Carbon and consumers

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Summary

The focus of the conference is on the impact of a carbon pollution reduction stream (CPRS) on low-income and other disadvantaged households.

Because domestic energy is essential for everyday living, such households are already paying a high share of their income on electricity and gas. Also, the price of these utilities has been rising in real terms over the last ten years, and is expected to do so even more strongly under a CPRS.

While the Commonwealth has said it will provide financial compensation for low-income households, they are likely to be constrained in making investments which will allow them to reduce their fuel consumption. In part, this is because all consumers, whatever their financial circumstances, find the necessary calculations difficult, and are subject to behavioral biases which tend to discount future savings. In addition, people in low-income households, particularly those who are renting, are generally constrained in their choices, and find that energy-saving appliances are priced out of their reach. Also commercial incentives on utility companies tend to favour consumption over conservation, and they do not make it easy for people to take advantage of lower-priced tariffs.

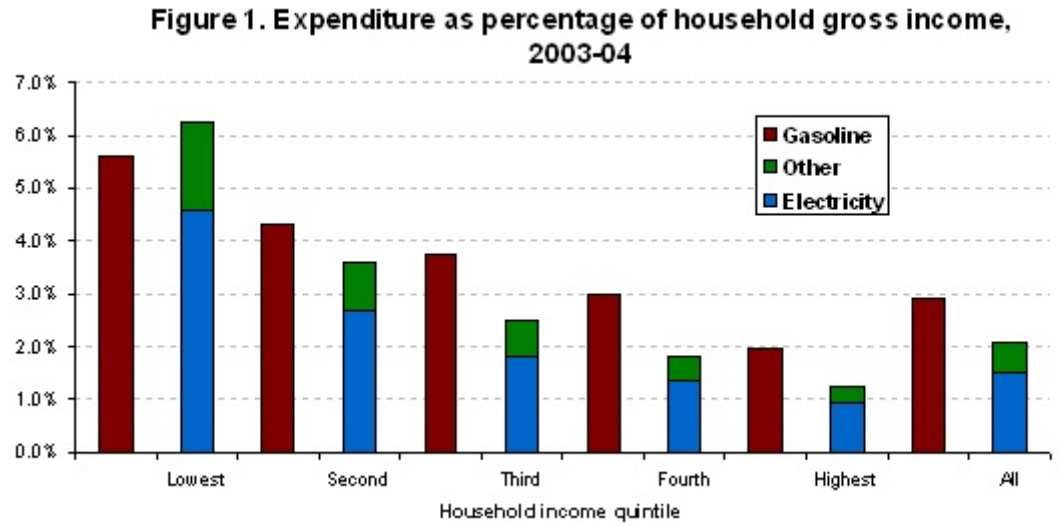
In hoping people respond to the prie signals in a CPRS, governments may be too reliant on market forces and on assumptions of "rational" consumer behavior. Without distorting resource allocation (in fact improving environmental and equity outcomes), there are more active forms of market intervention governments can use.

Setting the context

We know already that those with lower incomes are devoting a large share of their income to paying for energy. Well before we became aware of climate change and of measures such as carbon pricing, poorer households paying heavily for energy and prices were on the way up.

Fuel use by households

Although this conference is mainly concerned with electricity, in any discussion on domestic electricity use it is useful to look at the wider context of household fuel use, for electricity and gas are close substitutes for domestic heating. In some regions, particularly Victoria, gas is a



major source of domestic heating.When we look at expenditure on energy as a proportion of household income, it is clear that energy outlays impose a particularly high burden on lower-income households. The ABS household expenditure data is a few years old, but it reveals that domestic fuel accounts for just over six percent of income in lower income households, compared with just over one percent in highest income households. (Figure 1, drawn from ABS *Household Expenditure* data, shows this distribution.)

Use of fuel is not heavily dependent on income; we all need roughly the same amount for basic needs such as lighting, cooking, refrigeration, water heating, and space heating. In fact, when we look at outlays on domestic fuel per *person* on a household income basis, we find it is almost flat across income groups. (Although there is more fuel expenditure in higher-income households, lower-income households tend to be smaller households; almost two thirds of households in the lowest income quintile have only one occupant, often an aged pensioner.)

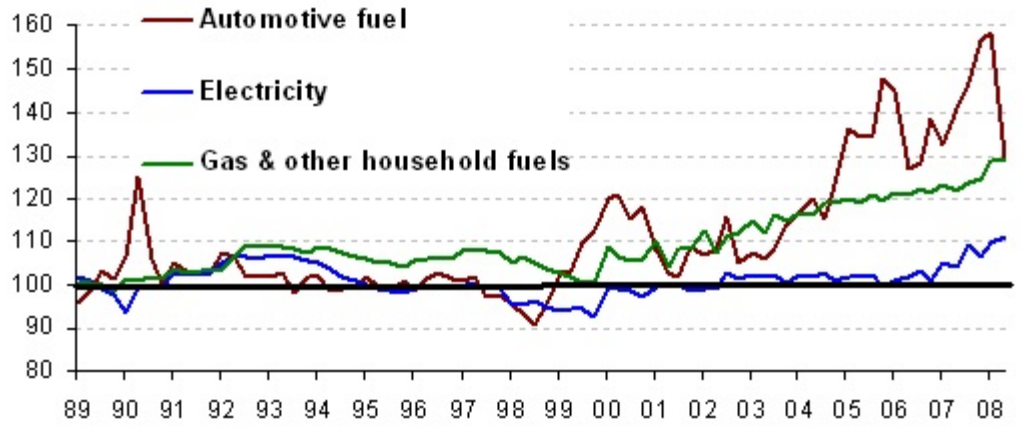
In Figure 1 I have included gasoline, as a reminder that it is not only in household fuel that lower income-households bear a disproportionate burden, but also in transport fuel. We live in cities where restrained housing and employment choices make many people on lower incomes highly car dependent, and where much public transport serves the relatively well-off with regular employment in city centers. This is not an argument against investing in public transport, but it is a warning that in the debates around climate change policies there will be calls for increased subsidies for public transport, which translate into demands for more transfers from all taxpayers to the already well-off. In Australia the thinking of some transport advocates is rooted in a time when cars were the playthings of the rich and public transport was for the poor, almost the diametric opposite to the current reality.

Fuel price movements

When we look at price movements it is unsurprising that fuel prices have been rising faster than inflation. (Figure 2.) Both gas and electricity prices started to rise in real (inflation-

adjusted terms) about ten years ago, and have been rising ever since, particularly over the last few years.

Figure 2. Fuel prices relative to CPI (base 1989-90 = 100)



The impact of electricity price rises on low-income households is illustrated in a 2004 study in South Australia, which surveyed the way twelve households, already in financial stress, coped with a sudden price rise of around 25 percent, following introduction of "full retail contestability". All respondents reported additional stress, all reported that they were unable to heat or cool their home to a comfortable level, and many reported that they were bearing debt for electricity bills.[1]

Households' contribution to fuel use

Another point relevant to public policy is to remember that, although there is always a great deal of pressure on households to do their part, the household sector accounts for only about 12 percent of national energy use, or about 17 percent of greenhouse gas emissions according to 1995 data. (The imbalance in these percentages is because households are heavy users of electricity, which is generated mainly from greenhouse gas-intensive coal-fired power stations.[2]) Some later data suggests a higher percentage, but it includes travel to work.[3]

Within households at least three quarters of energy use is for heating – space heating, water heating and cooking, as shown in the table below.

Household energy use 1995	
Space heating	40%
Water heating	27%
Cooking	8%
Sub total heating	75%
Refrigeration	9%
Lighting	4%
All other uses	13%
Total	100%

The data in this table relates to 1995. Since then there has been a large growth in household air conditioning and in other appliances which were once considered to be luxuries. In 1994 only 33 percent of houses had air conditioning; by 2008 this had doubled to 66 percent, and most growth has been in refrigerated rather than evaporative units. Over the same period the proportion of houses with two or more refrigerators rose from 24 percent to 34 percent.[4] Appliances such as dishwashers and clothes dryers have moved from discretionary items to "must haves" in many households.

This breakdown by heating and other uses is important, for heating applications are suited to substitution away from electricity, particularly natural gas, which has a much lower carbon contribution than electricity. Also, even if the economics of photovoltaic solar electricity are marginal, there is a strong economic case for solar water heating in most of Australia.

A CPRS will have effects beyond the normal rise in fuel we have witnessed over recent years, because different fuels have different carbon contributions. Our electricity is generated from four sources – brown coal, particularly in Victoria, black coal in most other states, natural gas as a supplement, and small amounts of renewable sources such as solar, and hydroelectric in Tasmania. Because of brown coal dependence, for each KWH hour of electricity delivered, Victoria's electricity contributes about 40 percent more carbon to the atmosphere than the electricity generated in NSW.[5] Also, at peak times, power utilities tend to swing older, less efficient and more polluting power stations into action. This means peak carbon credits (or taxes) could be very expensive for such stations, and wholesale peak prices will be correspondingly expensive.

While a CPRS will impose higher costs on Victoria than on other states, it is unclear whether the costs will be passed on locally or will be distributed to all users through the interstate grid. It should be noted that in spite of the claims that in the eastern states there is a national electricity market, there is wide price dispersion in electricity prices between different states.

Public policy – faith in markets

While we do not know the exact shape of the Government's CRPS we do know that it will be modest, almost certainly based on a "cap-and-trade" system (rather than a carbon tax), and will largely rely on pricing rather than more intrusive interventions.

The guidance so far from the Government is:

> In the CPRS scenarios (in which emission pricing is introduced in 2010), a one-off rise in the price level of around 1-1.5 per cent is expected, with minimal implications for ongoing inflation. For the average household, this corresponds to an extra $4-5 per week spending on electricity and $2 per week on gas and other household fuels. Prices of petrol and emission-intensive meat products will not be affected initially, due to reductions in fuel taxes and agriculture's initial exclusion from the Carbon Pollution Reduction Scheme.
>
> Emission pricing will have a slightly greater impact on low-income households as they spend a higher share of their income on emission-intensive goods. The Government, as it outlined in the Carbon Pollution Reduction Scheme Green Paper, is committed to helping households adjust to the scheme, including by increasing benefit payments and other assistance to low-income households through the tax and payment system.[6]

The Commonwealth has pledged that most assistance will go to low and middle income households, with weighting for larger families.[7]

Allan Asher, drawing on his experience in the UK, will go further into some of the design principles, in particular some of the shortcomings of a "cap and trade" system. While, in pure economic theory, a carbon tax and a "cap and trade" system are similar (one uses a set price to determine the quantity of carbon, while the other uses a set quantity to determine a price), there are important practical differences.

Already environmental advocates have voiced some criticism of the proposal to compensate low-income households through money transfers, rather than through other means, on the basis that this will simply allow people to continue their established consumption habits and have no effect on energy use.

As every Economics 1 student knows, however, if some prices rise relative to others, there will be some degree of substitution. In its reliance on markets, the government will be expecting substitution to occur such as investment in more energy-efficient appliances, solar hot water, insulation, etc.

The path to adjustment probably lies between these two scenarios – between zero adjustment and a market-determined "rational" response. People's behavior in markets does not comply fully with the "rational" models held by economists and policy makers. There are reasons to believe adjustment will be most difficult for low-income households. I will dwell mainly on consumer behavior, but will also touch on supplier behavior.

Consumer behavior

There are at least two conditions to be met before people can make rational responses to price signals such as a rise in the price of electricity. First they must understand the consequences of making a choice. Second, they must have options open to them and the means to act on those options. I will suggest that, when it comes to electricity (and by extension other utilities) we are all somewhat impaired in making a wise choice – either because of computational difficulties or because of biases in our behavior. And people with low incomes often do not have the options or the means open to them to make wise choices.

It's OK if you can read backwards

I will dwell mainly on the first set of impediments, bringing in some of the findings of behavioural economics. Alison Peters, Deb Pippen, and Maree O'Halloran, from the perspective of welfare groups and Jenna Wood from a supplier's perspective, will undoubtedly emphasise the limited choices faced by people with low income.

One problem with electricity, gas and water is that most people do not have the slightest idea of the units they are dealing in or their prices. It's always a revealing exercise to ask a group of students to write down the price of a liter of gasoline, a liter of milk (beer for undergraduates), and a

KWH of electricity. It's even more revealing to ask them to estimate their usage.

The way we measure and charge for utilities makes it very difficult for consumers to exercise rational choice. The newer electricity meters, designed to handle time-of-day tariffs offer a slight improvement on the old Heath-Robinson contraptions with counter-rotating dials, but it is still hard for any but the most disciplined and obsessive of users to monitor and evaluate use. (Imagine the outcry to the ACCC if gasoline pumps had no displays, and all we got was a quarterly bill for our usage.)

For all the rhetoric about developing a "market" for electricity, consumers are denied one of the basic elements of a market – the feedback of timely and legible price and quantity information. It is therefore very difficult for most consumers, poor or prosperous, to manage their electricity consumption through making wise investments in energy matters.

An example of what should be an easy choice is between florescent and incandescent light bulbs. A "rational" calculation may go something like the one below:

Data:		
	Purchase price 60 W incandescent bulb	$1.20
	13 W equivalent florescent	$6.00
	Electricity price	$0.15 per KWH
	Daily use	5 hours
Analysis:		
	Difference in purchase price	= $4.80
	Difference in power	= 47 Watts
	Difference in energy used a year = (47 x 5 x 365)/1000	= 86 KWH
	Annual saving using florescent = 86 x 0.15	= $12.90

That's one of the easiest energy calculations, and the result gives a clear guidance; not even the most unethical financial spruikers of the boom times were offering an assured 270 percent return on investment. But it isn't an easy calculation to do on the spot, when one is in a supermarket looking for a replacement light bulb. And, of course, if the shopper has a severely constrained budget, where that $4.80 could be spent only by foregoing food basics, the more expensive light bulb does not warrant consideration. The electricity bill will come in two or three months; the family needs to be fed now.

One finding from the South Australian project mentioned above, was that for heating, people in low-income households tended to rely heavily on bar heaters. These are cheap to buy, but they can be extraordinarily inefficient and expensive to run; if electricity costs 15 cents per KWH, a two KW heater will cost 30 cents an hour, or $270 if run for six hours a day over 150 cold days – and that's to heat one corner of one room. One problem, I suspect, is that people are reluctant to part with a working appliance. There is a behavioral phenomenon known as the "endowment bias"; we hang on to things we would not choose to buy if given the option again; I may know my old heater is costly to run, but I do not want to part with it while it's in working order. Jenna Wood, I am sure, has some stories to tell in this regard.

For most energy choices the calculations are more difficult than choosing a lightbulb or a room heater. A rigorous process is life cycle costing, which requires not only knowledge of consumption and prices, but also familiarity with reasonably advanced (Year 12) math and the concept of discounted cash flow analysis. For purchases such as solar hot water and photovoltaic systems it requires knowledge of energy credit schemes, local insolation, and of State and Commonwealth subsidies.

It is hardly surprising, therefore, that few consumers undertake these calculations.

A good deal if you have an idle $20K

In fact, in most decisions involving present outlays and deferred benefits, the present dominates our thinking. Of course it is quite rational to discount future benefits in such decisions. If I am considering making an outlay of, say, $20 000 on a photovoltaic system which will save me $800 a year in electricity bills (an after tax inflation-indexed return of 4.0 percent), I will look around and ask what other investments may make a higher return. Economists refer to the "opportunity cost of finance" or to the "personal discount rate", being the percentage by which we "discount" future benefits. But when economists analyze our decisions, they find we use extremely high personal discount rates, and opt heavily for present savings over future benefits. We reveal biassed decision-making behavior which can be described as "myopia" or "frailty of will".[8] We tend to consider the outlay today, not the stream of outlays into the future.

When the ABS surveyed the considerations people took into account in installing a heater, the initial price was a more important factor than saving on energy bills. For all other appliances initial price was the most important consideration, ranging from 35 percent for washing machines up to 44 percent for clothes dryers – one of the more energy-hungry appliances.[9]

We may be tempted to believe that such short-sighted behavior is confined to the poor or the uneducated, but behavioral research suggests that education and income are poor indicators of our tendency to impulsive or myopic decision-making. The poor and the well-off tend to make the same errors, but for the well-off the consequences are less severe, for they generally have the resources to cope with their mistakes.

What others at this seminar will point out is that, besides these biases which we all share, the poor have other constraints which force them into sub-optimal decisions. Someone with cash to invest may be very attracted to an investment in photovoltaic power with a return of 4.0 percent: it is certainly better than most other investments made in recent times. But someone using credit cards to extend their finances has an opportunity cost of finance of 15 to 20 percent. An investment in anything with a lower yield would be financially dumb.

More basically if one lives in rented housing, there is little choice to be exercised. Choices such as the type of insulation, window treatments, water heating and room heating, are

generally made by the owners, who know that they are unlikely to suffer a lower market rent if they fail to make energy-wise investments. Even public housing authorities can be poor landlords in this regard. The South Australian study found that both private owners and the State Housing Trust provided housing which saddled renters with unnecessarily high energy costs. Poor building design and inadequate insulation were particularly common problems mentioned in the study.[10]

People are in a particularly difficult situation when rental markets are tight, a point Deb Pippen will undoubtedly cover. Others have pointed out that energy-saving features in appliances often command a high premium, or are available only on the most expensive brands. And, as Maree O'Halloran said to me "It's hard to save the planet when you're desperate".

The ACT feed-in tariff

In February 2009 the ACT Government announced a feed in tariff for small domestic photovoltaic systems (up to 10 KW). They will be paid 50.05 cents per KWH generated, on a gross basis (i.e. even if the power is used in the house rather than put into the grid).

This is a strong incentive; it gives investors returns of around 10 percent a year.

But it is to be financed by raising the price of electricity paid by other users. That means the benefits are not available to renters or to those without a spare $20 000 to invest, and, worse, as more people take up photovoltaic systems, the price paid by others will rise.

Environmentally it is good policy, but it fails on any reasonable set of equity criteria.

It is hard to know how such poor design arises. It may result from the decision-making processes in government, which have different and isolated agencies considering different policies – environmental and social welfare policies in this case – rather than close policy integration.

What works

This all sounds rather dismal. We may be heading towards a society in which the well-off, with their hybrid cars, short bicycle commutes to their CBD jobs, solar hot water, double glazed windows and (subsidised) photovoltaic self-sufficiency, will be able to look down on the less fortunate whom they charge with environmental irresponsibility, even while they pay for the environmental choices of the well-off.

But it need not be so dismal. Governments can, and do, intervene when private markets fail. There is a hierarchy of measures which can be deployed, ranging from moral suasion through information provision up to prescription with penalties.

Moral suasion through messages such as "think globally, act locally" have a certain appeal, but, on their own, they are likely to be ineffective, for, in the absence of other incentives, one person's responsible action can make room for someone else to act irresponsibility. This is most vividly illustrated in the case of use of public transport: if you decide, in order to save the planet, that you will leave your car at home and use the bus, you will have made the road a little less congested for me to use my car, and I probably won't even send you a thank-you note. Similarly if you choose to pay a premium to use "green energy", you free up a little demand on the coal-based generators and in so doing reduce its price a little. (This is one of the criticisms of a "cap-and-trade" system, for until such a system is reset with a new cap, it simply re-distributes sources of pollution.)

What behavioral research suggests, however, is that establishment of norms of behavior may be more effective than mere moral exhortation in eliciting compliance. This may appear at first sight, to be another way of packaging moral suasion, but there is a difference in the messages "go out and be the pioneer in saving the planet; others may follow" and "do it because everyone else is doing it". Unless I place a high value on martyrdom, I don't want to be the one who makes sacrifices so others can harvest the rewards from my efforts. But, conversely, if everyone else is acting responsibly, or even if I merely *believe* everyone else is behaving responsibly, I may feel uneasy about free riding on their contributions.

To illustrate the power of norms, one example is the six cylinder "family car", which has a legacy going back to the 1940s. In spite of its high running costs, it's proving to be an enduring tradition, perhaps only now being weakened. We may see such resilience as a problem, but once a new norm is established it develops its own inertia and resilience, becoming an asset. Our success in AIDS campaigns is a case in successful behavioral change, and Alison Peters, I believe, will refer to work by the Cancer Council in changing smoking habits.

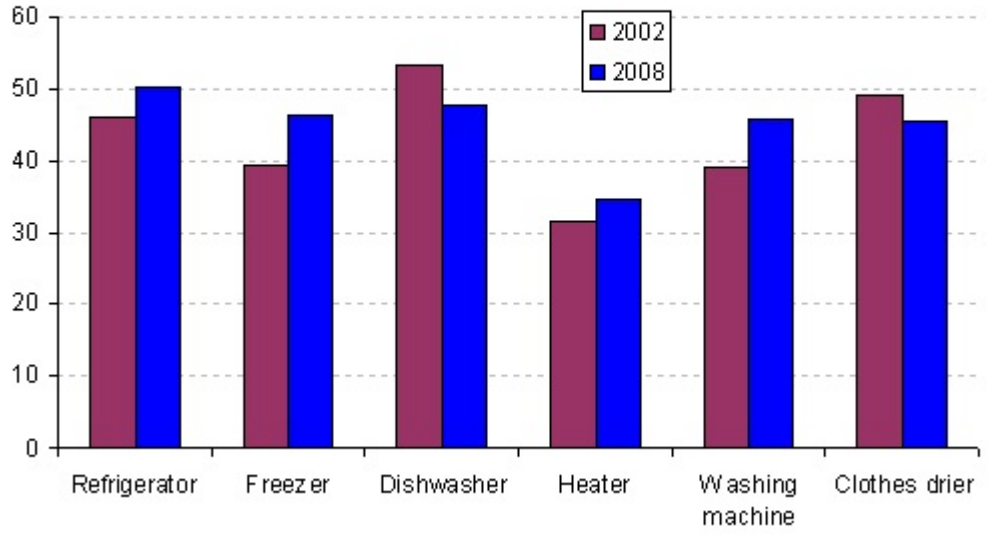
One way norms can be established is through use of defaults. International studies of organ donation provide an example. Countries with assumed consent for organ donation, where everyone is assumed to be a donor but can opt out, have much higher rates of organ donation than similar countries with "opt in" provisions, where one has to make a definite election to donate organs. Consent rates in Denmark, Netherlands, UK and Germany, all "opt in" countries, are all below 30 percent, while in Austria, Belgium, France and Hungary, which have "opt in" systems consent rates are all above 90 percent.[11]

Such policy instruments which direct but do not constrain choice are known as "soft paternalism".[12] When the decision-maker is presented with options, a default (such as donating organs) has two effects. First, it aligns with our tendency to procrastinate; that is, not to make a decision unless we have to. Second, it implies a norm of behavior – "In general, everyone donates organs, but you can choose to opt out." It would be simple, for example, to have green energy as a default for new electricity consumers, with an "opt out" provision to preserve consumer choice. (Presumably, green energy will become relatively more attractive if Australia has an effective emissions trading scheme.)

Information provision is another area where governments can intervene lightly. As illustrated, it is difficult for consumers to make decisions on energy matters. But they do seem to be willing to be guided by trusted parties. For example, even if people cannot make energy calculations for themselves, many do take the energy star rating into account when buying appliances. For up to 50 percent of appliance purchases, consumers consider energy star ratings, and for most appliances that proportion has been growing. (See Figure 3.) It is surprising, however, that energy star ratings do not feature so strongly for heaters, which are the most power-hungry of appliances.

Energy star ratings have the advantage of being inescapable; they are displayed prominently on appliances. Other trusted sources, but which require some effort to find, include consumer organizations, such as Choice (which has an energy comparison and switching website)[13], and state and Commonwealth websites, but we can be reasonably assured that because of limited access to computers and language difficulties, many low income consumers will not be making full use of these sources.

Figure 3. Percentage of buyers nominating energy star rating as a factor considered in purchasing appliances



One message from behavioral economics is that when people are being persuaded to change their behavior or to absorb information which will influence their choice, they are more likely to respond to options which are presented in concrete rather than abstract terms.[14] A message such as "check your front door for drafts" is more likely to promote action than one such as "make sure your house is well sealed".

While persuasion and information provision have their roles, governments can go further on the consumer or demand side of markets, particularly for low-income consumers. They can develop schemes to buy back old and energy-inefficient appliances and to provide vouchers for new appliances meeting certain standards. They can prohibit the sale of some energy-inefficient appliances and devices, as is occurring with lightbulbs. (The very fact that the government has to mandate the abandonment of incandescent bulbs shows how difficult it is for consumers to make a rational choice.)

The Commonwealth's announcement that it will subsidize household insulation may be criticized on the basis that installing insulation, because of its high return, is a no-brainer, but up to 40 percent of our houses are uninsulated. The benefit of the initiative is that not only will there be an improvement in energy efficiency, but also that it carries a strong message, that insulating one's house is the universal practice.

But perhaps the most effective interventions are to be found on the supply side, where governments have tended to rely too heavily on the operation of the "invisible hand" of competition.

Supplier behavior

In 1970 Nobel-Prize winning economist George Akerlof wrote what has become a seminal essay, "The market for lemons: Quality uncertainty and the market mechanism".[15] This essay establishes that in markets where buyers cannot establish the quality of a product, sellers cannot establish a premium for quality. Therefore price and quality fall to the lowest level that will sustain a market. The clearest application is in the used car market (from where Akerlof drew the word "lemons") because it's hard for a seller to establish in the buyer's mind the quality of a used car. There is a credibility problem.

In order to overcome this limitation, governments have established mandatory guarantees, which not only protect consumers, but they protect sellers of quality used cars who can convey their credibility through use of the warranty. It's an intervention which works in the interest of all but the least ethical suppliers.

For attributes such as energy efficiency, the market failure in the rental sector is similar. An easy approach, used in some jurisdictions, is to require property owners to provide a star rating, but desperate renters may not take heed of such information. A stronger approach is to mandate certain standards, which is already done for new properties, but is not done for older properties. Rather than waiting for old stock to be replaced, there could be a requirement for properties to be brought up to standard, say, within 30 years of their construction, which is around the time owners undertake a complete renovation. Owners of rented property could be required to install solar water heaters and photovoltaic systems or face a penalty (in the form of a tax or a requirement to buy carbon credits).

There is still the problem of poor landlords/poor tenants, which has been a US phenomenon for many years, and could well emerge in Australia; if it does, other measures may be needed.

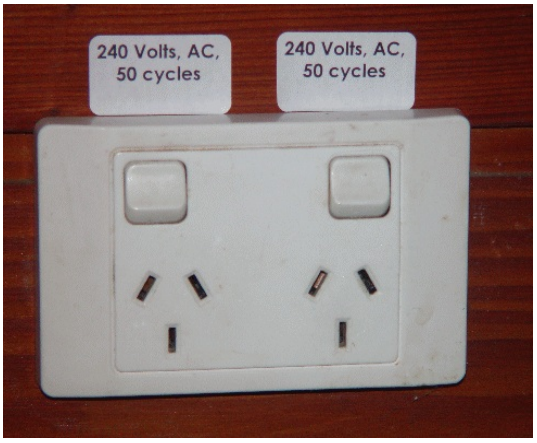
Most intervention, however, has to be directed at the utilities themselves. Utilities have been subject to privatization, corporatization, and structural separation into generating, transmitting, distributing and retailing components.

It has never been clear what public interest these "reforms" were supposed to serve, for they have added massively to transaction costs, and when the utilities have been privatized they have had to bear a higher cost of capital, for governments have always been able gain access to finance at a lower price than private investors. Politically there is no evidence we ever sought these "reforms"; there was no public pressure as there had been for shopping hour deregulation or tariff reductions. Rather, in an act of extraordinary paternalism, these changes were imposed on us, on the basis that they were inevitable and beyond question.

Admittedly many of the utilities were overstaffed and under-capitalized, but governments made no serious attempt to address these deficiencies directly. Rather, in a faith akin to religious fundamentalism, there has been a belief that the market alone, with just a little regulation, would bring a cornucopia of economic benefits. We have learned the consequences of this faith in the realm of financial markets, but we are still to learn it in the case of utilities.

As a result of the introduction of retail contestability, consumers have been left with a bewildering array of "choice", for what is a standard, fungible commodity. This choice is not

only between "suppliers" (a misleading term in itself, for all supply the one product; the "suppliers" are only billing agencies), but also between the "plans" offered by suppliers.



Choice without variety

In most markets consumers enjoy choice in the forms of lower prices, variety, and innovation. In electricity, however, variety and product innovation are not only irrelevant; they are also undesirable. Any departure from the "vanilla" supply of 240 volts at 50 cycles is undesirable. There is little scope for process innovation, for electricity is a very mature product; there are no great technological breakthroughs on the horizon. That leaves price as the only feature on which utilities can compete, but as any marketing expert knows, firms will do anything to avoid price competition. One way is through presenting complex tariff structures, often with bundles of other distantly-related services.

Professor Joshua Gans of the Melbourne Business School has borrowed the term "confusopoly" from the cartoonist Scott Adams to describe this practice. The definition is "a group of companies with similar products who intentionally confuse customers instead of competing on price".[16]

In 2005 Catherine Waddams of the University of East Anglia and a member of the UK Competition Commission, presented to the OECD a paper showing how low income UK consumers coped with switching opportunities. That research revealed that most consumers did not switch even though there were considerable possible benefits from doing so; some switched to a more expensive supplier and very few switched to the cheapest available. Some specific findings were that:

- 32 percent of switching consumers changed to an plan charging *more* than the firm they were switching from, creating an average annual loss of £16.53 per household;
- while the average maximum gain available was £53.91 (switching to the best available plan), the annual average gain was only £12.55;
- only seven percent of consumers achieved the maximum saving from their switch of electricity supplier;
- the decision to switch (once the consumer was aware of the ability to switch) was not responsive to the maximum savings available. It also appeared unresponsive to the number of competitors. However, an increase in the number of firms *reduced* the gains made by switching consumers relative to the maximum available.

This last finding seems counter-intuitive – surely the more firms and the more products competing for consumers' attention the better – but it aligns with the findings of behavioral economics. Past a point, the more choice is offered, the less likely is a consumer to make any choice. This has been demonstrated in products ranging from varieties of jam through to pension products.[17]

Waddams concluded that switching mistakes by consumers are caused by complexity rather than by factors explained by conventional theories of rational decision-making.[18]

While this research was done in the UK, a country with many cultural differences from our own, it is a warning that reliance on consumers exercising their market power by switching between suppliers does not necessarily produce the competitive results modelled in the textbooks – a point I am sure Allan Asher, with his first-hand experience of the UK market and of this study, will take up.

What is particularly revealing about Waddams' research is that it relates to a capital-intensive industry where overall profits are kept to a reasonably competitive level by a combination of specific regulation and competitive market forces. In aggregate, the utilities are unlikely to be extracting monopoly profits from consumers. That means that one consumer's gain in switching to a lower tariff almost certainly has to be offset by reducing the gains available to other consumers. In other words, there are cross-subsidies to the benefit of savvy consumers who switch to cheaper tariffs, paid for by others who do not switch or who switch to more expensive tariffs.

Competition authorities tend to see switching as an unmitigated benefit, but a market with high switching may simply one in which there is a rotating re-distribution of costs and benefits between different consumers, all imposing high transaction costs on one another. For any individual the advice to switch to a better tariff is useful, but this outcome cannot be scaled up. It's an example of what economists know as the *fallacy of composition*, or, more colloquially, "good for one, dumb for all"..

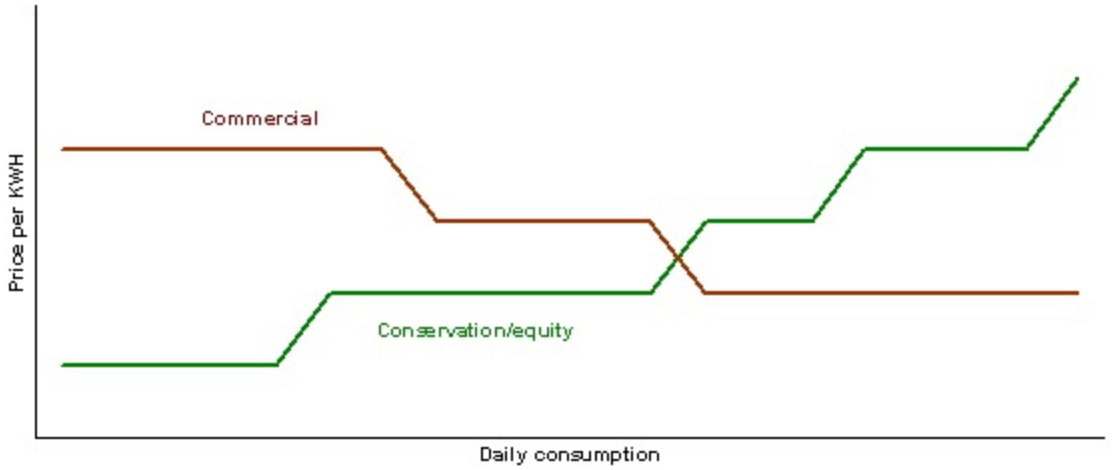
While some of those savvy consumers who switch to cheaper plans may be in low-income households – pensioners with spreadsheets – it is probable that those who get most benefit from switching will be in higher income groups. (In conformation of the UK findings, the South Australian study found that the low-income people surveyed were generally unaware of the gains to be made from switching.)

If we are to persist with the absurdity of electricity privatization and structural separation, then the least that can be done by government regulators is to require utilities to restrict their offerings to simply structured tariffs, and presenting consumers with models for "typical" households.

But perhaps the greatest problem with privatization and corporatization is the set of incentives in setting tariff structures. The tariffs that an authority concerned with energy conservation and distributive justice, and an authority concerned with profit maximization, are radically different.

A commercial entity has a strong incentive to charge more for those services where demand is unresponsive to price (price inelastic) and less for those services where demand is price-responsive (price elastic). In electricity, the basic connection (usually called a "supply charge") is a "must have". So too are the first seven or ten KWH a day, used for lighting and refrigeration. But for heating applications, gas is a competitor, and solar water heating is a contender for water heating (low off-peak tariffs reflect not only cheaper supply, but also greater competition from gas and solar). For high users, it makes commercial sense for a provider to reduce price so as to maximize consumption, provided at least marginal cost is covered. (Obviously the commercial suppliers have to beware of high peak loads, when

Figure 4. Tariffs compared



marginal costs rise steeply, but they will want to encourage high off-peak usage.) Hence, it is probable that under a commercially structured tariff, consumers will pay less per KWH to heat a swimming pool than to run the refrigerator or the lights over children's desks.

A tariff structure concerned with conservation and equity would be almost a mirror-image of a commercial structure (See Figure 4.). It would charge lightly for the basic supply and initial units, possibly recouping some of the cost from general revenue. And it would charge heavily for more discretionary consumption. Such a tariff would need to be mandated, or built into the charter of a publicly-owned utility, and there would have to be a similar treatment for gas (but with more leniency to encourage substitution to the lower carbon source).

In Australia we have moved from retail price regulation to one where there is "retail contestability" through choice of "supplier".[19] Price regulation is maintained only for what can be considered to be the natural monopoly aspects of electricity. Most "suppliers" do offer stepped-up tariffs, with the steps applying from around 10 to 20 KWH daily consumption (probably well above what would be considered as essential consumption). In Sydney the step is generally steep, in the order of 50 to 70 percent, while in Melbourne the step is more modest, in the order of 10 percent. In some other markets "suppliers" offer no steps, and in Hobart for example, there is on offer a stepped-down tariff. In a short research of websites I could find no examples of higher steps for very high electricity users. Industry representatives defend de-regulation vigorously, but seldom acknowledge the conflicts between commercial and environmental incentives.

Some economists may suggest that mandated tariff structures distort resource allocation. For those "must have" (inelastic) services, however, there would be no change in resource allocation. In fact, provided we could find the revenue from our taxes, we could provide all households with a free connection and the first few KWH free, with no departure from what would occur in an unregulated market. In fact, the "suppliers" would have the benefit of fewer bad debts and of not having the unpleasant task of disconnecting people's electricity. Disconnection imposes high costs on those least able to bear it – financial costs associated with re-connection, spoilage of food, discomfort and a loss of hygiene, and a loss of dignity. And it imposes transaction costs on the "suppliers".[20]

A mandated tariff structure designed to meet conservation and equity objectives, with or without a free base component, would produce a different resource allocation from one which is left to market forces, but that is the very point of a conservation-oriented tariff. Also, such a tariff would also go some way to discouraging peak usage, in a much more simple way than peak pricing, which would work only with a radical change in electricity metering.

Another option to governments is to require suppliers to apply quantitative consumption limits, so that once a household exceeds a certain current, a circuit breaker trips (with appropriate warning). Clearly such limits would have to take into account household size and the type of fuel dependence. The inconvenience caused would be minor compared with the inconvenience of sudden and unannounced blackouts (now euphemistically called "load shedding") which are becoming common on hot afternoons. Such limits, too, would go some way to reducing the requirement for investment in and use of peak power, for peak power is costly on the community. The capacity to provide peak power has to be paid for by all consumers, and, environmentally, the last few GW of power are generally provided by the oldest, least efficient and dirtiest power stations, incurring high carbon credit costs.

Issues surrounding peak power are undoubtedly contentious. On one hand there are people with environmental concerns and a strong belief in market solutions who believe that smart metering will allow consumers to respond to instantaneous price signals if "suppliers" are allowed to vary tariffs over the dynamic course of a day's demand (and the dynamic load on the system). On the other hand there are those who fear that inattentive consumers, and those who have no discretion in their use, could face horrendous charges, because some peak prices can be extremely high, not just because of the cost of carbon credits, but also because a market at capacity is a market in which suppliers have a lot of pricing power. Some even go so far as to oppose modernization of meters.

It's an unfortunate conflict, for it obscures many innovative solutions which are technically feasible provided there is enough leadership and appropriate regulation from governments. For example, peak tariffs, rather than being spread across all users, could be applied only to very high users, with the first X KWH subject to "normal" tariffs. There are exciting energy-saving technologies involving smart appliances talking to smart meters. And even within a market system, peak tariffs can be regulated, for, by very definition, when the marginal supplier is in an effective monopoly position, the market has failed.

Of course any interventions as mentioned above would be resisted by the industry, but our governments have been extraordinarily generous to this industry; it has become accustomed to an easy time. For example, where natural monopoly aspects have been subject to control, governments have allowed a very high return on assets, through a weighted average cost of capital (WACC) formula which is biassed towards very high returns. It gives the industry an inflation-indexed return of around nine percent. Part of the justification is a technical one, for the WACC formula includes a premium for risk, but this is an industry with very low risk, even in these troubled times.[21] In those areas where there is not a natural monopoly, particularly retail "supply", governments have allowed the firms to bamboozle consumers with choice overload for some, and to rely on consumers' disinclination to spend their precious free time browsing websites to find the best out of constantly-changing plans on offer.

Conclusion – "We're all in this together"

Governments have been overly confident in the power of passive market mechanisms, particularly pricing, to help consumers adapt to the higher energy costs which will result from a CPRS. In particular, they have not taken into account the behavioral biases which get in the way of wise decision-making, and they have not considered the constraints of people who, through lack of financial resources, or through other situations (such as renters), have little discretion in their decision-making.

This means that, without more market intervention, a CPRS may be less equitable than it could be. In looking at government policies I have wondered why equity has tended to be neglected, or tacked on as an afterthought. Perhaps it has to do with the set of administrative "reforms" embraced by governments around 30 years ago, in which each agency tends to look after its own portfolio, and where policy coordination takes place only at cabinet level. (The procedure before these "reforms" was for far more design integration before proposals made it to cabinet.) Also, from my experience with public service departments, I find that there has been a loss of analytical skills in the public service.[22] This is particularly so in some of the welfare-oriented departments.

This adversarial method of policy-making is costly, and is leading to poor outcomes.

Once when I was visiting the Netherlands I asked a Dutch academic a rather dumb question. I asked why I had found the Dutch – old and young, rich and poor, left and right – to be so environmentally conscious. She pointed out her window to the flat landscape, and reminded me of the nation's relation to sea level, and of the climate change predictions. "We are all in this together", she said.

Such a consciousness has not yet reached our shores. We still see the task of coping with climate change in terms of conflicting interests. We seek excuses for doing nothing, or for confining our activities to token efforts, which make few demands on us and do not conflict with established beliefs, particularly our belief in letting unfettered markets allocate our scarce resources.

Helping those who are disadvantaged or vulnerable adjust to climate change will be costly if it is to be effective, and that cost should be borne by those who are more fortunate. Such a redistribution is not because of some socialist or equalitarian zeal (though some may see it in such a way). Rather, it is because we're all in it together.

Notes

1. Western Region Energy Action Group *Powering Poverty: A report on the impact of the 2002-2003 electricity price rises on 12 low-income households in South Australia*.

2. These figures are from George Wilkenfeld and Associates *Household Energy Use in Australia*, for the Appliance Energy Labelling Review Committee, March 1998.

3. Australian Greenhouse Office "End Use Allocation of Emissions" 2002.

4. ABS *Environmental Issues: Energy Use and Conservation* Cat 4602.0.55.001 November 2008.

5. Australian Greenhouse Office 2002 op. cit.

6. Australian Treasury Australia's low pollution future http://www.treasury.gov.au/lowpollutionfuture/

7. Commonwealth Treasury "The Carbon Pollution Reduction Scheme and You" 2008.

8. In the field of behavioral economics there is a large amount of published research on this phenomenon, generally under the heading of "hyperbolic discounting". For a rigorous approach, see David Laibson ""Golden eggs and hyperbolic discounting" *Quarterly Journal of Economics*, May 1997.

9. ABS Cat 4602.0.55.001 *op. cit.*

10. Western Region Energy Action Group *op. cit.*

11. Alberto Abadie and Sebastien Gay. "The Impact of Presumed Consent Legislation on Cadaveric Organ Donation: A Cross Country Study" Kennedy School of Government Faculty Research Working Paper Series RWP04-024, June 2004.

12. Colin Camerer, Samuel Issacharoff, George Loewenstein, Ted O'Donoghue, and Matthew Rabin "Regulation for conservatives: Behavioral economics and the case for 'asymmetric paternalism'" *University of Pennsylvania Law Review* (Vol 151, pp 1211 - 1254, 2003).

13. www.choiceswitch.com.au

14. Sean McCrea, Nira Liberman, Yaacov Trope, and Steven J. Sherman "Construal level and procrastination" *Psychological Science*, 19, 2008.

15. George Akerlof "The market for lemons: Quality uncertainty and the market mechanism" *Quarterly Journal of Economics*, Vol 3, 1970.

16. See Joshua Gans' web page www.mbs.edu/home/jgans/papers for his presentation "The road to confusopoly" .

17. See Sheena Iyengar and Mark Lepper "When Choice is Demotivating: Can one desire too much of a good thing" *Journal of Psychology and Social Psychology* Vol 79 No 6, 2000, and Sheena Iyengar, Wei Jiang and Gur Huberman "How Much Choice is Too Much?: Contributions to 401(k) Retirement Plans" Pension Research Council Working Paper, The Wharton School, University of Pennsylvania 2003.

18. A summary of this research is in the *OECD Roundtable on Demand-Side Economics for Consumer Policy: Summary Report*. OECD 2006.

19. Australian Treasury "Price Regulation of Utilities".

20. See, for example "Cutoff II: The experience of utility disconnections Final Report" Prepared by Urbis for the Energy and Water Consumers' Advocacy Program, Public Interest Advocacy Centre, January 2009.

21. See the reales of the Australian Energy Regulator www.aer.gov.au . The standard WACC formula is influenced by a figure called a "beta", which is a measure of volatility of returns in a market. In the WACC methodology, volatility is assumed to indicate risk, but that is a generous assumption.

22. A point reinforced, with evidence, by Gary Banks, Chairman of the Productivity Commission, in an address "Evidence-based policy-making: What is it? How do we get it?", 4 February 2009. See the PC website www.pc.gov.au