

# The price of uncertainty

## Economic modelling and the National Energy Guarantee

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Discussion paper

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**August 2018**

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ISSN: 1836-9014

# Introduction

The Turnbull Government has argued that the passage of its National Energy Guarantee (NEG) will deliver significant price reductions to consumers, with much of the claimed price benefit coming from the 'greater certainty' it claims investors will have were the NEG to be agreed upon by state governments and the federal parliament.

However, at the same time that the Turnbull Government is suggesting that the 'certainty' associated with the NEG will deliver price benefits to households, the government is creating uncertainty by talking about new subsidies for coal fired power stations.

New coal fired power stations would have a significant impact on incumbent electricity generators. Even the discussion of such a possibility will increase the perceived risk for other electricity generators and, in turn, increase the cost of financing new generation. Ironically, one of the major potential benefits of the NEG, according to the modelling of the NEG commissioned by the Energy Security Board, is that by reducing policy uncertainty the NEG would lower the risk, and cost, of financing investment in electricity generation.

This paper provides an overview of the limitations of attempting to model the potential price impacts of policies like the NEG. In particular, it outlines the limitations of attempting to model the benefits of reducing 'policy uncertainty' in an industry like electricity, the market conduct of which is dominated by interacting state and federal legislation, a high degree of strategic interaction between oligopolists with significant market power, and a high degree of exposure to changes in tax, subsidy and consumer laws.

# Can we predict the electricity price?

Forecasts of electricity demand, and in turn the electricity price, have been notoriously unreliable in Australia in recent years. As the Finkel Inquiry showed clearly, Australian electricity demand fell steadily between 2010 and 2016 while the Electricity Statement of Opportunities (ESOO) predicted strong increases in electricity demand in each of those years.<sup>1</sup> Put simply, if we cannot accurately predict long run demand then it is impossible to predict long run price.

Despite the historic inaccuracy of electricity demand and price forecasting, even in the absence of significant policy change, once again economic modelling is being used to make forecasts about the impact of changes in energy policy on the long run price of electricity in Australia. Once again, despite the well-known adage of ‘garbage in garbage out’, the policy and political debate surrounding those claims is focussed almost exclusively on the conclusion of the modelling rather the assumptions. Indeed, despite the centrality of the modelling results to the Turnbull Government’s case for the NEG, they have been reluctant to release information on the key assumptions.

In a surprising coincidence, the Turnbull Government is now suggesting that the introduction of the NEG will lead to an electricity price reduction of \$550, exactly the same price reduction that the Abbott Government said would result from the removal of the carbon price.<sup>2</sup> It is significant to note the specificity of the \$550 forecast. That is, in making such a specific forecast economic modellers typically avoid the use of sensitivity analysis to provide policy makers and voters with range of likely outcomes. They also tend to avoid the use of error bars or confidence intervals that are commonly used by physical scientists when making such forecasts. In turn, many readers of economic modelling reports tend to confuse the precision of the forecasts with the likely accuracy.<sup>3</sup>

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<sup>1</sup> Finkel (2017) *Independent review into the future security of the National Electricity Market*, figure 5.1, p 135, <https://www.energy.gov.au/government-priorities/energy-markets/independent-review-future-security-national-electricity-market>

<sup>2</sup> RMIT ABC Fact Check (2016) *Fact Check: Have electricity prices dropped \$550 since the carbon tax was abolished?*, <http://www.abc.net.au/news/2015-08-17/joe-hockey-550-electricity-prices-carbon-tax-fact-check/6668552>

<sup>3</sup> Ironically, the transparency and intellectual honesty of physical scientists is often used by climate sceptics on the conservative side of politics to exaggerate the degree of uncertainty around future

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climate change projections. Such scrutiny about the accuracy of models and forecasts is, however, rarely applied to the economic claims about the potential costs of reducing greenhouse gas emissions or the potential benefits of subsidising coal mines or coal fired power stations.

# Did the removal of the carbon price save households \$550?

Former Prime Minister Tony Abbott claimed that the removal of the carbon price “means every household will be \$550 a year better off” and the claim was repeated at the Liberal Party election launch in 2013.<sup>4</sup>

Treasurer Joe Hockey went further and not only claimed that prices would fall, but had fallen:

Electricity prices have come down \$550 per household as a result of us abolishing the carbon tax.<sup>5</sup>

In fact, household electricity bills only fell by about \$120 in the year 2014–15.<sup>6</sup>

Figure 1 (below) uses ABS data to show that electricity prices were rising rapidly in Australia well before the introduction of the carbon price in 2012 and, while there was a reduction in electricity prices after its removal in 2014, this reduction was neither large nor did it have a lasting impact on the upward trend in electricity prices. Electricity prices are significantly higher today than they were when the carbon price was in place.

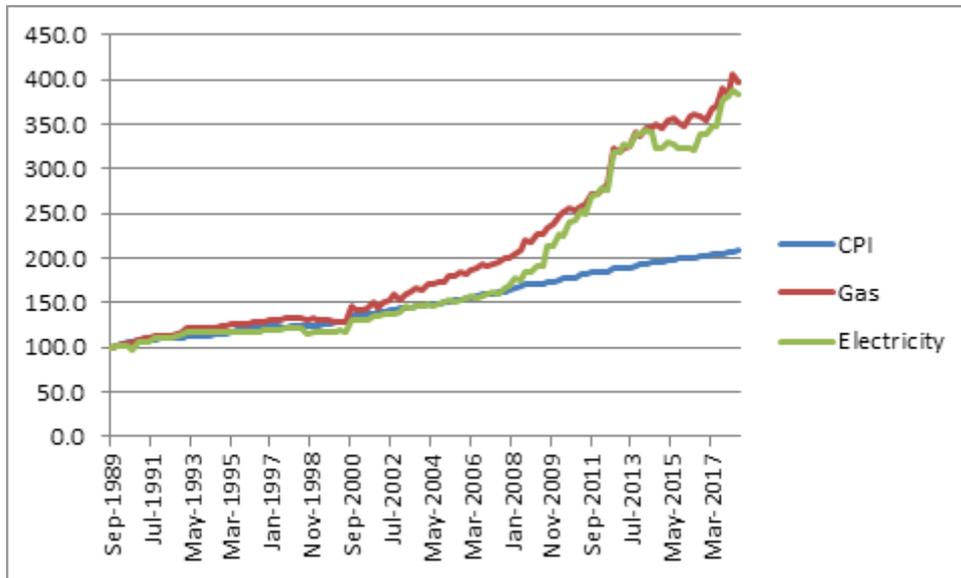
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<sup>4</sup> RMIT ABC Fact Check (2016) *Tony Abbott's claim households will be \$550 a year better off without the carbon tax is outdated*, <http://www.abc.net.au/news/2013-08-28/abbott-using-outdated-figure-on-carbon-tax-cost/4912726>

<sup>5</sup> RMIT ABC Fact Check (2016) *Fact Check: Have electricity prices dropped \$550 since the carbon tax was abolished?*, <http://www.abc.net.au/news/2015-08-17/joe-hockey-550-electricity-prices-carbon-tax-fact-check/6668552>

<sup>6</sup> RMIT ABC Fact Check (2016) *Fact Check: Have electricity prices dropped \$550 since the carbon tax was abolished?*, <http://www.abc.net.au/news/2015-08-17/joe-hockey-550-electricity-prices-carbon-tax-fact-check/6668552>

**Figure 1: CPI, gas price and electricity price growth (indexed)**



Source: ABS (2018) 6401.0 - Consumer Price Index, Australia,  
<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6401.0Jun%202018?OpenDocument>

Figure 1 also makes clear that, while there was a small reduction in the price of electricity after the carbon price was removed, there was no discernible impact on the Consumer Price Index as a whole.

# What does the NEG modelling say about electricity prices?

The Turnbull Government's Energy Security Board has released modelling to show that, compared to a 'no policy change' scenario, the price of electricity will be \$550 per year lower (for the average household) over the decade from 2020 if the NEG is passed.

As Mr Turnbull says:

The National Energy guarantee will deliver cheaper electricity, \$550 a year less. Now that's not my estimate, that's what the Energy Security Board has said.<sup>7</sup>

While Mr Turnbull has highlighted the potential \$550 benefit to consumers from the NEG, the ESB modelling doesn't actually say that the \$550 price reduction is attributable to the NEG alone. On the contrary, the ESB modelling makes clear that only \$150 of the forecast \$550 price reduction would result from the passage of the NEG.<sup>8</sup>

As the ESB has not released all of the assumptions that underpin their modelling of the NEG it is not clear what the source of the other \$400 price reduction is expected to be, but most analysts suggest that it is likely to be the consequence of the significant amount of investment in renewable energy that is currently underway. If this is the case it is interesting to note that, according to the Turnbull Government, the Renewable Energy Target (RET), so frequently cited as causing electricity prices to rise, is likely to deliver nearly three times the price reduction of the proposed NEG.

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<sup>7</sup> Turnbull (2018) *Doorstop with the Minister for Indigenous Affairs & and Ms Jacinta Price - Alice Springs*, <https://www.malcolmturnbull.com.au/media/doorstop-with-the-minister-for-indigenous-affairs-and-ms-jacinta-price-alic>

<sup>8</sup> Parkinson and Vorrath (2018) *Revealed: NEG "decisions" document confirms fears of critics*, <https://reneweconomy.com.au/revealed-neg-decisions-document-confirms-fears-of-critics-95143/>

# Garbage in garbage out

Despite the centrality of the ESB's modelling to the Turnbull government's claims about the benefits of the NEG, neither Mr Turnbull nor the ESB have released the assumptions on which that modelling is based. This lack of transparency led 23 researchers to sign a public letter calling for the release of all key assumptions.<sup>9</sup>

That said, from the summary of the modelling that has been released,<sup>10</sup> it is possible to identify a number of the key assumptions, including:<sup>11</sup>

1. That electricity retailers will secure an additional 5 per cent of their electricity from long run contracts rather than on the spot-market and, in turn, that this will result in lower prices. A number of analysts have questioned whether these price reductions are likely (including Salim Mazouz and Henry Ergas).<sup>12</sup>
2. An extra 1,000 MW of renewable supply is assumed to be installed, which lowers wholesale prices. No information is provided to support this assumption, invoking the iron rule of modelling: beware round numbers.
3. Consumer behaviour change. The ESB modelling assumes that, as a result of the introduction of the NEG, customers will use less power at peak times. There is no explanation of why a policy designed to place emissions and reliability obligations on electricity retailers would have a significant impact on the behaviour of electricity customers.
4. The ESB modelling assumes that the introduction of the NEG will deliver so much certainty for investors in the electricity industry that the cost of financing new generation capacity will be 3 per cent lower than the 'No policy' case. Given the capital-intensive nature of the energy industry, assumptions about financing costs are particularly important. The ESB provides no supporting evidence for their assumption that the cost of finance will fall so dramatically.

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<sup>9</sup> Holmes à Court (2018) *Open letter to energy ministers: Release NEG modelling in full*, <https://reneweconomy.com.au/open-letter-energy-ministers-release-neg-modelling-full-73162/>

<sup>10</sup> Energy Security Board (2018) National Energy Guarantee: Final detailed design, [http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Final%20Detailed%20Design%20-%20National%20Energy%20Guarantee\\_1.pdf](http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Final%20Detailed%20Design%20-%20National%20Energy%20Guarantee_1.pdf)

<sup>11</sup> Mazouz, Jotzo and Saddler (2018) *Could the NEG bring down power prices? It's hard to be confident that it will*, <https://theconversation.com/could-the-neg-bring-down-power-prices-its-hard-to-be-confident-that-it-will-100965>

<sup>12</sup> Ergas (2018) *NEG might be the answer but Turnbull needs to explain why*, <https://www.theaustralian.com.au/opinion/neg-might-be-the-answer-but-turnbull-needs-to-explain-why/news-story/e8a0c41df572969cf0be9f6ca387aee3>

Despite these concerns, the head of the ESB, Kerry Scott, described the modelling as “reasonably robust”.<sup>13</sup> Perhaps the least robust assumption is that around certainty.

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<sup>13</sup> Hannam (2018) *Promised savings under NEG need closer inspection*, <https://www.smh.com.au/environment/climate-change/promised-savings-under-neg-need-closer-inspection-20180808-p4zw8y.html>

# The only certainty is that there will always be uncertainty

It is axiomatic in financial models that investors need higher returns to compensate them for perceptions of higher risk. Put simply, if two investments both offer an 8 per cent rate of return but one of the investments came with more risk than the other, a rational investor would choose the lower risk option. In turn, because investors perceive that changes in state or federal policy can have a significant impact on the future profitability of different forms of energy investment, they demand a higher rate of return to justify the investment (risk). This is sometimes called an ‘uncertainty premium’.

In his review of the electricity market,<sup>14</sup> Chief Scientist Alan Finkel assumed that the uncertainty premium in electricity generation was 3 per cent.<sup>15</sup> This suggests that the ESB modelling assumes that the introduction of the NEG will remove all of the risk premium or, put another way, that once the NEG is introduced there will be no further changes to the regulation or taxation or subsidisation of any element of the electricity market between now and 2030.

The euphemism used by economists to describe such an assumption is ‘heroic’.

The post-tax return on investment for an energy investment is primarily determined by the price of electricity, the cost of producing that electricity and the tax treatment of the profits earned from such an investment. In turn, any government policies that significantly impact the demand for energy, the cost of producing energy, or its tax treatment will have a significant impact on the likely future return on investment in the energy market.

Some examples of policies that might affect the price, cost or tax treatment of electricity between now and 2030 (the period considered by the ESB modelling) include:

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<sup>14</sup> Finkel (2017) *Independent review into the future security of the National Electricity Market*, figure 5.1, p 135, <https://www.energy.gov.au/government-priorities/energy-markets/independent-review-future-security-national-electricity-market>

<sup>15</sup> Mazouz, Jotzo and Saddler (2018) *Could the NEG bring down power prices? It's hard to be confident that it will*, <https://theconversation.com/could-the-neg-bring-down-power-prices-its-hard-to-be-confident-that-it-will-100965>

- The introduction of more ambitious renewable energy targets at a state or national level
- New subsidies for coal fired power stations
- New subsidies for gas fired power stations
- New subsidies for renewable energy (at a state or federal level)
- New subsidies for storage solutions (at a state or federal level)
- New competition laws that reduce the market power of large power companies
- Changes to the tax treatment of depreciation or other investment incentives
- The introduction of demand management rules that reduce peaks in demand (and price)
- Changes to the rate of immigration (and in turn the size of peak energy demand)

Put simply, given that any change to any of these policy areas has the potential to significantly impact the price and/or profitability of investment in electricity. Yet government members actively suggest that government should build or subsidise the construction of a new coal-fired power stations and ensure existing coal generators such as Liddell stay open longer than their private owners want them to.

Similarly, and more concerning for households, industry and those focussed on the scientific evidence on the urgency of greenhouse gas emission reductions, if the Turnbull Government believes the NEG can and will provide 'investment certainty' then it is in effect ruling out any further policies designed to significantly reduce energy prices, greenhouse gas emissions, or both.

The very fact that the Turnbull Government is now publicly considering new policy measures to encourage additional coal fired electricity generation means that the claimed price reductions in the ESB modelling are already virtually meaningless. The ESB modelling results would also be rendered meaningless if the Turnbull Government, or any future government, sought to introduce new policies to encourage greater competition – or more ambitious emission reductions – into the electricity industry.

Given the uncertainty around all these issues, it is inconceivable that the passage of the NEG will 'deliver certainty' to the electricity industry.

# Conclusion

Economic modelling can be a very useful tool for policy analysis. The process of modelling a policy forces analysts to make detailed estimates of all impacts and to closely examine the relationships between different variables. In this process many costs and benefits of a policy or project can be realised, some of which may otherwise have been overlooked.

However, modelling is only as good as the data that backs it and the assumptions that underpin the model. Relying on unsupported assumptions and partially released analysis, such as we see in the ESB's modelling of the NEG, is not good practice and serves only to erode the public's faith in the proponents and modelling in general. All too often interest groups have used such modelling to influence public debate and give the impression that the public's interest is actually aligned with their proposal. For this reason, The Australia Institute has long advocated for a code of conduct for the economic modelling industry.<sup>16</sup>

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<sup>16</sup> Denniss (2016) A code of Conduct for Economic Modelling: Ensuring transparency, quality and consistency, <http://www.tai.org.au/sites/default/files/Brief%20-%20Code%20of%20Conduct%20for%20Economic%20Modelling.pdf>