Questions on notice:

1. Migratory Emission

The Hon. Dr PETER PHELPS:

". . . *if you have a high-pressure gas system and you offer a low-pressure exit and a high-pressure exit the gas is more likely to migrate up the low-pressure exit, is it not?"*

The rate at which gas will flow through any exit is a function of the pressure within a cavity, (in this case, the reserve). Over time, the reserve pressure drops as the gas is extracted from the field. In the short term however, the pressure with the reserve will remain high and the migratory emissions will still occur.

A simple analogy can be imagined with a different fluid: water. Imagine filling a large bucket with water, and piercing the bucket with a large hole and a small hole near the bottom. As you can imagine, the presence of the large hole does not stop water flowing out the small hole. The factor which affects the flow rate is the hight of the water in the bucket, (which dictates the pressure of water in the bottom of the bucket). Obviously, as the water flows out the bucket, and the water level – and hence pressure – decrease, the flow out the smaller hole will change.

As a gas reserve depletes and the pressure decreases it become less economic to extract the gas: at some point the gas well will ultimately be plugged. At this point there is still some pressure and gas in the reserve, though it is uneconomical to economic to continue extracting gas. As there is still pressure within the reserve, and a corresponding pressure difference between the reserve and the atmosphere, migratory emissions will also occur after the well is plugged.

Going back to the analogy, closing the larger hole before the bucket is empty (analogous to plugging a well) will not stop the water flowing out the smaller hole.

2. Renewables and Electricity Prices

The Hon. Dr PETER PHELPS:

"...How is Australia supposed to maintain a competitive advantage in cheap energy for its productive industries, retailers and mums and dads if we have to pay multiple times what we are currently paying for electricity? [when we have $600 for photovoltaic, $180 for solar, $100 for wind, $60 for gas and $45 for coal]"

Fossil Technology Costs

The suggested levelised costs for new gas and coal electricity are out of date, and do not reflect the current projections for these technologies. A report by the Australian Academy of Technological

Sciences and Engineering (ATSE) complete for the Garnaut Review Update in 2011 [1] indicates substantially higher prices than that proposed in the question. Using the Australian Energy Market Operators (AEMO) cost data, ATSE reports that the cost of new black coal electricity in 2015 would be around $100/MWh. Using similar AEMO data, ATSE reports the gas fired electricity cost to be $80/MWhr by 2015. These figures including a carbon price of $27.90/tonne, but do not include the impact of rising gas prices. The domestic gas price is expected to increase to international parity price,

1 Australian Academy of Technological Sciences and Engineering, *New Power Cost Comparisons*, Available at: http://www.garnautreview.org.au/update-2011/commissioned-work/new-power-cost-comparisons.pdf

as new export terminals expose the domestic markets to international markets. At this price the cost of gas could rise to over $120/MWhr). These ATSE projections (combined with the impact of international gas price parity) are consistent with the Grattan Institutes (very) recent publication which reports “economic forecasts of future prices
in Australia [in] the order of $100 to $150 per megawatt-hour
”[2]. The costs of the renewable technologies should be contrasted with these updated and recent numbers.

Photovoltaic Technology Costs

The suggested levelised cost for PV is also substantially out of date. This industry has experience rapid growth driving significant and unbelievable cost reductions in the last few years. The same Grattan Report as above suggest PV levelized costs could already be as low as $200 / MWhr. Whilst this is high relative to current wholesale prices (around $50/MWh) or projected electricity prices as above, making this comparison misses a key key point.

Unlike large-scale centralized power stations, rooftop PV competes with the retail price of electricity. This is typically 4-5 times greater than the wholesale price of electricity, at roughly $200/MWh - $250 Mwh (or 20-25 cents per kWh, the unit charged at the meter). The point at which it becomes cheaper to buy a new PV system relative to electricity from the grid is known as 'grid parity', and is rapidly approaching in Australia, and many other locations in the world. After this point, no subsidies are required, and PV can save electricity consumers money.

It was noted in the question that NSW had a $600/MWh gross feed in tariff. This static/fixed gross tariff was completely unsustainable: it failed to take into account the significant cost reductions experienced by the PV industry in that period. Countries with superior Feed in Tariff Schemes, such a Germany, managed costs by adjusting the tariffs in line with the cost reductions to prevent cost blowouts, and profiteering.

Large-scale Solar

Whilst large scale solar is more expensive than wholesale or fossil power today, future projections (including ATSE, and the Melbourne Energy Institute[3]) have projected that the long term cost of these technologies will fall to between $100 and $150/MWh (again, in the range projected by the Grattan Institute).

Maintaining a competitive advantage

As we move towards a carbon constrained world, the only way to maintain a competitive advantage and provide cheap energy for Australia's productive industries, retailers and mums and dads is to bring the cost of renewable energy down this cost curve. This can be achieved by deploying renewables, driving economies of scale and learning by doing (as has been achieved to date in the PV industry). It is essential to deploy these technologies today, so that we can enjoy a low-cost zero emission renewable energy economy in the future.

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2 Grattan Institute, *No easy choices: which way to Australia's energy future?* Available at: http://www.grattan.edu.au/publications/124_energy_no_easy_choices.pdf

3 The Melbourne Energy Institute, *Renewably Energy Technology Cost Review,* Available at: http://www.earthsci.unimelb.edu.au/~rogerd/Renew_Energy_Tech_Cost_Review.pdf