Price reform in Kuwait's electricity and water: assessing the benefits

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Kuwait's electricity and water sector has been in disarray for several years, struggling with several decades of fast-rising demand resulting from industrialization, rapid population growth, rising living standards amongst its citizens, as well as the artificially low consumer prices set by the government. The country's electricity demand has been growing at an impressive rate, estimated at an annual rate of 5.3 per cent between 1999 and 2009, and its per capita electricity consumption has exceeded 16,000 kWh, one of the highest in the world. With per capita water consumption of 500 litres per day, Kuwait is also the world's largest water consumer. According to Kuwait Institute for Scientific Research (KISR), the current cost of providing a reliable source of fresh water in Kuwait (principally through desalination plants) exceeds US$1.2 billion annually. By 2050, given current consumption patterns, it is estimated that the majority of the country's oil-generated revenue will be required to fund the increased production of desalinated water.

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The rapid increase in demand has placed some serious strains on supply of these utilities. The EIA describes Kuwait as being already 'perpetually in a state of electricity supply shortage and experiences frequent blackouts and brownouts each summer'. Its desalinated water supply is also expected to come under strain, even though capacity has been increasing on average by 4.1 per cent from 1992 to 2008. In response to the shortfall in supply of these key services, the government has announced plans for new investment in key infrastructure projects. The 2010–14 Kuwait Development Plan envisages a massive increase in the scale of Kuwait's electricity and desalinated water co-generation. The centrepiece of the plan is the Al Zour gas-fired power and seawater treatment plant. When completed, this project will account for almost 12 per cent of Kuwait's power generation capacity and almost 25 per cent of its desalination capacity. In addition, there are government plans to build a new refinery (the Al Zour refinery) with a capacity of 615,000 b/d; of this, 225,000 b/d will consist of low-sulphur fuel oil to meet the growing demand from the power sector.

Kuwait's power and desalinated water generation inadequacies are as much a consequence of the low prices charged for Kuwait's utilities as its insufficient infrastructure. The Kuwaiti government provides these basic utilities at a very low cost. Historically, the price of electricity had some links with the cost of production, but this link has been broken, and rather than raising electricity prices, the government has reduced them over time. In 1953, the selling price was 27 fils/kWh but between 1953 and 1955, when oil revenues started flowing into the state's coffers, the government decreased the selling price to 18 fils/kWh. The electricity tariff continued on its downward trend over the years until 1966, when the government set the price at 2 fils/kWh (0.7 US cents) for ordinary consumers and 1 fils/kWh (0.35 US cents) for industrial companies, very low even by regional standards. The 1966 tariff structure is still in force today, though for chalets/villas, the price of electricity has been raised to 10 fils/kWh (3.5 US cents).

Due to these low prices, there is a wide gap between production costs and the selling prices of electricity. In the early 1980s, the average cost of electricity production was estimated at 26 fils/kWh, while the price was administratively set at 1–2 fils/kWh. The rise in oil prices in international markets in the mid-2000s, together with Kuwait's increasing reliance on LNG imports to fuel its power sector, means that the gap has continued to widen.

The transition to market prices: net benefits

Given the rapid increase in demand for electricity and water, there is an urgent need for the Kuwaiti government to reconsider its low pricing policy for these basic utilities. In a recent study, published at the Oxford Institute for Energy Studies, we argue that a reform of utility pricing could yield substantial net benefits for Kuwait's economy, while alternative mechanisms to distribute savings made could offset some of the negative implications of higher utility prices for its citizens.

In our study, we use a model-based methodology to compare the current pricing scheme against an alternative where consumer prices are raised to market levels and consumers are on average compensated by cash transfers that do not distort their economic decisions. The model captures four important economic features of the production of electricity and water:

- The greatest share of production is taken by fuel, whose market price is unpredictable;

- The maximum supply in the short run is constrained by the existing level of infrastructure, and when output is close to that limit, marginal costs rise sharply and the system becomes congested;
- Electricity is produced by a domestic power generator and that infrastructure investment is needed to maintain capacity such that supply is not elastic;
- The demand for these services is quite inelastic.

The model was calibrated to match Kuwait's electricity market data and simulated in two modes. In the first mode, the government fixes a low price to the consumer and the producer has to receive a high enough price to ensure a sufficient rate of return at the prevailing level of output. The difference between the high producer price and the low consumer price (multiplied by output) is a fiscal cost that is currently being financed by the government. In contrast, in the second mode, consumers pay the unfettered market price, but they are compensated on average (through a cash transfer scheme) for the utility-equivalent loss from moving to the market regime. The cash transfer scheme involves an alternative fiscal cost, replacing the subsidy costs in the first mode. The net benefit from transitioning to market prices is the fiscal cost in the second mode minus the fiscal cost in the first mode.

Potential fiscal benefits could be enormous

The results in our study demonstrate that the potential fiscal benefits of reform are so large that consumers can be compensated on average whilst still leaving large fiscal savings and allowing a more reliable level of spare capacity. Specifically, we find that:

(i) *A realignment of prices at or closer to the market price level confers a benefit on current and future generations of Kuwaitis in terms of fiscal savings that outweighs the impact of raising electricity and water consumer prices to market price levels.* Specifically, in the market price scenario with consumer prices at about ten times current levels, there is a total fiscal cost of about one-third of the value of fuel input used in the power sector (or about 1.5 per cent of GDP), entirely due to the cash transfer. But this is just less than one-fifth of the fiscal cost of the current low pricing regime and in principle represents a massive saving. The net benefit of moving to market prices is 140 per cent of the value of the fuel input, or 6.3 per cent of GDP. As high as this might seem, it compares well with the IMF's estimate (5.3 per cent of GDP in 2011) of the actual cost of electricity and water subsidies in Kuwait.

(ii) *As the price of these basic utilities increases tenfold, the share of electricity and water in the budget increases from 0.3 per cent to 0.9 per cent, roughly threefold, but it is still less than 1 per cent of consumption*. The effect of the higher prices is to lower the amount of electricity and water consumed, offsetting higher prices to some extent. Once we take account of the mitigating cash transfer, the net share rises by only 0.1 per cent, a very small increase. Hence the cash transfer offsets the effect of the higher prices on the average consumer's budget.

(iii) *Producer prices need to be higher than otherwise when consumer prices are fixed at low levels, because producers require more compensation per unit to compensate for their losses resulting from operating at an inefficiently higher level of production.* Though producers can, to some extent, alter wages and infrastructure demands in order to compensate for price differences, the distortion created by the need to supply a much larger subsidized demand in the face of fluctuating fuel input prices implies higher-than-otherwise producer prices. This is a natural consequence of having a less than perfect elastic supply for the subsidized consumer good.

(iv) *In the subsidy regime almost 50 per cent of costs are taken up by infrastructure while in the full market price regime it is 38 per cent.* There is less need for infrastructure when consumers are sharing some of the burden of efficiency. It is in this sense that congestion pricing is a complement to infrastructure.

(v) *Output is proportionately closer to its maximum (and hence closer to the congestion zone) in the low price regime compared to the market price regime.* Particularly, the ratio of average electricity output to maximum capacity generation is 46 per cent in the market price regime compared to 60 per cent in the current subsidized regime. This is key, as the capacity factor determines how the system is able to cope with unforeseen shocks to demand. It follows that the shift to a market pricing regime will be a more efficient route to achieving spare capacity in the electricity and water system.

The key to understanding our results is that higher prices serve to make consumers more efficient in their use of energy. The promotion of efficiency in use through better prices is called *congestion pricing*. Congestion pricing can be contrasted to a *financially sustainable pricing* policy, where the main concern is whether the price charged is affordable by the ultimate financer of the investment. Given ample oil reserves and revenues in Kuwait, even very low prices for generated electricity can be fiscally sustainable.

However, as Nobel prize winner William Vickrey explains, congestion pricing should dominate the financially sustainable price as the relevant concept whenever there is a public benefit from limiting individual usage: the 'delusion still persists that the primary role of pricing should always be that of financing the service rather than that of promoting economy in its use'.

Alternative cash transfers raise many more questions …

In short, our results show that there is a substantial benefit to be gained from allowing the prices of electricity and water to rise to market levels. The fiscal savings are more than sufficient to compensate consumers on average for the loss, while still leaving a substantial surplus. While electricity and water price charges will be much higher, they will still be less than 1 per cent of consumption. Moreover, current and future generations of Kuwaitis, who are ultimately the beneficiaries of any savings, should gain from the fiscal savings of the market reform. Thus there may be no need to redress consumers on average for their loss on pure economic grounds.

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Therefore, any potential cash transfer scheme should be judged on its ability to gain political acceptance for the reform and not as a necessary economic part of the price reform. But as the cash transfer should not discriminate according to usage, even if the cash transfers are substantial, the price reform is likely to have its opponents. This is because there will inevitably be some losers under the market price scheme – heavy users of electricity and water – who cannot be compensated by cash transfers for their greater loss. The losers are likely to be distinguished by their occupation or place of living, while winners are more likely to be dispersed among society. As the group of losers is easily superimposed over existing demarcations – such as trade unions, societies, or constituencies – they could easily cohere into a lobby or a protest group. The natural emergence of an opposition explains why subsidy price reforms have been reversed in several parts of the world. The key question facing Kuwaiti policymakers is then: how can the cash transfer be designed to minimize the opposition to energy pricing reform?

The authors' study was recently published by the Oxford Institute for Energy Studies under the title 'Price Reform in Kuwait's Electricity and Water: Assessing the Net Benefits in the Presence of Congestion', and is available to download from the OIES website.