ENERGY PRICES FORECAST

One of the main benefits of reduced energy consumption in buildings is reduced on-going energy charges.

Household energy expenditures are a small part of overall expenditure on average: 1.9% according to ABS figures for 2009-10[78]. However, averages can conceal a lot. For households that are having financial difficulty, any rise in costs can be difficult. Electricity prices have risen sharply in recent years, largely due to the costs of network upgrades. Many households, especially those on low incomes, have found the extra cost difficult to manage.

Unfortunately gas has been promoted as a cheap energy source. While this Plan considers gas undesirable for ecological reasons and its inefficiency, it is also going to be increasingly expensive in coming years. Wholesale prices could double or triple as Australia's market is linked to international prices via LNG export facilities.

Reducing energy use by the measures outlined in this plan can reduce household costs directly, by lowering energy bills. Gas-free houses will also avoid the fixed network charges of a second, redundant energy network.

Reducing energy use overall - especially peak energy use - can also reduce the cost of electricity indirectly.

Lower generation and grid costs can be had by reducing the need for power plants, and the high cost of generators and network upgrades to accommodate high peak loads.

Electricity prices are expected to increase further, whether under business-as-usual or if the Zero Carbon Australia plan were adopted. This section outlines the likely future electricity and gas tariffs.

TABLE 2.7

Space heating vs Cooling by State for 2011 (PJ/annum)

	NSW	**VIC**	**QLD**	**SA**	**WA**	**TAS**	**NT**	**ACT**	**Australia**
Heating	22.5	81.0	2.5	8.4	5.9	8.0	0	4.8	133.1
Cooling	3.6	1.1	5.0	1.4	1.5	0.1	0.7	0.1	13.5
Ratio H:C	6	74	1	6	4	80	0	48	10

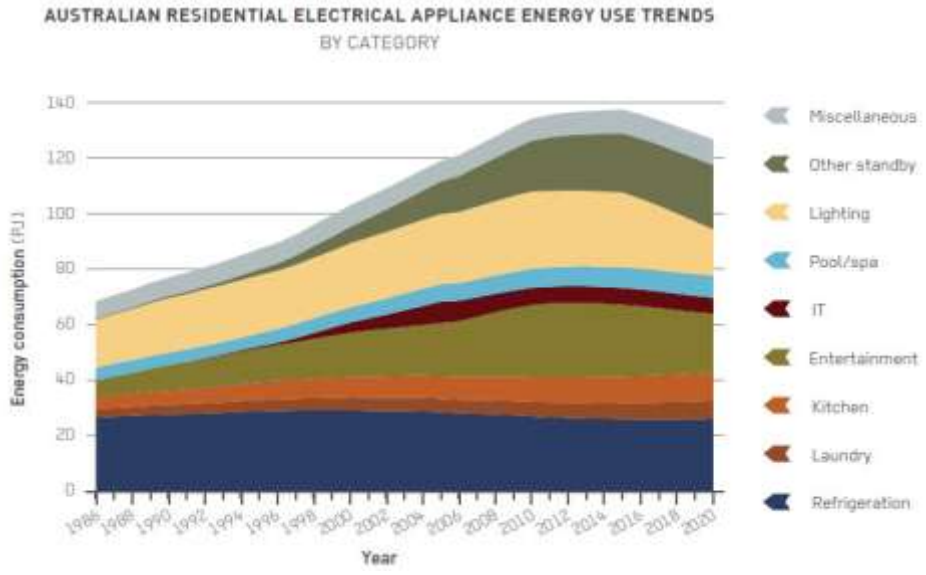

FIGURE 2.27 Trends in appliance energy consumption

Electricity prices

Electricity price projections were evaluated for both a) a business-as-usual scenario and b) a Zero Carbon Australia (ZCA) Project scenario. The 2020 business-as-usual retail price of electricity is projected to be above 30 c/kWh and includes the impacts of a low carbon price and continued expenditure on network infrastructure. The ZCA Project price is projected to be around 38 c/kWh, and includes the additional network costs, and the cost of implementing the renewable energy deployment through large-scale feed-in tariffs. Although ZCA prices are the higher of the two, this is likely to be offset for consumers by not having the extra costs of gas connection, and by using less energy.

Business-as-usual

Business-As-Usual Prices. Many factors will increase electricity prices over the next ten years. Carbon pricing and network charges in particular, are expected to have substantial impacts on the electricity tariff paid by consumers. Large commercial sector users sign individual power purchasing agreements and are often able to negotiate significantly smaller tariffs due to the size of their high energy consumption. Historically, these contracts have operated over long time frames (five to ten years). However in discussion with various experts, the authors of the Buildings Plan understand that shorter contracts with prices more closely approximating the retail tariff are more typical today.

Commercial Electricity Prices. Beyond Zero Emissions (BZE) commissioned a study[79] of commercial electricity prices from Energy Action. The energy cost data was extracted from the Energy Action Price Index[80], which indicates the typical median cost of procuring the contestable energy component of a retail contract (see Appendix 12). The index values are considered to be carbon inclusive, hence have been negotiated to include a carbon cost component and will not be subject to a carbon adjustment. Network data was derived from a survey of Energy Action clients based on the latest network tariffs effective as of 1 July 2012 in New South Wales, Queensland and South Australia, and 1 January in Victoria. Where applicable, the survey focused on the metro-CBD network areas operated by Ausgrid in New South Wales, Citipower in Melbourne and Energex in Queensland. Federal Environmental Costs were based on scheme targets from the Clean Energy Regulator's website and current market rates. State based Environmental targets were sourced from the applicable state regulators – Independent Pricing and Regulatory Tribunal in New South Wales, Essential Services Commission in Victoria and the Queensland Government – and costs were based on current market rates. Metering costs are typically fixed annual costs that do not vary with onsite consumption levels. Metering costs were extrapolated into a c/kWh rate using typical metering charges against a 500 MWh site.

Wholesale Electricity. The underlying wholesale electricity price only contributes a small proportion of the total retail price for buildings. The newly introduced carbon price ($23/ tonne) will have an impact upon the supply and production of emissions-intensive electricity and hence on the wholesale electricity price. Both wholesale price projections include the carbon tax. These wholesale projections were still used, as the timing of the initiation of carbon pricing has little impact on the cost projection out to 2020.

Network Charges. Network costs are the single largest contributor to retail electricity prices, and typically represent 40-50% of the total retail cost of electricity. Recent electricity price increases are largely attributable to rapidly increasing network costs, and these are likely to continue to increase over time. In some cases (eg large shopping centres, hospitals, universities) users connect into high voltage power and therefore their retail tariff would include a smaller network component. The projected Network charges for each NEM region were determined by the AER (Australian Energy Regulator) decisions for the current planning periods [80]. The decisions made for the final year of the planning periods were projected to continue out until 2020.

TABLE 2.8

Estimated ranges for electricity cost components (all numbers are expressed in c/kWh) [79]

State	Energy Costs		Network Costs		Environmental Costs		Metering Costs		Market Costs		Total Cost	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
NSW	6.40	6.75	10.20	13.90	1.40	1.56	0.40	0.70	0.07	0.09	18.47	23.00
VIC	5.65	6.10	5.00	6.10	1.67	1.85	0.40	0.70	0.07	0.09	12.79	14.84
QlD	5.90	6.35	7.20	10.60	1.32	1.47	0.40	0.70	0.07	0.09	14.89	19.21
SA	6.60	7.05	9.60	14.30	1.24	1.38	0.40	0.70	0.07	0.09	17.90	23.52

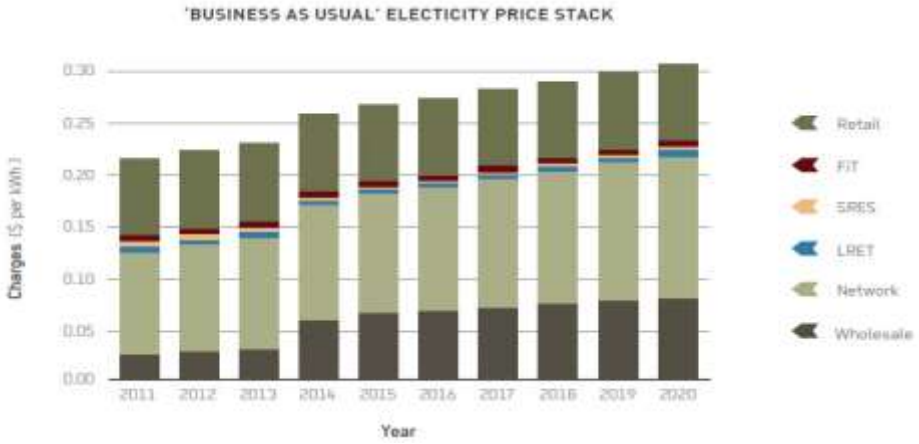

FIGURE 2.28

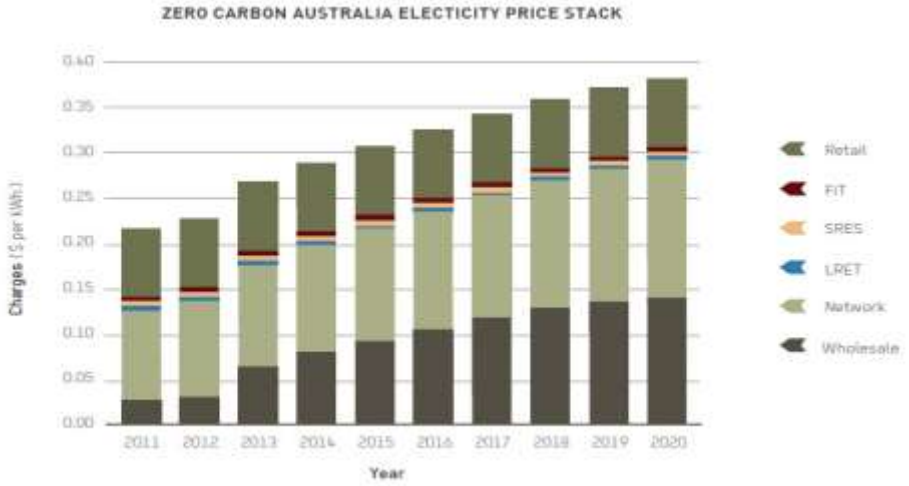

FIGURE 2.29

Retailer Margins. These contribute a substantial proportion to the retail cost, and include hedging against wholesale price risks, as well as other general retail costs. (It should be noted that this margin associated with hedging purchases of wholesale electricity is often counted towards the wholesale component directly, rather than being listed explicitly as a retailer margin[81]). The retailer margins are not expected to increase (or decrease) over time. This may prove to be conservative. The AEMC paper to COAG showed that 60% of Victoria's projected price increase will be due to increasing retailer margins, apparently to cover their increasing 'customer acquisition costs' due to the high rate of turnover. As other states follow Victoria in opening up their retail markets to competition, this price increase could happen across Australia.

Other. The remaining charges include costs of the various renewable energy schemes which typically range between 4% and 7% (depending on the state). These costs can be further broken down into the federal government's Large-scale Renewable Energy Target (LRET)[82] scheme (whose costs are evenly spread across all energy consumers) and the Feed-in Tariff (FiT) schemes (which are state based). These are likely to be less than 10% of retail electricity charges by 2020, even under aggressive renewable roll out scenarios. In any case, a recent paper[83] suggests that renewables may depress electricity prices by reducing demand at peak-intermediate times.

Projection. Figure 2.28 represents an average retail electricity price projection (and price breakdown) over the next ten years under a 'Business As Usual' (low carbon price) scenario. This projection represents a weighted average of the entire NEM (as each state or NEM region will have a slightly different price projection). The average NEM retail price is expected to be above 30 cents by 2020.

Zero Carbon Australia prices

The electricity price stack for the Zero Carbon Australia electricity generation network was also modeled. In the Zero Carbon Australia plan, a larger electricity demand is required (325 TWh/annum), and the transmission network is extended and upgraded to form one large National Electricity Market (ie the current NEM connected to South West Interconnected System (SWIS) and North West Interconnected System (NWIS), and substantial upgrade of the inter-connectors between the current NEM regions). This increased demand and transmission infrastructure were considered in this analysis.

Wholesale Electricity. The modelling assumes that the Zero Carbon Australia generating assets are constructed and financed through a National large-scale feed-in tariff.

The tariff rate is assumed to be equivalent to the Long Run Marginal Cost (LRMC) for the new renewable generation. The tariff for new entrant plants is assumed to decline over time in line with International Energy Agency cost projections for

CST[84] and conservative Global Wind Energy Council (baseline) projections for Wind costs[85]. The tariff rate was assumed to apply for twenty five years, and the construction profile was assumed. The price impact of the feed-in tariff was modelled in a low carbon-price environment.

Network Charges. The Zero Carbon Australia plan includes significant transmission upgrades to facilitate the large-scale deployment of renewable energy. The entire plan requires $92b to be invested in transmission over the ten-year period. As previously mentioned, the current NEM is expected to be upgraded and extended. Network charges are assumed to be spread across this enlarged NEM. For the purposes of the modelling, the transmission costs were assumed to be completely additional to the 'Business As Usual' network costs. This represents a conservative estimate, as it is likely that under a Zero Carbon Australia rollout, some of the prescribed 'Business As Usual' transmission upgrades would be unnecessary. The distribution network component of the network upgrade is assumed to be the same as the 'Business As Usual' requirement.

The additional transmission charges calculation was based on the AER's Post Tax Revenue Model (PTRM)[86]. The transmission investment was assumed to be spread evenly over the ten-year period, and a nominal post tax WACC (Weighted Average Cost of Capital) of 8.82% was used, in line with the AER WACC decision[87].

Retail. As in the business-as-usual case, the retail margin was assumed to remain the same over the ten-year period. The retail margin also includes provisions for the risk related to purchase of wholesale electricity.

Other. The large-scale renewable energy feed-in tariff is assumed to drive the required deployment in renewable energy. As such, the current LRET scheme is considered unnecessary. Current LRET costs due to existing projects are expected to continue, however the magnitude per unit of energy will decrease due to the larger demand and production of electricity. New LRET costs will not however contribute to the 2020 retail price. The Small-scale Renewable Energy Scheme (SRES)[88] and small-scale feed-in tariffs (for renewable energy) are expected to continue, in line with high PV growth.

Projection. The total electricity price under a Zero Carbon Australia roll out is anticipated to reach around 38 c/kWh by 2020. See Figure 2.29.

Gas prices

The developing Liquid Natural Gas (LNG) export industry in Eastern States is a key factor that will push prices up. Developing export capacity is linking the Australian domestic market to international markets and prices, particularly the Asian market[89], where prices are linked to the oil price[90]. A similar scenario developed in Western Australia, from the late 1980s, with the growth of WA's LNG export capacity[91].

Figure 2.30 illustrates the recent developments in the gas price internationally[92]. By contrast, Australian domestic prices are around $3/GJ-$4/GJ.

For our analysis, Queensland gas costs were determined by applying the expected increases to the current annual gas bill of $1,800 (based on 60 GJ usage)[91]. The network components (representing 54% of total[91]) were increased in line with the AER average rate of 1.8% (real), and the wholesale component was increased in line with the Queensland wholesale gas price projections[93]. The standard retail margin was maintained at the current level (which is higher than the other states), and a consumption based carbon charge was also included. Figure 2.30, illustrates the gas price projection for QLD, with the typical gas bill rising from $1,800 in 2011, to over approximately $2,300 in 2020 (and over $2,600 in 2030).

The cost of gas in the South Eastern states was determined using a similar approach. However, the cost were based on the Victorian gas bill with an average annual bill at $1,058 (2011, pre-carbon tax, for the average usage of 60 GJ per annum)[91]. This is the lowest of NSW, SA and Vic and therefore the price projections represent a conservative estimation. The factors creating price pressures (see Appendix 11) aggregated to determine the following gas cost projection, in Figure 2.31 (2011 AUD) using the same approach used for Queensland.

The typical gas bill rises over 50% out to 2020 (from $1,058 to over $1,600, in real dollars), and almost 100% out to 2030 (to over $2,000, in real dollars). Refer to Figure 2.32.

The full analysis of gas price rises is available at Appendix 11.

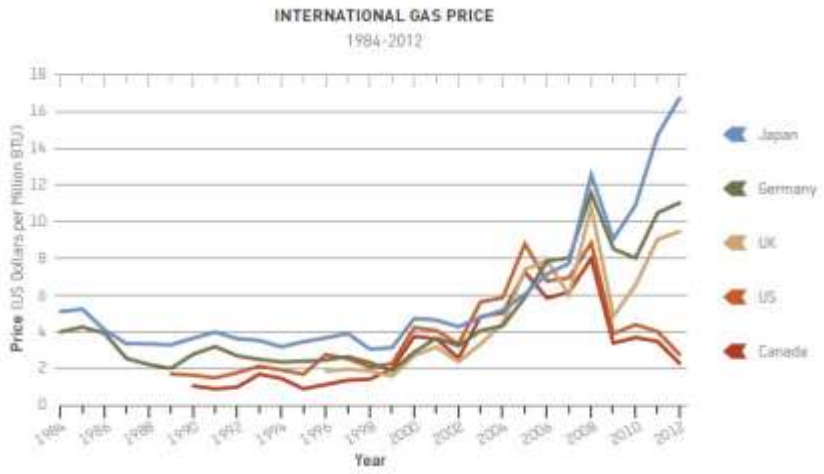

FIGURE 2.30
International Gas Prices [BP Statistical Review 2012[92]]

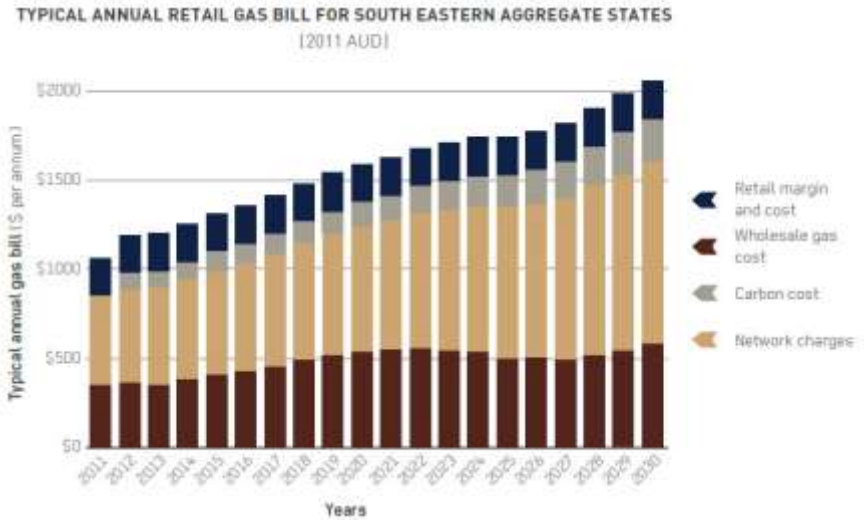

FIGURE 2.32
Typical Annual retail gas bill for South Eastern aggregate states (2011 AUD)

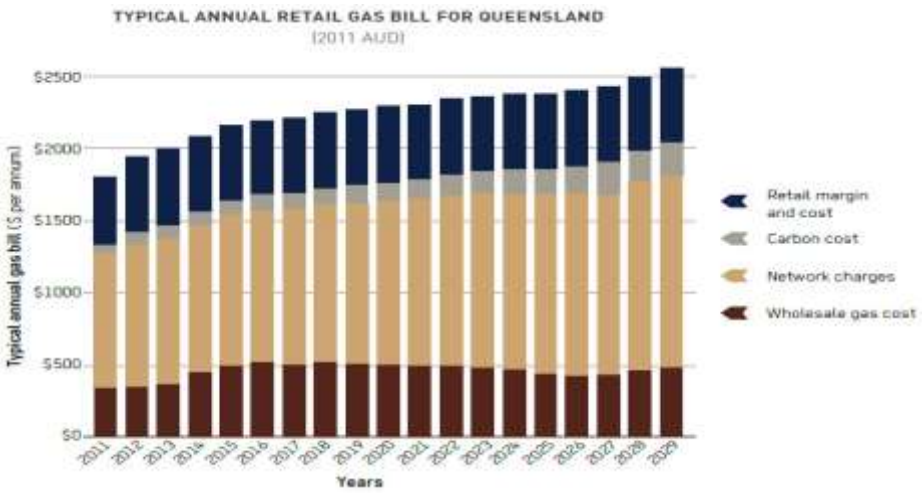

FIGURE 2.31
Typical annual retail gas bill for Queensland (2011 AUD)

Source: http://decarboni.se/publications/zero-carbon-australia-buildings-plan/7-energy-prices-forecast