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Who Wins and Who Loses from Changing the LRET?

Prediction is very difficult, especially if it's about the future.

Niels Bohr

Forecasting is a mug's game

Forecaster mugged by reality

Garbage in, garbage out

Paraphrased thoughts of Charles Babbage, inventor of the first computer

The art of taxation consists in so plucking the goose as to obtain the largest possible amount of feathers with the smallest possible amount of hissing

Jean Baptiste Colbert, French Economist and Minister of Finance under King Louis XIV

Modelling Can Surprise

Modelling can be a fairly straightforward affair where you input data into a black box and it produces outputs at the other that you simply report. This can be useful if you're confident about your inputs and the precision of your black box model (as engineers and physicists are to some extent), but not so helpful if your system is subject to many uncertainties. What one seeks in this case are insights that are useful and robust against a wide range of such uncertainties.

Sometimes those insights are not what you expect to find when you start out. Let me give you a simple example before returning to the main topic, which is what might happen if and when the Large Scale Renewable Energy Target (LRET) is adjusted after the current review.

Some years ago, I led a team on a capacity-building project in the countries of ASEAN. The project aimed to train country teams in system modelling to inform energy policy development. Each team had to develop, with our assistance, a large-scale energy model of the country covering energy supply, processing, transmission and use over all energy sectors. The modelling (using a package called MARKAL) was based on optimisation principles to emulate an efficient market outcome, but subject to various market distortions that may be introduced such as taxes, subsidies and constraints of various types, including emission constraints.

Using this model, each national team undertook three energy policy studies. One of particular interest was a study on policy proposal in Thailand to reduce the subsidy on LPG. We ran the model with the business-as-usual case – subsidy present - and then with the subsidy removed. To our surprise, we noted that system costs increased when the subsidy was removed (all end user demands of services were assumed constant).

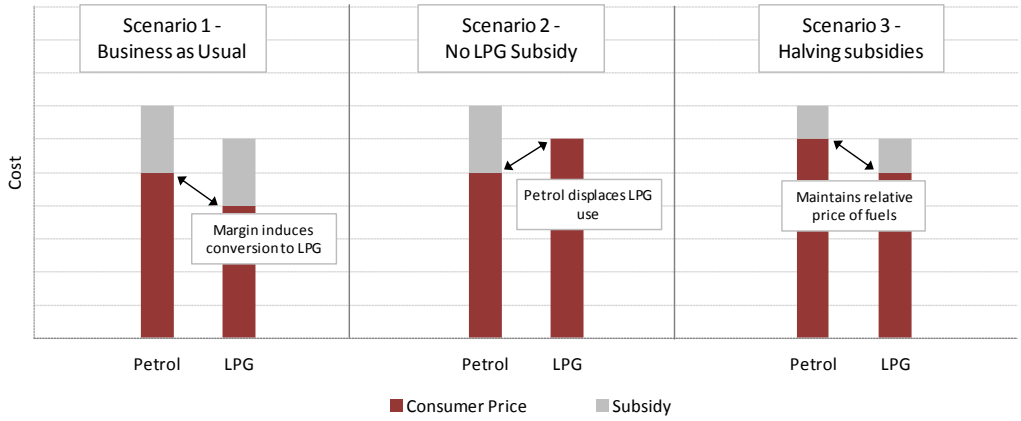
Costs increase? How could that be? Doesn't reducing or removing a subsidy lead to improved efficiency and lower costs? After some initial head scratching we dived in to see what errors we

might have made, or to at least track down what was going on. The answer was at once surprising (at least to us) but also clear, but only after the event and thanks to the modelling that uncovered it.

The situation was this. All fuels in Thailand, including petrol and LPG, were subsidised. A major use of subsidised LPG was as a fuel for high mileage vehicles such as taxis and buses, where it was cost effective to convert the vehicle to run on the cheaper LPG. If the LPG subsidy were to be removed (and no other subsidies reduced or removed), the running cost advantage of LPG would be greatly reduced and conversion to LPG wouldn't pay even for high mileage vehicles. LPG usage would drop and petrol usage increase. However, the underlying economics was that LPG was indeed a fuel of lower untaxed cost than petrol, so this switch to petrol drove system costs up – an unhappy outcome.

The charts below indicate what was happening here. The chart on the left is the business as usual case – with the subsidies on both fuels. The height of the bar is the economic cost of the delivered fuel. The grey part is the subsidy and the red (darker colour) is the cost as seen by the customer. The cost difference seen by customers drives some of them to convert to LPG.

Figure 1: Fuel Subsidy Scenarios



Now observe the outcome when the LPG subsidy is removed, as shown in the centre chart. The cost advantage for LPG seen by the customer has disappeared, few conversions to LPG take place and the costlier fuel displaces the cheaper fuel. That is the outcome we observed.

The robust conclusion to be drawn is that, if subsidies are to be reduced or removed, this should be done so as to maintain the relative economic cost of competing fuels. This is illustrated in the right hand chart, where the subsidy has been halved for both petrol and LPG but the appropriate relativity as seen by the customer is maintained at a level that minimises the potential for distorted outcomes.

This is a principle well known to economists. During the 80s and 90s as Australian tariffs were reduced, some care was taken to phase them down across the board, so as to minimise the risk of unintentionally distorting markets on the way down. The same principle drives a preference for general trade liberalisation rather than bilateral trade deals; bilateral deals can advantage and disadvantage products and businesses in arbitrary and sometimes inefficient ways. And that is why a GST is seen as an efficient tax, because it maintains relativities between product prices, except for exempt product categories of course.

From a policy perspective, the most useful output from the modelling was to observe and respond to this unintended outcome, rather than simply reporting on an increase in petrol and a decrease in LPG consumption of x% and y% respectively.

Untangling the Implications of Changes to the LRET

With that background, I return to the main topic of the day – the future of the RET and the LRET in particular. There has been a lot written about this of late, some of it contradictory. It is generally conceded all around that the LRET has driven down wholesale energy market prices, an intended outcome exacerbated by the evaporation of load growth. Removing or reducing the LRET will tend to increase wholesale energy market prices relative to the unchanged LRET case. But the impact on retail tariffs and wealth distribution seems unclear.

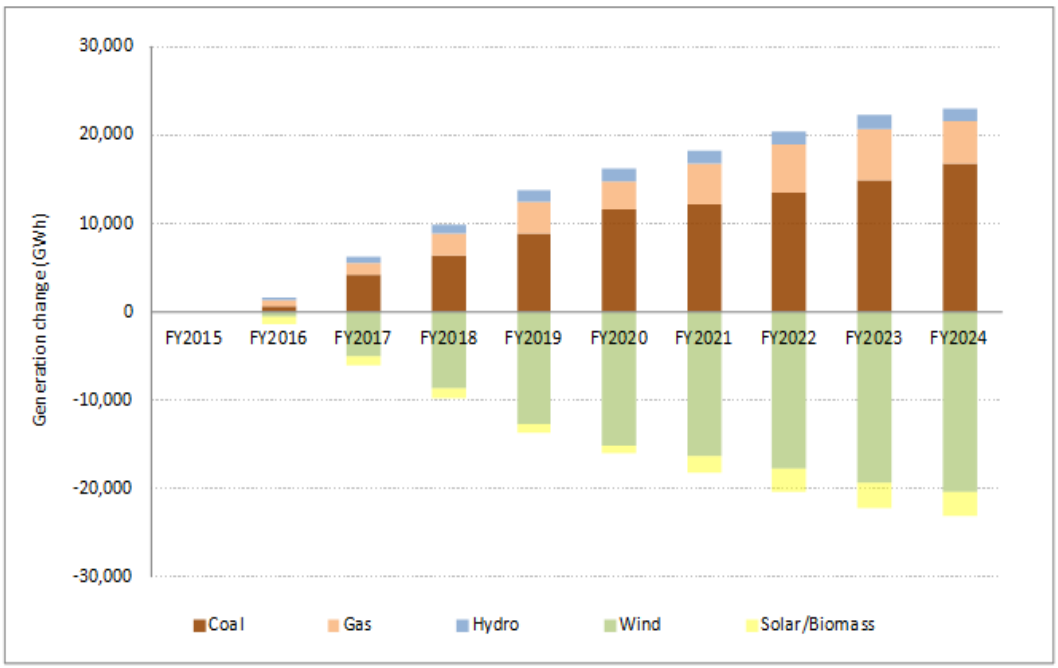
The LRET clearly imposes a short and medium term economic cost; whether that cost is justified or not is another debate, but there has been a political consensus on the LRET until recently. Intuitively, it would seem that removing or reducing the LRET would remove or reduce that cost, and that cost reduction should flow more or less directly to retail customers. Many in the media seem to make that leap, even if many practitioners are more cautious.

So what does IES think? We extended the analysis from our last newsletter from the point of view of who gains and who loses from a change in the LRET. To keep this simple, we assumed no carbon tax in both cases, retaining the current LRET in the base case and effective removal of it as an alternative (no LRET) scenario. Clearly, half-way house options are possible but the extreme cases chosen highlight the issues we are examining.

We made some reasonable but simplified assumptions about production costs to get a net impact on the bottom line of specific groups of market participants. We do not include retailers, which we assumed will simply maintain their margins and pass through cost changes. This assumption is very much muddied by the degree of vertical integration now in the market, but is nevertheless a useful device to begin an analysis.

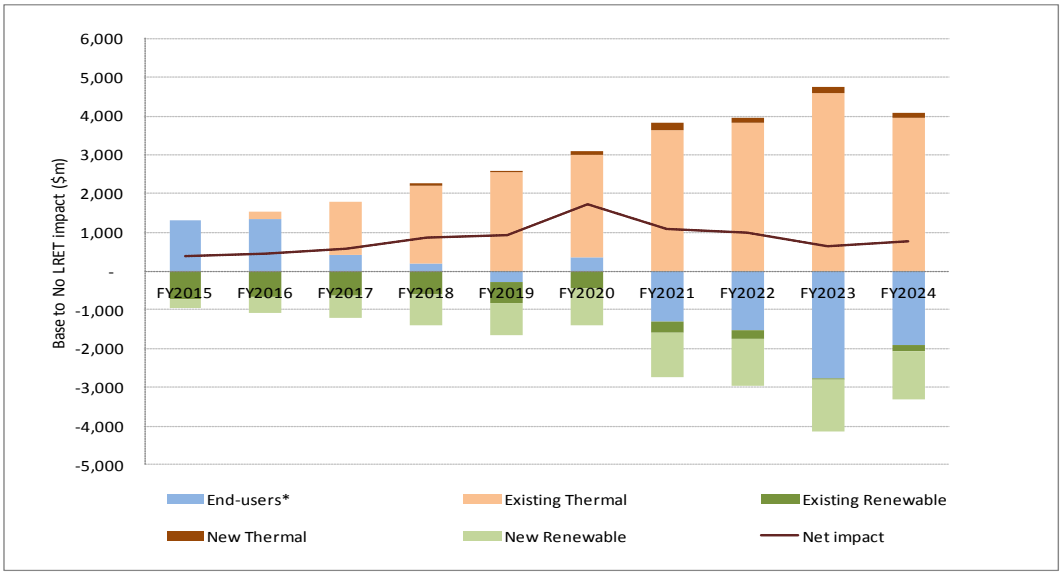
The following chart shows the generation changes as a result of removing the LRET. Everything is as per expectations; wind new-entry is not economic without LRET policy support and the renewable generation that would have occurred in the base case is instead largely picked up by the existing coal and gas-fired generators.

Figure 2: Generation Changes Going from Base Case to No LRET Scenario



The financial impact is presented below in the stacked bar chart, covering the years up to 2024. The work here is solely based on spot outcomes and takes into account pool and LGC revenues and generator capital and running costs. The end-user impact is based on wholesale energy purchases and the cost of meeting LRET (assumes other cost components stay constant). The following sections provide a brief commentary on each of the specific groups analysed in the chart.

Figure 3: Base Case to a No LRET Scenario Impact*



* Results do not take into account possible network upgrades over and above currently committed projects. Inter-regional settlement residues have been omitted from the chart.

Existing renewable generators

These businesses would take an immediate and substantial hit if the LRET target were to be removed altogether, causing LGC prices to drop to $0/certificate. They would be left with a loss of expected income from LGCs of up to $725m in 2014-15. Presumably some form of compensation package would be put in place to keep them whole (or retain some lower LRET target), given that they invested in good faith.

Existing non-renewable generators

Their fate is determined by the pattern of wholesale prices. On LRET removal, demand and plant availability is not likely to immediately change, so initially their financial position would remain essentially unchanged. Over time, however, as demand grows prices increase to a level attractive to new entrants. Wholesale prices could rise to higher than what they have been historically as the price of gas as a fuel also rise because it is now linked to international LNG prices. In time, existing non-renewable generators would be windfall winners from LRET removal or dilution. Our modelling shows existing non-renewable generators stand to benefit up to $4.6bn in 2023 or $12.8bn on an NPV basis.

New renewable generators

Most investment in such plant would likely cease for the time being under the no LRET scenario, with the exception of any committed new entry, at least until wholesale energy prices rise and/or grid based renewable costs decrease further. The lack of policy support in the form of the LRET pushes out what would have been viable new renewable generation projects. Altogether this group of generators lose out $4.7bn (NPV) across the 10 year period, at least according to our modelling assumptions and results.

New non-renewable generators

This group (mostly conventional thermal plant) shows a gain when moving to a no LRET environment as new renewable generation would have displaced this category under the base case of current LRET. There is a broader question as to what bank lending terms will be on offer for new coal fired plant with economic lifetimes of 30 years, despite the current move to policy settings more favourable to them. Investment is a long term business.

Customers (all customer classes)

With LRET removed or diluted and likely little change in the wholesale price short term, customers might expect a small benefit, at least initially as indicated in the chart, due to the removal of the LRET charge from their tariffs. As wholesale prices rise without the LRET in the medium term (more than they would do with the LRET), this small benefit turns to a significant tariff impost.

Huh? Say that again? How can customers lose out when a cost impost on the overall industry is removed? Surely our assumptions are wonky - garbage in, garbage out. Well, our assumptions are what they are and bound to be wrong in retrospect, along with everyone else's. So what is going on here? We need to delve more deeply to understand this quite counter-intuitive outcome.

The answer lies in the devilishly cunning design of the LRET, where a requirement for a certain quantum of energy needs is required to be sourced from large-scale renewables. This additional cost is passed on to customers along with wholesale energy costs, network and other charges, admin, marketing and mark-up. If we change the LRET, the change in retail costs and likely pass through to tariffs is essentially driven by the following simple formula:

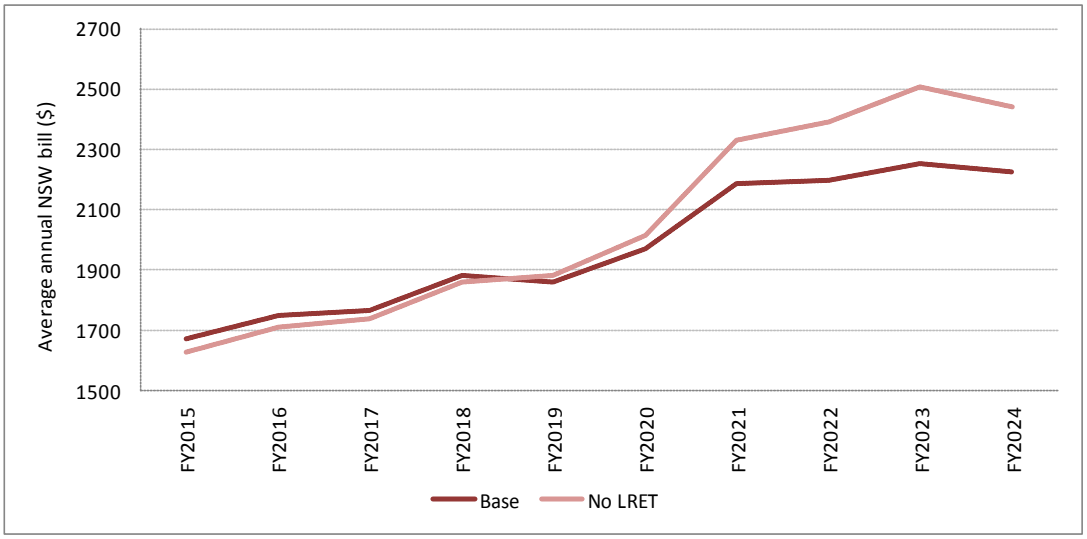
*Retail price change = Wholesale price change + Renewable fraction * LGC price change*

To see how this works, suppose the current renewable fraction (technically the Renewable Power Percentage) is 10%. So if LRET removal or dilution drops LRET prices from $50/MWh to zero, for example, the impact on retail tariffs is diluted to a reduction of only $5/MWh or 0.5c/kWh. If wholesale prices don't change (as we might expect in the short term after LRET removal or dilution) we should see a small benefit for customers (assuming the benefit is fully passed through). Should wholesale prices rise by more than $5/MWh relative to the current LRET case (as they are likely to do at some point), then the change in retail costs will be positive and customers will be worse off. A $5/MWh wholesale relative price increase is likely to be exceeded by a wide margin in the medium term, as the chart of our modelled results in Figure 4 is showing from 2017 onwards.

Figure 4: Average NEM Spot Prices

The impact of the wholesale spot prices (and assumed hedging cost impacts) coupled with the LRET cost can be seen in the following chart showing an average annual NSW power bill across both scenarios. For simplicity we assume all other components of the electricity tariff to be constant. As discussed earlier, we expect a short-term cost reduction in the no LRET scenario; however the benefit is eroded by increasing spot prices over the medium to long-term.

Figure 5: Estimated Average Annual NSW Power Bill



This is still a hard thing to swallow. Somewhat like the Thailand LPG subsidy study outlined earlier – how do retail tariffs manage to go up if you remove a distortion? Let's look more closely at some of the years from our analysis in the following table.

Table 1: Illustrative Benefit Changes after LRET Removal ($billion)

Participant Class	FY2015	FY2019	FY2024	10 Year NPV
Existing Thermal	-0.0	2.6	3.9	12.8
Existing Renewable	-0.7	-0.5	-0.1	-3.0
New Thermal	0.0	0.0	0.1	0.4
New Renewable	-0.2	-0.8	-1.3	-4.7
End-users	1.3	-0.3	-1.9	-0.5
Net Impact	**0.4**	**0.9**	**0.8**	**5.0**

The simple view is that reducing or diluting LRET will deliver overall cost reductions that should eventually flow through to benefit customers. The chart and table above suggest that the accompanying wealth shifts could be very much larger. The big winners would likely be existing non-renewable generators. Whether such an outcome would reflect correction of a policy folly or a very nice windfall for non-renewable incumbent participants will be left as an exercise for the reader.

Under current policy settings it is existing thermal generators, not customers, who are effectively underwriting the LRET. We can fiddle with our assumptions and scenarios but I will stick my neck out and assert that this is a robust conclusion from any serious modelling. We will see what ACIL Allen comes up with as the official modellers, assuming that they will produce a winners and losers analysis.

I notice as we go to press that some energy intensive industries want exemption from the LRET requirement for themselves but not removal of the LRET requirement on everybody else. They like the lower wholesale prices from the LRET, but prefer that that everybody else pays to achieve that outcome. That's a smart move if they can get away with it.

An Aside on the Carbon Tax

I remain in awe, as do many others, of Tony Abbott's success in taking an apparently unexceptional piece of policy, implementation of a carbon price, and turning it into something which, in Julia Gillard's hands, would lead inexorably to the ruination of the country. The punters apparently bought this argument at the election last year, giving the government every right to seek to repeal the enabling legislation, which they will no doubt succeed in doing. And he did this while claiming that his alternative Direct Action policy would do the job better, despite the conventional wisdom of most economists to the contrary.

How did he do that? Setting aside the rhetoric used, the explanation is very much the same as that which explains how the LRET slipped under the conservative radar for so long. Direct Action and the LRET are finely targeted. The money goes in and some level of policy objective, be it emission reduction or technology development, comes out.

In contrast, a carbon tax, or the auctioning of permits and subsequent trading, actually produces revenue as well as some emission reduction. While the aim is to reduce emissions, revenue generation, and a lot of it, is a by-product. A carbon tax involves lots of financial churn relative to the LRET and Direct Action. So it is easy to focus on the GBNT (Great Big New Tax) and ignore the resulting revenue, because of the companion argument that governments, or at least one government in particular, would waste this revenue. I am not expressing a partisan view here; just trying to summarise the arguments as I heard them.

Now that the budget is out, we find that revenue is not so easy to come by. Programme cuts are painful and in some cases apparently inequitable. We can now put on new spectacles and look at the carbon tax as a tax, much like the so called "sin" taxes on cigarettes, alcohol and gambling. Here the main aim is to raise revenue, but if a little less of the taxed item is consumed or produced on the way though, that might be a bonus. An adult government (again, to use a fashionable term of the day) would not waste the resulting revenue but put it to a good purpose, such as reducing debt. And if we don't want extra taxation, I will put in a self-interested plea to do a deal with the states to reduce the dead weight of payroll tax, to benefit exporters of professional services such as IES. Memo to Tony Abbott: miners and other energy intensive industries, such that remain, aren't the only businesses that earn export revenue and employ people!

In an idealised but perhaps more old fashioned world, a carbon tax would be an instrument of choice to raise revenue, at the same time nudging the economy toward less carbon intensity in the process. With this instrument in place, other policy measures such as the RET and Direct Action could then be gradually phased out or not renewed.

Contacts

Hugh Bannister
Work: +61 (0)2 8622 2210 Mobile +61 (0)4112 408 086
hbannister@iesys.com

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