical instability in some key energy exporting regions and threats of possible natural disasters bringing acute shortage of supply of certain energy sources have all resulted in tight oil and gas markets.

In 2009, coal accounted for around 35.4% of total primary energy supply in APEC, up from nearly 27.9% in 1990, which is equivalent to a growth rate of 3.1% per year. The share of coal in the energy mix may decrease but the absolute quantity is expected to continue to increase.

Coal has the advantages of being widely available and relatively inexpensive in many APEC economies. Therefore, it will experience significant growth: 172 Mtoe or 2002 terawatt-hours (TWh). Growth in China's output of electricity from coal accounts for most of this growth (161 Mtoe or 1872 TWh), while coal generation in the United States is projected to decline by 37 Mtoe or 426 TWh.

The absolute demand for natural gas generation will grow much more rapidly than coal (246 Mtoe or 2867 TWh). Gas has the advantages of also being widely available in many APEC economies and environmentally preferable to coal, since its greenhouse gas emissions are generally lower. New renewable energy (NRE) (which does not include hydro) will show the third-largest absolute growth of 150 Mtoe or 1740 TWh, spurred by declining costs and supportive government policies in many economies. Despite the re-examination of policies on nuclear energy in many APEC economies, nuclear generation is also projected to show a significant growth of 113 Mtoe or 1315 TWh. About two-thirds of this growth will be in China.

Under business-as-usual assumptions, coal production in the APEC region will continue to grow by about 1% per year during the outlook period. It will amount to 3703 million tonnes of oil equivalent (Mtoe) in 2035 or about 37% more than in 2009. All 15 existing coal producing APEC economies will continue to produce coal, while Papua New Guinea may start some minor production.

The five major coal producing economies (China, Australia, United States, Indonesia and Russia) are projected to maintain their 97% share of APEC's coal production throughout the forecast period. China will continue to be the major coal producing economy not just among the APEC economies, but worldwide. Production in China will be 1849 Mtoe in 2035, or about 50% of the APEC region's production; it was 57% in 2009.

The APEC region is likely to be a net coal exporting region. Australia, Indonesia, Russia, United States and Canada will be able to supply 1046 Mtoe of coal to the international market in 2035. Papua New Guinea and New Zealand may start some minor export.

By 2035 there will be seven net coal exporting economies in APEC, and 13 more APEC economies that are net importers of coal. Brunei Darussalam is projected to have no production, consumption, imports, or exports of coal during the outlook period.

The largest coal importing economies are China, Japan, Chinese Taipei and Korea. Coal imports by Japan are projected to decline in the 2020–2035 period. China will

be a large and growing net importer of coal, but imports will supply only about 5% of its demand in 2035. Viet Nam will become a net coal importer after 2020.

Coal currently accounts for more than half of the CO<sub>2</sub> emissions from fuel combustion in the APEC region, and we project in our business-as-usual scenario that these CO<sub>2</sub> emissions from coal will grow by more than 50% between 2010 and 2035.

## **Conclusions**

The APEC is a major player in the global coal industry and the driving forces in the coal sector of APEC include those with positive impacts, such as economic growth, urbanization, market development, and technology breakthroughs, among others, and those that have negative impacts like environment and social concerns.

Depending on the strength of these driving forces, APEC coal development industries and utilization policies may undergo different transformations.

It is recommended that APEC should further develop APEC cooperative activities on coal industry development as coal is and will remain the dominant energy resource in the energy mix of APEC in the coming decades.