PÖYRY

PÖYRY POINT OF VIEW - FEBRUARY 2016

A country in transformation: three areas to reform the electricity sector of Saudi Arabia

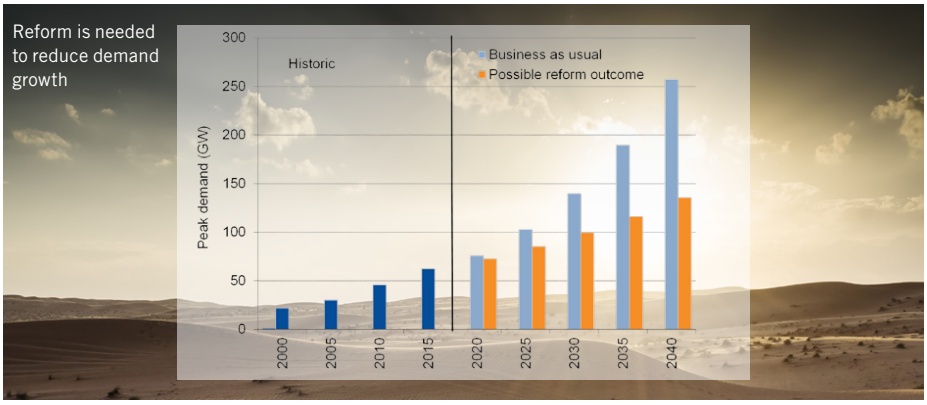
The Kingdom of Saudi Arabia's reliance on oil revenues needs to change. Whilst the Kingdom's foreign reserves can cover deficits on a temporary basis, this is not tenable in the long run. In its 2016 budget, the Kingdom announced its intention to implement structural reform and reduce dependence on oil. So what are the possible areas for reform in the electricity sector?

Below we outline three key areas that should be considered.

Oil sales represent over 70% of the government's revenue

Oil prices (per barrel) fell from **$115** in 2014 to **$30** in January 2016

SR326 BILLION
Resulting budget deficit in 2015



1. ACTIONS TO REDUCE ELECTRICITY DEMAND GROWTH

As the government has used oil revenues to provide citizens with electricity and water at low price levels, peak demand has grown rapidly. Oil consumption has doubled since 2000 to 37 barrels per capita annually. This is reducing the amount of oil that can be exported now and in the future. Tariffs should become cost reflective – reflective not only of the physical cost of production but the opportunity cost of foregone exports.

The tariff increases announced at the end of December 2015 were an important first step in tariff reform. However, we believe these changes alone will have limited impact on electricity demand growth.

Comprehensive tariff reform will be complex. There are several different aspects to implementation. We make the following suggestions:

- The tariff calculation methodology should be transparent and supported by legislation. This would give citizens, businesses and investors visibility of the changes and confidence to make investments that improve efficiency and diversify their activities.
- The overall level of the tariffs should be set to fully cover the costs of the best new electricity generation technology using international benchmark fuel prices. The level of the tariff should also cover the full cost of transmission and distribution.
- The shape of the tariff should reflect the marginal cost of generation across the year. In the residential sector, the marginal cost shape should inform the level of the monthly slab tariffs.
- Existing (but not new) low income households should receive a fixed payment in the initial years of the reform. This would compensate these users for the increased costs without changing the intended incentives of higher tariffs. In the absence of household income data, this could be done on the basis of historic electricity consumption.

Separately from tariff reform, an industrial demand-side response programme should be developed. There is roughly 5GW of generation capacity in the Kingdom that runs less than 100 hours per year. Flattening the load shape by getting industrial consumers to reduce their demand during these hours could avoid the need for this capacity and save significant costs. In Europe and United States, industrial demand-side response of 5% or more of peak demand has been accessed through such schemes.

2. DEVELOPMENT OF RENEWABLE CAPACITY

The cost of solar PV has fallen by 75% over the past five years. It is likely that long-term contract prices in the Gulf Cooperation Council will fall to $50/MWh in 2016, from the current level of $60/MWh . Initial additions of solar PV would displace oil-fired generation which (even at the current oil price) has an economic cost significantly more than this. Solar PV has the added benefit that its output is correlated with electricity demand. This would make the first tranche of renewable capacity highly beneficial for the Kingdom's economy.

EXPECTED PEAK DEMAND GROWTH (PER YEAR):

7% without tariff reform

3% with tariff reform

OVER THE NEXT 15 YEARS, TARIFF REFORM COULD:

Avoid the need for **30GW** of new capacity

Free up **1 million barrels per day** for export

Have a downward impact on international oil prices of less than $1.5/barrel in the long-run

BENEFITS OF INSTITUTIONAL REFORM AND INCREASED COMPETITION

SHORT-TERM BENEFITS
- Reduction in operating costs
- Improvements in generator availability
- Better signals for demand side participation

LONG-TERM BENEFITS
- Reduced investment costs
- Better investment decisions
- Reward for innovation
- Transfer of risk from consumers

OTHER BENEFITS
- No need for central planning and contracting
- Increased transparency
- Promote competition in the supply chain

A target of at least 15% renewable electricity by 2025 should be aggressively pursued. This capacity could be added without the need for any significant storage or back-up generation. Any higher, and the case would need to be assessed carefully, with benefits still likely to exist.

A direct move to competitive procurement of renewables is an alternative to Feed-In Tariffs. Competitive allocation of long-term contracts that are backed by the government are likely to be a lower cost option and would still attract significant developer interest.

In additional to solar PV, the Kingdom should also consider the procurement of other forms of renewable technology such as wind and solar CSP. Nuclear power should only be considered if it is competitive with renewable technologies or if political reasons to justify the cost.

The potential for renewables and tariff reform will reduce but not eliminate the requirement for conventional thermal power plants. Peak demand will still grow at 2-3 GW per year, and investment should continue in this form of power generation to ensure future security of supply.

3. INSTITUTIONAL REFORM

The institutional structure of the electricity sector needs to evolve. One of the barriers to reform in the Kingdom is the perceived overlap between responsibilities and activities in the sector. One example of this is the present confusion amongst developers as to who will be responsible for different elements of the renewable deployment programme with KA-CARE, SEC and Saudi Aramco all taking overlapping roles.

Potential reform measures are:

- There should be clear long-term policies provided by government ministries. This should include clear definitions of the roles of the different electricity sector organisations.
- The network business of SEC should operate as a legally separate company from its generation and supply business. This network business could also potentially act as the single-buyer for electricity and water. This allows transparency in cost allocation and avoids any potential discrimination in grid access.
- Generators should be charged an international benchmark price for the cost of the fossil fuels they consume.
- Consideration should be given to SEC being divided in to legally separate companies to promote competition. This would be achieved via cross-regional companies each with a mix of power generation technologies, as any division along regional lines could lead to market power issues in a future wholesale market.
- The structure of any new power-purchase agreements that are put in place following any reform measures should not restrict National Grid SA's ability to dispatch the system on a least cost basis.
- Transparency and availability of data must be increased, allowing developers and investors to better understand the market and identify and analyse investment opportunities. This allows greater scrutiny of costs.
- Decisions on new capacity (as well as the closure or repowering of old plants) should be taken so as to minimise the overall economic system cost.

There are ongoing discussions on the privatisation of SEC and other organisations. While this would raise considerable revenue for the Kingdom in the short term, the longer-term goal should be to promote efficiency and improve investment decisions. To promote competition and ensure that potential buyers are clear on what is for sale, institutional reform should be undertaken before privatisation.

In the long-term, there would be significant benefits in creating a wholesale spot market for electricity. This would allow increased cross-border trading of electricity which would be mutually beneficial for the Kingdom and other GCC countries.

Change is a necessity to maintain the living standards of citizens in the Kingdom. The changes will result in greater efficiency, more crude oil exports and greater diversification of the Kingdom's economy.

Sources: UN, IMF, BP, ECRA, World Bank, Pöyry analysis

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