Putting a price on carbon

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With both the Coalition and Labor repeatedly making unconditional commitments to reduce Australia's emissions by at least 5 per cent below 2000 levels by 2020, the question is not whether or not we should reduce greenhouse gas emissions, but rather how we reduce them.

Despite a number of experts calling for this to be done through an economy-wide price on carbon (Nobel Laureate economist Joseph Stiglitz recently called this a "no brainer"), both sides of politics are distancing themselves from such a policy.

The reason seems pretty straight forward – concern about voters' hip pockets.

Yet once you explore this topic in detail you find a glaring contradiction between what the statistical data tells us – carbon pricing would have a very small impact on household budgets – and what politicians appear to be hearing from their constituents: 'Don't you dare increase the price of energy!'

Over a series of three articles I'll try to explain why cold, hard statistical evidence suggests carbon pricing should be easy, and why politicians don't seem to believe this, and how we might be able to overcome this impasse.

Part One: Statistical evidence says this shouldn't be so hard

When you delve into the quantitative data on energy and carbon emissions it appears that there is little basis for households to fear carbon pricing. The energy price rises we're likely to experience are pretty mild for most households and most businesses in comparison to their overall expenditure. And the money raised by government through requiring polluters to pay a carbon tax or purchase carbon permits doesn't just disappear into the ether. It can be redistributed back to households such that they are no worse off – although some polluting businesses will be less profitable.

Getting a reasonable feel for energy price rises over the next decade is actually a reasonably straightforward calculation that can be demonstrated transparently, without the need for fancy economic models.

In terms of electricity, for each kilowatt-hour we consume, around 1 kilogram of carbon dioxide is emitted (slightly more in Victoria and slightly less in most other states). If government imposed a carbon price of $20 per tonne of carbon dioxide then the price of this electricity would increase by 2 cents per kilowatt-hour, at most. Multiply this by average Australian household consumption of around 6,000 kilowatt-hours per annum, and the additional electricity spend is $120 per household per year. If the carbon price was $40 (about the level it will need to gradually rise to by 2020 in order to achieve the 5 per cent cut) then of course the price will increase by 4 cents, and the household spend by $240 per year.

In terms of petrol, the average emissions released from burning a litre of fuel driving your car are about 2.3 kilograms of carbon dioxide (slightly higher for diesel). At $40 per tonne of carbon dioxide, or 4 cents per kg, this equates to an increase in fuel prices of 9.2 cents per litre.

For natural gas, around 70 kilograms of carbon dioxide is released for every gigajoule consumed, so that's a price increase of $2.80 per gigajoule. For the average Australian household this equates to an extra annual cost of $60.

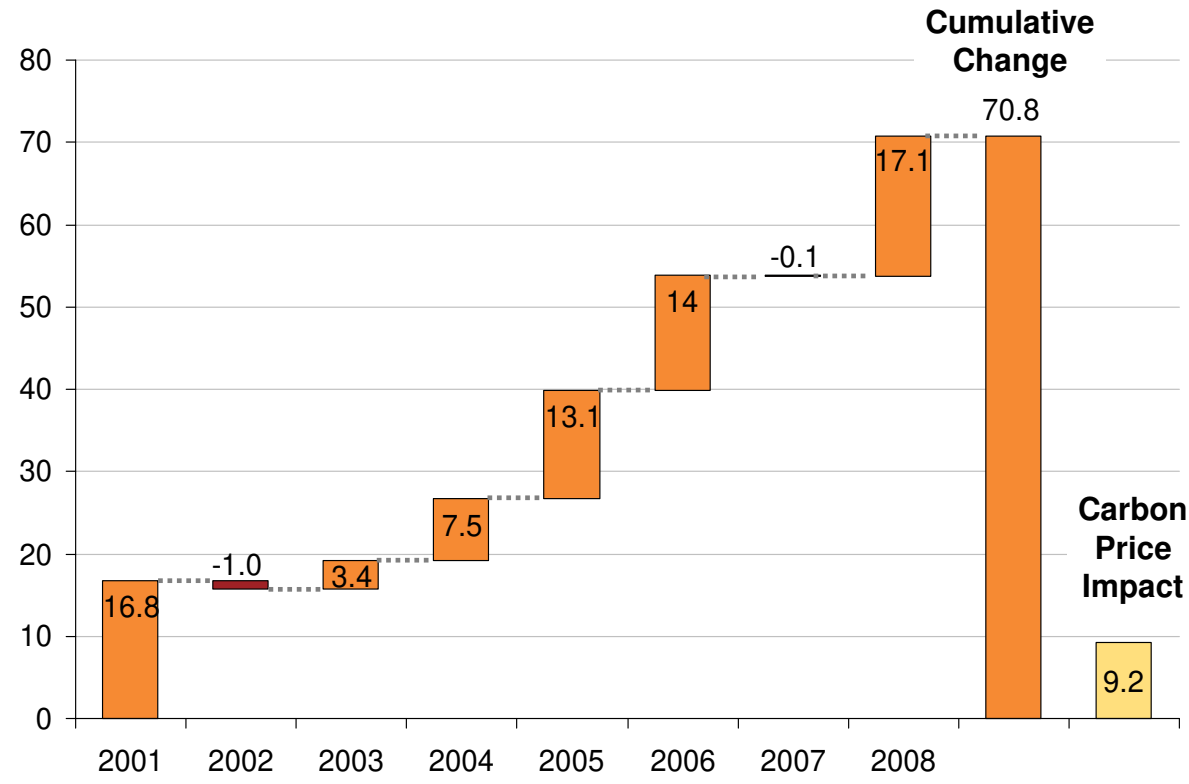
This change in energy prices over a decade is all summarised in the table below, and put into perspective against current household retail prices to illustrate the proportional change in prices.

Energy source	Unit	Retail price per unit		Approx CO2-e (kg)	Cost increase @ $40 per tonne CO2	% price increase with low retail prices	Impact on average household spend per year in 2020
		Low	High				
Petrol	Litre	$1.10	$1.40	2.3	9.2c	9.1%	$140
Electricity	kWh	$0.15	$0.25	1.0	4c	26.7%	$240
Gas	Gigajoule	$12.00	$20.00	70.0	$2.80	23.3%	$60

These price rises are not insignificant, but considering they would gradually unfold over ten years they are hardly unprecedented (if we followed the original timetable for an emissions trading scheme).

For example, between 2001 and 2008 the cumulative change in petrol prices was 70.8 cents per litre. This made life difficult for some heavily car-dependent households, but overall our economy prospered. By comparison, a carbon pricing scheme will involve a gradual increase in petrol prices of less than a single cent per annum on average.

Changes in petrol price 1999-2008 compared to effect of $40/tCO$_2$ carbon price (c/L)



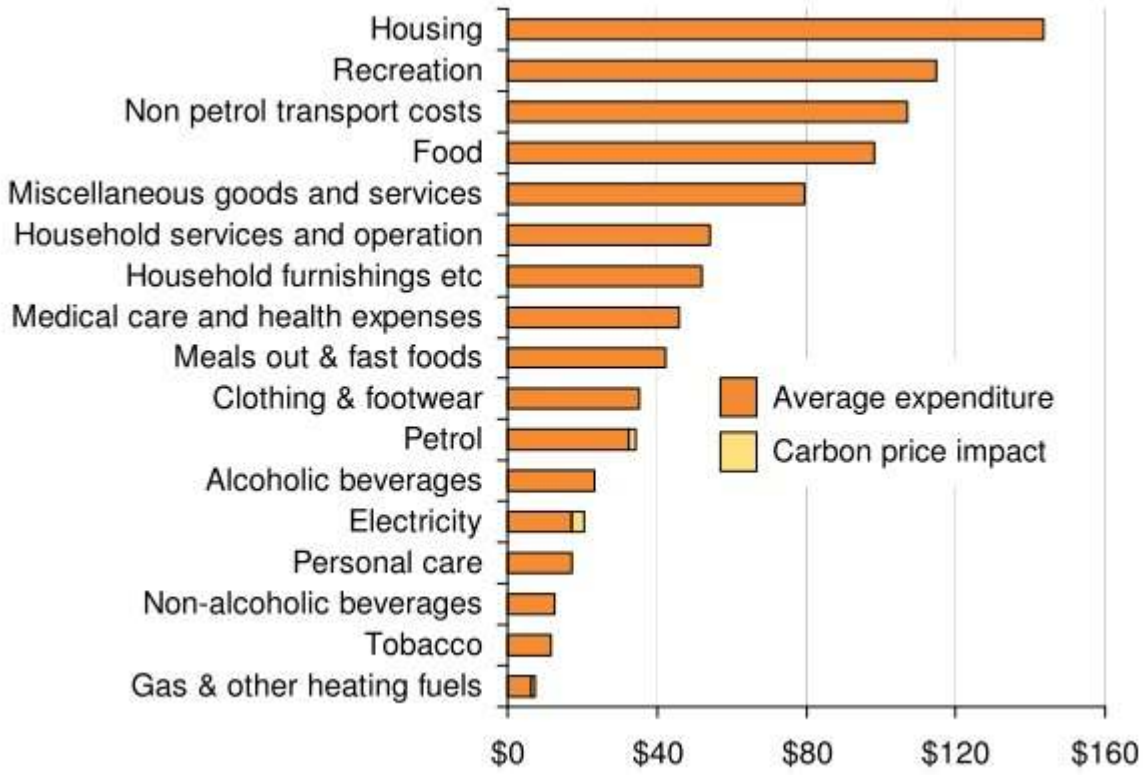
Source: Grattan Institute analysis of Australian Automobile Association (2009) Fueltrac data

Also, it's not widely known that electricity prices increased by more in proportional terms over the past decade than they will as a result of a $40 carbon price.

But what is really extraordinary is how small these cost increases are once you put them in perspective to households' overall weekly expenditure. The Australian Bureau of Statistics undertakes a survey every few years of Australian households' weekly expenditure. It provides a very detailed breakdown of how Australians spend their money, listing over 500 different items ranging from mortgage repayments, to bottled gas for your BBQ, and even underwear. Using this survey data we

can estimate how significant these energy price rises are in proportion to householders' overall expenditure. This is illustrated below.

Carbon price impact on average Australian household weekly expenditure



Source: ABS Household Expenditure Survey (2006). Carbon price impact based on Grattan Institute analysis.

The small increases in petrol, electricity and gas and other heating fuels hardly leave the impression that we're facing some kind of earth-shattering economic change.

What about food prices, I hear you say. Well, considering agricultural emissions would be excluded from any obligation under an emissions trading scheme (because of emission measurement difficulties), we only really need to worry about the effects of a carbon price on energy inputs to food production and sale. There may also be an impact on fertilizer prices, but if the fertilizer industry is to be believed, they face such significant competition from overseas producers that they have no ability to pass on carbon costs to farmers. I suspect that may not be completely true, but we could always reallocate all the free permits being given to the fertilizer industry across to farmers to address this problem.

The Australian Bureau of Agricultural and Resource Economics (ABARE) happen to collect data on energy inputs for farmers which help us to answer this particular issue. In their June 2009 report, Effects of the Carbon Pollution Reduction Scheme on the Economic Value of Farm Production, they estimate what the percentage cost increase would be for farm production from a $28 carbon price for several sectors. To convert this into the likely impact from $40 I've just scaled it up by 1.4 times.

Farming sector	increase in total on-farm input costs - $40/tCO2
Wheat and other crops	1.8%
Mixed livestock–crops	1.7%
Sheep	1.4%
Beef	1.1%
Sheep-beef	1.1%
Dairy	1.4%

Overall this is pretty small beer relative to the impact of a serious storm in Queensland which increased some food prices by 10-20 per cent in a few weeks.

If we move from the farm to food processing, we can use ABS input-output tables (which provide breakdowns on the inputs each industry uses), to assess the potential impact of increased energy prices. What this analysis reveals is that energy represents such a small proportion of food processing sectors' overall costs, even significant energy price increases become a rounding error in the overall scheme of things.

	Energy inputs as proportion of overall input costs including labour
Meat and meat products	1.07%
Dairy products	2.19%
Fruit and vegetable products	3.07%
Oils and fats	2.44%
Flour mill products and cereal foods	1.91%
Bakery products	1.52%
Confectionery	1.18%
Other food products	2.00%

Even if a carbon price led to energy costs increasing by 50 per cent across the board by 2020 (not likely), once you put this in context to overall food processing costs you're looking at an increase in costs of 0.5-1.5 per cent.

In terms of transporting the food products, the Bureau of Transport and Regional Economics estimates that transport costs contribute between 5-6 per cent of grocery retail prices. Energy makes up approximately 10 per cent of overall road transport costs, of which the vast bulk is diesel fuel. Based on a $40 carbon price, the price of a litre of diesel would increase by 10.8 cents (diesel has higher emissions per litre than petrol). For trucks this approximately equates to a 10 per cent increase in fuel costs. Once you multiply each of the percentages together the total proportional increase in grocery costs is 0.05 per cent (10 per cent x 10 per cent x 5.5 per cent).

At the end of the chain, in retail shops, energy makes up only 2 per cent of input costs. And all the other parts of the production chain's costs have been steadily diluted by other mark-ups along the way.

So in making its way from the farmer to the store, food goes through a variety of steps in which energy prices have a relatively small impact on total costs. This is the case for most goods and services across the economy. That's why the Australian Treasury's macro-economic modelling

estimated that the Carbon Pollution Reduction Scheme would only lead to, “a once-off rise in the price level of around 1-1.5 per cent, with minimal implications for ongoing inflation”.

Part Two: Why focus group testing may be telling politicians something different to the statistical evidence

While the analysis of the statistical evidence presented in part one of this series indicates that there’s not that much to be afraid of with pricing carbon, politicians don’t seem to think so. Partly this has been the result of some rather bad timing and mismanagement around energy policy.

Air conditioner penetration in households jumped at the start of this decade driven largely by their plummeting cost. This resulted in increased strain on electricity networks as peak demand soared. Yet state-owned electricity networks were caught in a bind as state governments sought dividends, while at the same time preventing electricity companies from increasing prices to residential consumers.Meanwhile, gas prices in WA have increased dramatically, driving up the costs of gas-fired electricity generation.

Something had to give and power outages in several of these states, as well as electricity privatisation in NSW, forced state governments to only recently allow increases in residential electricity prices. The end result has been that consumers have been hit with a sudden energy price shock of around 20-50 per cent, per year, for the next three years, rather than a more gradual increase that would have occurred with more rational policies.

In Victoria, which has had more rational electricity pricing policies, consumers are nonetheless being asked to pay an upfront fee for the roll-out of smart meters, which many haven’t even received yet. Those who have got their smart meters can’t really perceive what’s so “smart” about them, considering there’s no accompanying improvement in energy information that they receive. It would have been better to charge consumers for these smart meters progressively over a longer period of time, with offsetting benefits to account for lower meter reading costs.

These price increases have made voters especially sensitive. They have also resulted in a degree of confusion as voters incorrectly attribute the price rises to an emissions trading scheme, rather than their actual cause.

In addition, energy has some fundamental attributes that make us especially resentful about price rises. While it’s clearly a useful product, it is consumed without much thought or thanks. We all take great delight in the television we paid over a thousand dollars for, but we don’t feel the same way about the extra few dollars incurred on the energy bill to operate it. The same goes for petrol. Chests swell with pride over a new car costing $30,000, but our faces go red with anger if petrol prices increase by 10 cents a litre. There is no satisfaction to be gained in a bigger electricity or petrol bill.

I suspect that this is partly caused by feelings of powerlessness in the face of energy price rises. Purchasing decisions made in an emotional moment can lock in energy consumption requirements for many years to come. Yet often we dedicate little conscious thought to such consequences. Switching to public transport may be a highly impractical alternative if you don’t work in the CBD, or you choose to send your children to a school that is a long way from home because it has a good reputation. You’d like to reduce the heating bill, but the house you fell in love with came with a central heating system that can’t be restricted to just the living room.

In the case of electricity, consumers often lack a basic understanding of the major drivers of their electricity consumption and so often don’t even know how they might reduce their bills. Studies of energy consumption behaviour find that people tend to hawkishly monitor lights being left on, but don’t realise that the old drinks fridge in the garage consumes more electricity than all the lights put together.

Also, in terms of gas and electricity, we find out the price and the overall bill some time *after* the deed is done and it’s too late to do anything about it. By contrast, in the supermarket, when the price of

bananas goes up, you tend to notice it and can choose to purchase apples instead. Then there's the fact that, in many households, much of the energy consumption is driven by children, whose behaviour is difficult to control at the best of times.

This makes energy almost an involuntary good, where you don't have enough information or freedom in the short-term to choose how much to consume. So even though you may spend far more money on paying off the car or the new television, you still resent an extra $100 on your electricity bill. With the car and the television, at least, you made a conscious choice, and they both represent a noticeable improvement on what you had in the past.

These factors have combined to make politicians scared of carbon pricing, in spite of the statistical evidence about its comparatively small impacts on household budgets.

Part Three: Overcoming the fear factor

In the previous two articles in this series I've shown that:

– Carbon pricing would have a relatively small impact on household budgets (Part One);

– Householders tend to react strongly to energy price rises because they have limited ability to avoid or moderate their impact, making politicians fearful of imposing a carbon pricing scheme (Part Two).

In this article I'd like to outline four key things politicians could do to help voters become more comfortable with the energy price rises that will flow from a price on carbon pollution.

Number 1 – Offer credible and easy to understand financial help

Politicians, in fact, have a very effective mechanism for reassuring consumers about energy price rises. All the money government will raise from carbon pricing can be returned to householders (provided they don't give it all away to business first) so they are no worse off as a consequence of carbon pricing.

But for such a measure to provide effective reassurance, it must be easy to understand and credible. Unfortunately the CPRS involved a wide variety of adjustments to existing taxes and cash transfers, requiring no less than 27 pages of tables to explain how much compensation different households would receive. While adjusting existing taxes and transfers may be easier for government to administer, this complexity makes voters suspicious that the government is about to do something tricky which will leave them worse off.

Government would do better to structure its household compensation package, according to the following format, to make it simpler and more credible:

– Compensation should be delivered in the form of a single cash payment delivered each quarter, that is separate to other taxes or cash transfers. It can then be easily identified by householders as compensation for the carbon pricing scheme.

– The formula for determining the amount of compensation households receive must be simplified into a base payment that every household would be entitled to, up to a household income threshold defining those able to readily afford the cost increases (for example the CPRS white paper defined this as $160,000). Payments would be structured around a fixed amount per person per household. This payment would not vary depending on how much income you earn, or how old your children are, or whether you are an aged pensioner or a self-funded retiree. Provided you fall below the income threshold, you qualify – simple as that.

Payments per person would be set at a level such that they were likely to over-compensate the average household without access to reticulated natural gas (a key influence on the carbon intensity

of energy supply). While much simpler than the CPRS, such a structure will still provide a greater amount of compensation to low income households. This is because they tend to consume less energy than wealthier households. Also it still accounts for the challenges of "working families" raising children, by tying compensation to the number of people within the household.

– On top of this simple, universal, base compensation structure, a fund should be set aside to assist those with exceptional circumstances (for example, people who have a health problem that requires them to operate energy intensive health equipment). Criteria for eligibility and the basis for payments could be developed in conjunction with health and community service non-governmental organisations, and social service departments of state governments. By dealing with the small number of exceptional circumstances in a separate fund, it avoids excessively complicating the core household compensation package. This is essential to community understanding and acceptance, but will not neglect the needs of the small number of people that are especially disadvantaged by a carbon pricing scheme.

– In terms of petrol, the government's plan to offset the petrol excise one-for-one for the carbon price impact is poor policy, but relatively good politics. It seems extraordinary that a one cent per litre annual increase is so hard to implement. Yet there is tremendous political sensitivity around petrol prices, and a high degree of variance in transport needs and options amongst members of the community. This may mean that introducing a carbon price with a three-year petrol excise concession is the best we can do.

By structuring the household compensation package in such a way government will have an easily understood and communicated response to concerns about energy price rises along the lines of, "households can expect a cheque for $75 per person to arrive in their letter box by no later than 31 March. This is expected to fully compensate almost all households for price rises due to carbon pricing." This would be infinitely better than the 27 pages of tables we have within the current CPRS.

It is possible that this compensation package will come at greater cost than what is proposed under the CPRS. However there is a very obvious and justifiable way to pay for it. Our study, Restructuring the Australian Economy to Emit Less Carbon, found that the current CPRS provides over $20 billion in free permits to businesses that could not be justified on the basis of preventing carbon leakage or protecting jobs. This could be restructured in such a way that much of this money could be freed up to help the small number of displaced workers, reduce the cost of achieving a given emissions target, and provide more than enough money to fund a simplified household compensation package.

Number 2 – Explain what people will get for their money, other than a "trading scheme"

When listening to some of those extolling the virtues of an emissions trading scheme, one could be forgiven for thinking that its purpose is to support Australia's financial sector. It really needs to be communicated to people in more tangible terms if they are going to be willing to accept an increase in energy prices. People understand what a cap on pollution is. They also understand that if you make polluters pay for their pollution, they will produce less of it. The benefits from the "trading" in permits seem far less obvious.

Part of the problem around householder credibility in "trading schemes" may lie in the extensive amount of free permits proposed for businesses. While economic theory suggests that it should make no difference to firms' incentives whether they receive their permits for free or not; it makes households very suspicious.

A levy, such as that used to pay for Medicare, illustrates that people can willingly accept a cost if the burden is fairly shared and there is a clear link to societal benefits.

Number 3 – Avoid sudden surprises and information vacuums

If there is one thing householders hate more than an energy price rise, it's a large and sudden energy price rise that they weren't expecting. Politicians need to be upfront with households that energy

prices will rise, while at the same time reassuring them that the rises will be small, and assistance will be provided. If politicians try to implement a carbon price without openly discussing price rises, then it's likely the information vacuum will be filled by all sorts of myths, and the public will be angry when the price rises eventuate.

A further point to this issue is that the earlier we start the process of cutting emissions, the more gradual the necessary price rises will be and the smaller the disruption. Greenhouse gases are largely a function of long-lived infrastructure that takes time to replace. A price on carbon introduced in 2011 or 2012 is likely to result in more tolerable costs on householders, than waiting several years and then trying to achieve emission targets in a rush.

Number 4 – Help consumers to avoid poor energy efficiency choices

Detailed research dating as far back as the 1970's oil crisis, indicates that householders generally dedicate limited attention to energy operating costs of the equipment they purchase. This is understandable, considering the small incremental cost imposed by less efficient equipment on household budgets.

Providing information helps, but not in the form often favoured by politicians of an advertising campaign. History suggests these yield poor results. And information needs to be supplemented by minimum standards that remove highly inefficient products from the marketplace. Incentives can also play a useful role, but need to be very well thought out to avoid simply paying for activities that would have occurred anyway.

Unfortunately, Australian energy efficiency policy to date has been a series of grab-bag ideas, which have not been integrated into a considered and comprehensive strategy.

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