

Electric Vehicles in Australia's National Electricity Market: Energy Market and Policy Implications

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EVs would represent a new load, and would represent a sizable increase to the aggregate demand of an individual household. But EV take-up rates are likely to be gradual, and therefore changes to the NEM's aggregate demand will be equally incremental, not radical. For this reason, EV loads should not be considered either as a problem or a panacea for the grid over the short to medium term.

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I. Introduction

Australia is a relatively small country in relation to the world population and by implication, global influence. As energy policies are often geopolitical in nature, some components of Australian policymaking could be argued to be "policy taking" rather than "policy making." It is in this context that the electric vehicle (EV) market is likely to develop in Australia. Globally,

there are sign posts that point toward a long-run shift in transportation policy away from liquid fossil fuels, and toward electricity. The reason for this is straightforward; while the CO₂ intensity of the existing power system may present only modest environmental gains from consumers switching from internal combustion engines to EVs, over the very long run, the gains are potentially very significant compared to business

as usual. The success or failure of EVs to imbed within transportation paradigms is likely to be decided globally, and so we believe that Australia is likely to be an adopter of policies that are consistent with the rest of the world.

There are two main public policy drivers which are likely to result in the increased uptake of vehicles that are not powered conventionally (i.e., by gasoline and diesel). These relate to constraining anthropogenic greenhouse gas emissions with a view to reducing CO₂-equivalent concentrations in the atmosphere to limit climate change; and reducing the reliance of economies on imported liquid fuels, which are becoming scarcer and are sourced from volatile regions in the world. Policies aimed at achieving these objectives are being increasingly adopted. Vivid Economics (2010) found that there were 32 operating greenhouse gas emissions trading schemes in different countries in 2010. Renewable portfolio standards are also common with policies established in regions as diverse as Texas and China.

Transportation comprises around half the global emissions produced by the combustion of fossil fuels (Baumert, Herzog and Pershing, 2005). It is clear that reducing emissions from the combustion of fossil fuels by any material amount to 2050 is not compatible with simply improving the efficiency of petrol and diesel engines. The long-term solution to reducing emissions within the transportation sector requires substitution of the internal combustion engine with alternative power systems. This is evidenced by the decision of the European Union to include transport in its renewable energy requirements of member nations by 2020.

Energy security will also remain a primary concern of policy makers. Figure 1 outlines the distribution of global energy reserves by geographic region. Oil and gas are primarily located in two regions: the Middle East and Russia (Europe). With 61 percent of oil used for transportation, the geographic distribution of liquid fuels creates significant risks for developed and developing economies. Supply disruptions may arise due to regional conflict

and price pressures due to cartel structures. Around the world, countries are beginning to establish policies to reduce their reliance on “foreign oil.”

The physical distribution of global energy reserves is not the only concern of policymakers in relation to energy security. Fossil fuels are finite resources and will be depleted at some unknown point in the future. The concept of “peak oil” has been around for decades yet it is impossible to accurately predict when supplies will eventually run out. Reserve to production ratios can be used to accurately determine temporal supply capacities based upon current consumption rates, production technologies, and known reserves. In relation to oil and gas estimates:

- Oil: There are currently known global reserves of 1,331 billion barrels of oil. Based upon production rates of around 80 million barrels of oil per day, there is around 45 years of supply left. However, production of oil has increased by only 7 percent over the past 10 years whereas known reserves have increased by 20 percent over the same period (BP, 2010).

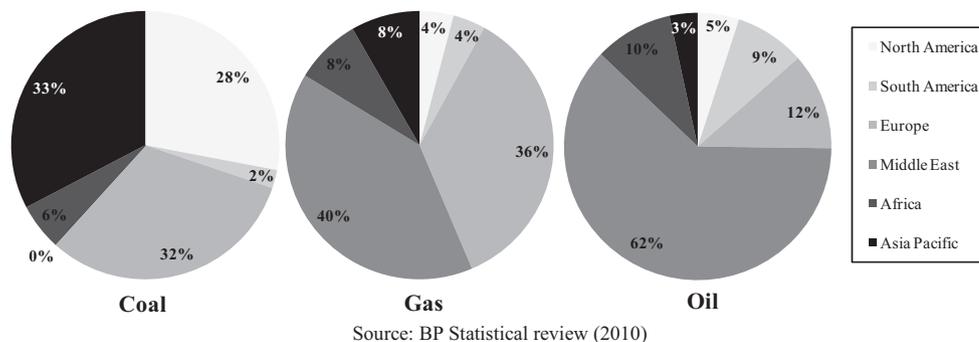


Figure 1: Distribution of Global Energy Reserves

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