

Carbon will be constrained: ready or not?

Published online in The Magazine Publishing Company, page 62, May-June 2012

*The impacts of a carbon-constrained future will become visible to Australians from July 1, 2012, with the introduction of a price on greenhouse gas emissions, a step towards de-carbonising our energy supply by mid-century, writes **Tony Wood***

A much publicised direct impact will be on the cost of electricity and gas that are our major primary sources of energy. There has been far less publicity regarding the less obvious and indirect impacts of the transformation that decarbonisation will represent for other sectors, including the networks that transport electricity and gas to our homes and businesses.

One clear endpoint for this transformation is that there is no future for the widespread combustion of fossil fuels unless the CO₂ that is emitted from that combustion is prevented from being released into the atmosphere. Today, the only identified but currently expensive solution is to capture the CO₂ and sequester it permanently in underground geological structures. Non-combustion electricity alternatives include renewable and nuclear energy. Similar alternatives do not exist for gas, and so, in this carbon-constrained future, the gas system we have developed over many decades will at least fundamentally change, if not cease to exist.

Pricing emissions from fossil-fuel power generation will, other things being equal, shift the relative cost balance towards lower emission forms of electricity generation. This shift will increase the value of measures that businesses and households can take to reduce electricity consumption. The recent reduction in the growth of electricity demand in Australia may be evidence of this impact. An opposite impact would arise from a shift in transport energy away from liquid fuels and towards electricity, if that electricity produces lower emissions. It is unclear how these factors will balance each other in the coming decades, even if a tightening carbon constraint is behind both.

The fixed costs that dominate electricity distribution businesses do not respond easily or quickly to volume changes. These regulated monopolies should only be directly impacted in the short term to the extent that their revenue is determined by throughput.

A bigger challenge for electricity distribution businesses arises from increases in distributed forms of electricity generation. Both electricity and gas networks have been designed and built to accept inputs of electricity and gas from one point or a very small number of points and to efficiently distribute that energy to businesses and homes across a city or town.

An important part of the stability and security of the supply is the ability of the businesses to balance the inputs and outputs over minutes, days and weeks. Reducing the cost advantage of coal and gas generation that have high scale economies provides an impetus for alternatives such as solar PV that can be widely distributed without overwhelming diseconomies. These sources can feed electricity into the grid in addition to displacing supply from the grid, particularly if the owners receive subsidised revenue payments for the power they generate. For the distributor, the management of such sources requires a major change in the way the grid is balanced, driving a whole new set of technologies and creating much smarter grids in the process.

An increasingly tight carbon constraint reflected in a rising carbon price will lead to a proportional increase in the cost of energy from gas combustion. In the short term, for central power generation, gas will be relatively less impacted than coal and the need for gas as a source of flexible, on-demand

generation to balance wind and solar may favour gas. Gas-fired cogeneration and gas-boosted solar water heating will also be relatively advantaged. However, as the carbon constraint continues to tighten, even lower emission sources will be favoured and the widespread use of gas for applications such as home heating and even cooking will become increasingly less economic. The long term implication for gas distribution networks is as clear as the timing of this change is not.

One thing that electricity and gas distribution networks share is that their profits are largely determined by the rate of return on their fixed assets, and this is in the hands of the Australian Energy Regulator. There is already much publicity about network costs being the dominating contributor to rising electricity prices and whether the way in which the regulatory process is structured provides for optimal investment in new and replacement assets.

Whilst carbon pricing may be a relatively small direct contributor, it will continue to add to this debate and increase the need for more transparent and better communicated decisions.

Major energy suppliers and users will be directly impacted by a carbon constraint and they have been very vocal and engaged in the public debate on the policies that will deliver that constraint. Although electricity and gas distribution networks face a different set of impacts, they should be increasingly visible and engaged.

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