Challenges and opportunities for the Turkish energy sector

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Turkey, the sixth largest economy in Europe, is also a major consumer of energy. Economic growth in recent years has been outstanding, with GDP growing at approximately 9 per cent, strongly correlating with total primary energy consumption. Historic trends suggest that with sustained economic growth, energy consumption, and in particular electricity consumption, will increase at a similar pace to GDP.

In the coming decade, primary energy consumption is estimated to increase by around 4 per cent per annum.

Electricity consumption to 2020 is estimated to increase in the range of 6.7 per cent (low) to 7.5 per cent (high).

The capital investment required to meet this growth in energy consumption, in the period 2010 to 2030, is estimated at between US$225-280 billion.

The characteristics of the Turkish Energy Sector can be summarised as:

- High increase in absolute energy consumption;
- High dependence on imported energy;
- Energy intensive industrial consumption.

These characteristics represent the primary challenges for the Turkish Energy Sector. The need to address these challenges is intrinsically important to the development of the Turkish economy and if not adequately addressed will have a serious impact upon economic expansion.

Around 90 per cent of primary energy consumption in Turkey is attributable to fossil fuels. This statistic provides a backdrop for the development of renewable energy, which offers the benefit of reducing greenhouse gas emissions, whilst also reducing the soaring dependence on imported energy, predominantly in the form of oil and natural gas.

In Turkey only 40 per cent of the hydraulic potential, (in the form of hydro-electric power stations), has been developed, which leaves around 85 billion kWh/year of electricity generation potential for future development.

At present, there is around 1600 MW of wind generation capacity in Turkey. There is material opportunity for this installed capacity to be increased in the coming decades. The challenge of connecting wind turbines in remote locations to the grid transmission system represents one of the primary technical and financial challenges. To realise the potential of wind generation (and also solar), will require strong political and regulatory support to oblige the grid administration to modernise and invest in its system, to allow for the connection of renewable generation facilities.

I do not want to speculate on the potential of solar power in Turkey. However, the Aegean, Mediterranean and South Eastern parts of Turkey look especially promising. The legislative and regulatory steps to promote solar power have been completed, however there remain economic barriers which will require both technical advances and a further reduction in the cost of solar panels.

Turkey has a material lignite reserve of over 11 billion tonnes. The lignite is of low calorific value and high in ash and moisture content, nevertheless, at present there is over 8000 MW of lignite generation capacity installed in Turkey. There are economically viable options for increasing the capacity of power generation fuelled by domestic lignite. It is estimated that with the new discoveries of lignite, over 10,000 MW of additional electricity generation capacity (generating approximately 70 billion kWh/yr) can be added to the existing 53,000 MW of total installed generation capacity.

In summary, with the projected and potential additional investments which utilise domestic resources, Turkey has the opportunity to meet a large proportion of its increasing energy demand with a reduced reliance on imported oil and natural gas.

With timely and proficient implementation of generation technologies utilising Turkey's natural resources, the high dependence on energy imports may decrease dramatically.

It is worth noting that Turkey's 2011 cost of imported energy was over US$54 billion. This figure means that close to 40 per cent of Turkey's annual exports are utilised to fund energy imports. This dramatic figure, which has been noted by policy- and decision-makers, will mean that future policies will trend towards the development of generation technologies using indigenous energy resources, which can achieve supply security and sustainability.

The high energy intensity of Turkey, which presents a further dilemma of energy utilisation, is expected to decrease considerably following new legislation and regulations which have been implemented in recent years. Considering that every ten years in Turkey, primary energy consumption increases by 50 per cent and electricity usage by approximately 100 per cent, the vast investment required to meet demand is a major concern.

Although the financial challenge to fund the estimated growth in energy consumption to 2030 is very material, (US$225-280 billion), there remains solid optimism that economic growth will continue, providing tremendous opportunity for the future of energy and for power project development in this country. ❑