Economics &
Markets Research

ANZ industry update: potential costs of emissions trading

How much will emissions trading cost? Who will pay and who will gain?

06 August 2008

Author:

Julie Toth
Senior Economist,
Industry and Strategic Research
+61 3 9273 6252
Julie.Toth@anz.com

For information about ANZ's emissions markets products and services, please call:

Astarini Suyono,
Electricity and Emissions Sales,
+61 3 9095 0014

Lloyd Fleming,
Corporate Sustainability,
+61 3 9273 3217

Our Vision:

For Economics & Markets Research to be the most respected, sought-after and commercially valued source of economics and markets research and information on Australia, New Zealand, the Pacific and Asia.

Key points

- The Garnaut Review Draft Report and the Government's Green Paper have set out options for a Carbon Pollution Reduction Scheme (CPRS) for Australia, as part of the Government's response to climate change. Release of Treasury's modelling of the likely costs and benefits of the CPRS has been delayed till October (see timetable below).
- Only around 1,000 large companies are expected to participate directly in the CPRS. All other businesses (and households) will be affected through input price rises, especially for electricity and energy fuels.
- The potential revenue to be raised though the CPRS will be large. Even a modest starting price of $20/t implies an annual bill of up to $8.9bn.
- The total amount due will depend on the number and price of permits to be sold and the number to be allocated for free. The Green Paper suggests up to 20% of permits will be initially issued free of charge to emission-intensive, trade-exposed (EITE) companies.
- Like other taxes and excises, the CPRS revenue will not be a dead loss. All of it will be redistributed through assistance and compensation to businesses and households. Many new business opportunities will also emerge, as further details of the system are bedded down.
- Based on the limited data currently available, the initial price effect will be strong enough to raise inflation by at least 0.9% when trading commences, mainly through higher power prices (up 16%). This price effect is deliberate. It is intended to change our emissions behaviour.
- With the CPRS due to commence in less than 18 months, business now needs more detailed information for investment and planning purposes.

Emissions trading development timetable

When ?	What ?	Who ?
Late Aug 2008	Garnaut Climate Change Review Supplementary Report released	Garnaut Review
10 Sept 2008	Submissions on Green Paper due	Dept of Climate Change
30 Sept 2008	Garnaut Climate Change Review Final Report released to public	Garnaut Review
Oct 2008	Economic modelling results released	Treasury
Dec 2008	White Paper and draft legislation	Fed Government
Early 2009	Consultations on the White Paper	Fed Government
Mid 2009	Bill debated & passed by Parliament	Fed Government
1 July 2009	Second stage of GHG mandatory reporting commences	Approx. 500 large GHG emitters
Mid 2009	Consultation and drafting of ETS technical regulations to support Act	Dept of Climate Change
Late 2009	ETS Act, regulations and statutory regulatory body commence	Fed Government
1 July 2010	Third stage of GHG mandatory reporting commences	Approx. 700 large GHG emitters
2010	ETS formally commences trading	Approx. 1,000 large GHG emitters

Sources: Dept of Climate Change; Garnaut Review; Office of Senator Penny Wong.

Potential revenue to be raised by the CPRS

Annual emissions targets will be set so as to meet the long-range target of 60% of 2000 emissions levels by 2050.

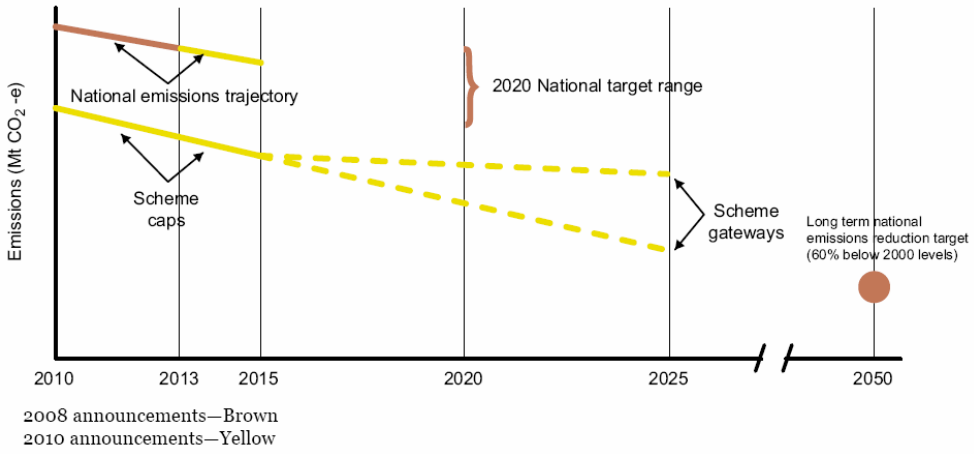
Beyond that long-range target, the government has not yet announced:

- **the number of permits to be sold each year (the 'annual emissions cap' and the 'trajectory')**
- **a starting price for the permits**
- **the maximum price for the permits (the 'price cap')**
- **the likely size of fines and penalties if companies emit more CO_2-e than their permits allow.**

The annual revenue to be raised by the CPRS will depend on the number of permits to be issued and the price the Government will charge for them.

The number of annual permits issued (the 'emissions cap') will reduce over time, along a defined 'trajectory', in order to meet national emissions targets. The annual caps have not yet been announced, beyond the general statement that they will be set so as to meet the Government's long-term national emissions reduction target of 60% below 2000 emissions levels by 2050 (as indicated by the upper brown line and large dot in the graph below). The Green Paper emphasises that although a range of measures will be employed to meet the national target, it "will be achieved primarily" through the CPRS. The Government will review and announce the annual CPRS caps for each five year period well in advance, so as to ensure market certainty. Given the central role of the CPRS in achieving the national target, it is probably not unreasonable to assume that the end-point emissions cap for the scheme will be 60% of 2000's emissions from the relevant emissions sources and industries. This would imply that emissions from sources not covered by the CPRS (namely agriculture and land-use change) would also need to be cut by 60% through some other means.

Indicative CPRS emissions caps and national emissions trajectories



Source: Green Paper, p. 191.

$20 per tonne has become the indicative starting price for discussion purposes.

The Government might also set a higher maximum price cap, for at least the first five years of the CPRS.

The other major piece of missing information is the initial **price of the permits**. Over time, the starting price will become less relevant as the scheme moves toward a system of auctioning all permits rather than issuing them at a set price or even for free. In the meantime, following the example of the Green Paper, $20 per tonne of CO_2-e has quickly become the indicative or default price for the purposes of discussion and debate.

The Government has also indicated a preference for a **fixed price cap**, for at least the first 5 years of the scheme, so as to enhance market certainty. This price cap "would be set high enough above the expected permit price to ensure a very low probability of use" (Green Paper, p. 165). In practice then, it will be the starting price for the permits that will matter the most.

A price of $20 per tonne for CO_2-e permits implies a total CPRS bill of up to $8.9 bn per year.

In the absence of better pricing information, **$20 per tonne** is as good a starting point as any for some rough calculations of the total annual revenue likely to be raised by the CPRS (see table below). At $20/t for example, it would have cost the covered industries a massive $8.9 bn to buy enough permits for all of their estimated 446 Mt of CO_2-e in 2006. Even if they were emitting CO_2-e at only 2000 levels, it still would have cost $8 bn for their 400 Mt of CO_2-e. To put these very large sums into context, **$8.9 bn** is equivalent to:

- 0.8% of annual GDP ($1,022 bn in 2007) or
- 75% of national annual expenditure on utilities ($11.9 bn in 2007) or
- 27% of national expenditure on the operation of vehicles ($32.8 bn in 2007).

Around 20% of the initial allocation of permits are likely to be issued to EITE companies for free.

These calculations should be regarded as a **maximum estimate** of potential CPRS (even an over-estimate), since they do not take into account any free or discounted permits, nor the possibility that not all of the permits will be required every year (e.g. in the happy event that actual industry emissions end up being lower than the maximum emissions permitted). The Green Paper estimates that in the first years, up to 20% of permits will be issued free of charge to EITE companies. If agriculture joins the scheme in 2015, it too might initially receive permits for free, taking the total allocations of free permits to around 30%.

Working from first principles, as the number of permits available each year reduces, the market price will logically increase. Depending on the interaction between the number of permits and their price, this will probably see the total annual revenue raised by the scheme increase over time. Some possible volume and value combinations are illustrated in the table below.

On the other hand, regulatory design flaws (such as too many free permits) and/or unforeseen market factors could cause the carbon price to fall over time, as happened in the early years of CO_2-e trading in Europe. If this situation eventuates, the CPRS will have failed to meet its objective of pricing CO_2-e so as to change behaviour and reduce our total national emissions.

CPRS total revenue matrix: estimates of maximum annual cost of permits

	Annual emissions	Total annual cost of permits ($mn) at:			
Year	Million tonnes (Mt)	$20/t	$40/t	$60/t	$80/t
Actual emissions of industries covered by the CPRS (energy, transport, industry, waste)					
1990	329	6,586	13,173	19,759	26,346
2000	400	8,010	16,020	24,030	32,040
2005	440	8,804	17,608	26,412	35,216
2006	**446**	**8,919**	17,837	26,756	35,674
*Possible total emissions permitted in the CPRS (the 'trading cap trajectory')**					
2010	**400** (100% of 2000 levels)	**8,010**	16,020	24,030	32,040
2020	360 (90% of 2000 levels)	8,010	**16,020**	24,030	32,040
2030	320 (80% of 2000 levels)	7,209	14,418	**21,627**	28,836
2040	280 (70% of 2000 levels)	6,408	12,816	19,224	**25,632**
2050	**240** (60% of 2000 levels)	5,607	11,214	16,821	22,428

* estimates of maximum possible emissions trading caps, based on estimated industry emissions levels as of 2008 and the Government's stated target of reducing total national GHG emissions to 60% of 2000 levels by 2050.
Sources: Greenhouse Gas Inventory; Green Paper; ANZ Economics and Markets Research.

The CPRS will include 70% of Australian CO_2-e emissions from energy, transport, waste and industrial production.

Only companies with large emissions (over 25 kt of CO_2-e per year) will need to buy CPRS permits.

Agriculture and land use will be omitted from the first stage of the scheme.

Large forestry operators can volunteer to participate.

Distribution of potential costs

The CPRS is designed to cover around **70% of Australia's CO_2-e emissions** — a far better coverage rate than the EU scheme. Of the major sources of Australian emissions, only agriculture and land use have been omitted from the first stage of the CPRS. Agriculture may be brought into the scheme from 2015, pending review. Forestry companies will be allowed to participate on a voluntary basis. For all industries, only large emitters will need to participate (over 25kt CO_2-e per year). The 'point of obligation' (that is, which company in the supply chain will be required to buy permits) varies across the covered industries, but generally falls at the point of production of emissions. For transport fuels, CPRS permits will be bought by the wholesalers who currently pay the fuel excise. This narrow band of eligibility will help to keep CPRS participation (and hopefully total transaction and administration costs) to a minimum, given the level of coverage.

The 1,000 CPRS companies

Only 1,000 or so companies will be required to buy emissions permits.

The Government estimates only around **1,000 large corporations** and/or sites will need to purchase emissions permits and participate directly in the ETS. While individual companies have not been (and will not be) publicly identified before trading commences, the Green Paper indicates they potentially include:

- 100 electricity generation facilities
- 10 LPG producers and/or importers
- 25 natural gas producers
- 200 black coal mines, washeries, distributors and processors
- 5 brown coal mines
- 1 brown coal processor
- 200 upstream (wholesale) liquid transport fuel suppliers
- 50 wholesale gas distributors / operators of gas transmission pipelines
- 200-300 large industrial companies and / or sites, including large transport operators, steel and aluminium producers, cement manufacturers and others
- 100 large solid waste handling sites (currently active large landfills)
- 60 large wastewater treatment sites.

Electricity generators will need to buy about half the CPRS permits.

The rest will be bought by fuel wholesalers, miners, large industrials and large waste treatment sites.

These 1,000 companies will be at the front line of emissions trading and will bear all of the direct costs of the scheme. Based on their 2006 estimated emissions, the annual cost of emissions permits for each industry group might look something like the table below. These estimates imply **the annual CPRS cost for some industries and individual companies will be very large**:

- electricity generators face paying about half the total cost of the CPRS permits, worth up to $4bn per year (based on $20 / tonne);
- 200-300 industrial sites plus mines and other non-electricity generation sites that combust fuel (e.g. in their plant and equipment) will pay up to $945mn. Up to another $568mn will be payable by heavy industry for permits to cover the industrial processes that emit a range of greenhouse gasses;
- 200 transport fuel wholesalers will pay around $1.5bn for CPRS permits with the intention that this cost is then passed on to all vehicles 87% of transport emissions are from road vehicles, including 54% from passenger vehicles. The fuel excise levies on petrol and diesel will be reduced by an equivalent amount for at least 3 years and 1 year respectively;
- coal miners are looking at a collective CPRS bill of up to $318mn for the coal itself, plus another $477mn for the 'fugitive emissions' their mines emit;
- large waste handling facilities (mainly large landfill sites) and sewerage treatment plants will pay up to $332mn for their methane emissions.

The cost of the CPRS is large. So is the potential assistance.

Coal fired electricity generation will receive special assistance.

EITE companies will be allocated free permits covering up to 90% of their emissions.

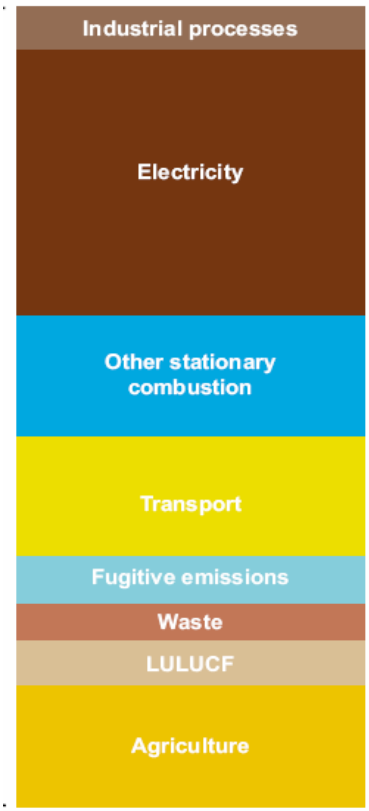
Up to 20% of the initial permit allocation is likely to be issued free of charge.

This assistance is potentially worth billions of dollars.

Many of the 1,000 directly affected companies will be **eligible for assistance**, including adjustment funding for electricity generators, with special funding programs for black and brown coal-based power generators. Among the EITE industries to be covered by the CPRS, the Green Paper nominates aluminium, lime, steel and silicon production as the most exposed EITE's, with a $20 / tonne carbon price expected to increase their costs by 10-15% (see chart of emissions intensity below). The Government proposes to allocate 90% of these industries' permits for free. In the next tier of emissions-intensity, the Green Paper nominates ceramics, alumina, oil and gas, basic chemicals, mineral products, pulp and paper and non-ferrous metals production as facing a 3-8% cost increase as a result of a $20 / tonne price on carbon. For these industries, the Green Paper proposes free permits covering 60% of their emissions. Together, the Green Paper estimates around **20% of CPRS permits will end up being allocated for free,** for at least the first few years of the scheme's operation.

The types, amounts and eligibility criteria for assistance to various industries and individual companies are yet to be announced by Government. With the legislation and regulations not yet finalised, all CPRS-related assistance will now be the subject of furious industry lobbying and probably, political compromise.

Total national emissions: only agriculture, land use and forestry (LULUCF) are not included in the CPRS.



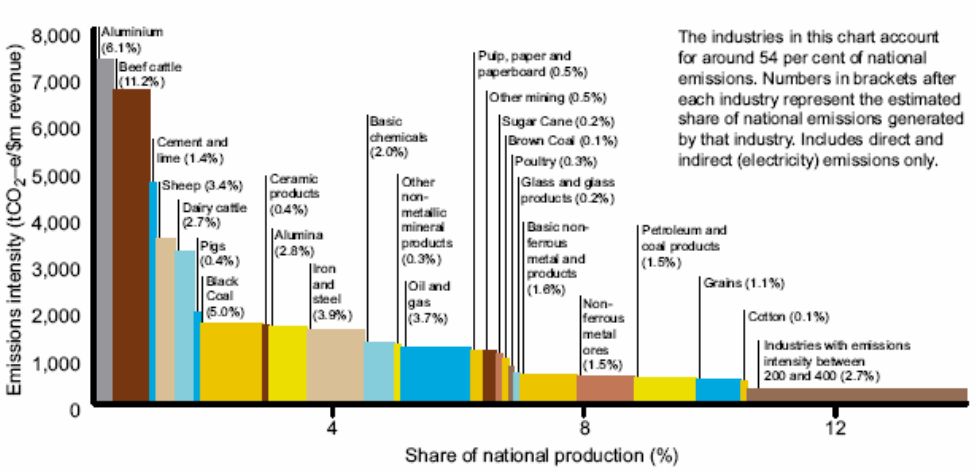
Source: Green Paper.

Indicative industry emissions and costs, based on 2006 emissions levels.

Emissions source	2006 CO_2-e (Mt)	Total cost at $20 / t ($mn)	Companies (no. & type of industry)	Free permits / assistance*
Industrial Processes	**28**	**568**	200-300 large industrial companies / sites including cement, metals, chemicals & other heavy industrial manufacturers	Free permits for energy intensive trade exposed (EITE) industries.
mineral products	6	117		
chemical industry	1	26		
metal production	11	216		
consumption of halocarbons and SF6	5	103		
other industrials	5	105		
Electricity generation	**198**	**3,962**	100 generators	$ to coal for adjustment
Petroleum refining	6	110	10 LPG producers	TBA
Solid fuels (e.g. coal)	16	318	206 coal mines	TBA
Other stationary fuel combustion by industry (mining, manufacturing, construction etc)	**47**	**945**	200-300 large industrial companies / sites	Free permits for EITE industries.
Transport	**79**	**1,582**	200 fuel wholesalers	Fuel excise reduction on petrol (3 yrs) & diesel (1 yr)
Road	69	1,378		
-- passenger cars	43	852		
Rail	2	38	Rail operators	NA
Civil aviation	6	122	Local airlines	NA
Domestic navigation	2	44	Local shipping	NA
Fuel combustion in other sectors (residential, commercial, agricultural)	19	388	NA	NA
Fugitive Emissions	**34**	**690**		
Solid Fuels (coal mining, decommissioned mines)	24	477	206 coal mines	TBA
Oil and natural gas production & distribution	11	213	25 natural gas producers & 50 gas distributors	TBA
Waste	**17**	**332**		
Solid waste disposal	13	263	100 landfills	NA
Waste-water handling	3	68	60 wastewater	NA
Land Use, Land-Use Change and Forestry	**40**	**799**		
Afforestation and reforestation	-23	-459	Voluntary for some forestry	NA
Land use change (deforestation)	63	1,259	NA	NA
Agriculture	**90**	**1,802**	NA	Fuel excise reduction
TOTAL, all sources	576	11,520	About 1,000 companies	Various
Total eligible for CPRS	**446**	**8,919**		

* Proposals for free permit allocations and/or CPRS assistance in the Green Paper.
Source: Greenhouse Gas inventory 2006; Green Paper.

Emissions intensity* of EITE industries



* Tonne of CO_2-e per $mn in revenue, 2001-02. Calculated by University of Sydney, 2008.
Source: Green Paper, p. 313.

Costs for other businesses

Retail electricity prices will rise by around 16% and gas prices by 9% in 2010.

Further energy price rises after 2010 are possible.

Among businesses that are not directly involved in CPRS trading (because their emissions are too small), the main cost of the ETS will come through **increased electricity prices**. The Green Paper estimates that retail electricity prices will initially rise by around 16% and gas prices by 9% when the scheme commences. Further electricity price rises after 2010 will depend on the price of carbon permits, the cost of adjustment and how the power companies choose to respond to their new trading environment. The other factor will be the (as yet undeclared) position of the state and territory essential service commissions, which regulate (to varying degrees) the retail price of electricity.

The CPRS will not effect petrol or diesel prices for at least 1 to 3 years.

For the first 1 to 3 years at least, the price signal the CPRS is intended to build into transport fuels will be effectively switched off, due to the Government's decision to **reduce fuel excise** on a cent for cent basis. This means that for this period, there will be no practical price effect for consumers of petrol or diesel.

The practical effect for most businesses will be higher electricity and gas prices.

The effect of the CPRS for most businesses then, will depend on the amount and intensity of their **energy consumption**. As a general rule, the industries with the highest emissions intensities (that is, CO_2-e per dollar of revenue) are either included directly in CPRS trading, or they are in agriculture and are specifically excluded until at least 2015 (see emissions intensity chart above). Some examples of industries that are *not* included directly in the CPRS and that have relatively high or low CO_2-e (i.e. energy) intensity are shown in the table below.

Emissions intensity per $mn of sales revenue, selected non-EITE industries

High intensity		Low intensity	
Industry	**CO_2-e (t) per $mn**	**Industry**	**CO_2-e (t) per $mn**
Commercial fishing	348	Financial services	1
Soap & detergents manufac.	279	Banking	2
Sawmill products	254	Ownership of dwellings	3
Textile manufacture	209	Prefab buildings	6
Knitting mills	165	Insurance	10
Electrical equipment manufac.	163	Furniture manufac.	13
Accomm., cafes & restaurants	142	Publishing & media	25
Flour mills	142	Residential buildings	33
Meat processing	132	Wholesale trade	38

Source: Green Paper, appendix D (based on 2001-02 industry input-output data).

The CPRS may seem expensive, but doing nothing about climate change would also carry an economic cost.

Potential inflationary effects of the CPRS

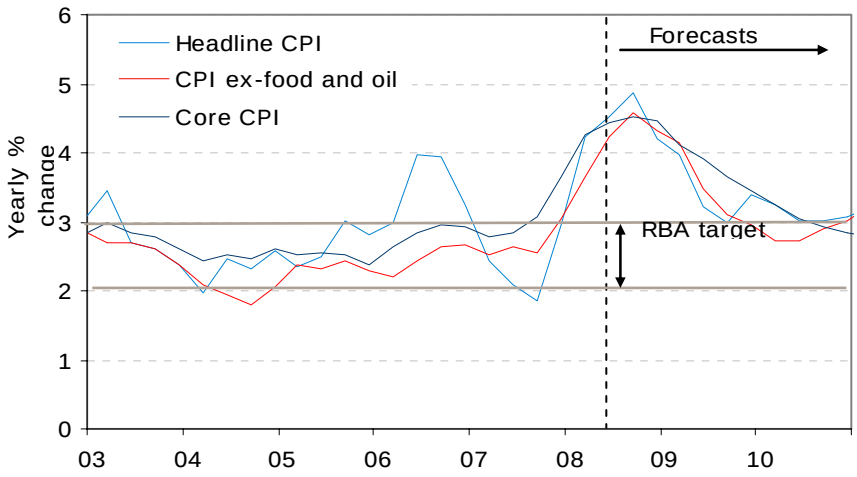
While the CPRS will have (deliberately) large costs and effects on the economy, the Garnaut Climate Change Review's draft report (July 2008) emphasised that at this point, doing nothing about climate change could be even *more* costly to the Australian economy. Garnaut estimated that by the end of this century, doing nothing about climate change would mean a minimum of:

- a reduction of 4.5% of GDP per year (from what it would have been in the absence of climate change and its mitigation costs);
- a reduction of 5.4% in household consumption; and
- a reduction of 7.8% in real wages.

The CPRS has the potential to push inflation from 3% back up to 4%, with a one-off price spike in 2010.

Preliminary modelling in the Green Paper suggests the main macroeconomic effect of the CPRS will be a **one-off inflation spike in 2010 of 0.9%.** That is, inflation will be 0.9 percentage points higher than otherwise. With inflation already forecast to be running at around 3% or more in 2010, this extra pressure will lift inflation back up to 4% in that year, well above the RBA's target range of 2-3%. Given the cause of the inflation however, the RBA is unlikely to respond to this spike, but will instead seek to 'see through' the price rise in the same manner as it did for the introduction of the GST in 2000-01.

Inflation will be around 3% in 2010. The CPRS may take it to 4%



Sources: ABS and ANZ

Retail prices for electricity will rise by 16% and gas by 9% in 2010.

Further price rises will depend on the subsequent development of (and interaction between) the national markets for CO_2-e and electricity.

Almost all of this inflation effect will come from retail price rises for utilities — 16% for electricity and an estimated 9% for gas and other household fuels in 2010 (based on $20 / tCO_2-e) — plus the flow-on effect of these on other goods and services. Further price increases might occur as the market price of CO_2-e develops over time. The extent to which these cost increases flow through to retail energy customers will depend on the electricity wholesalers and retailers and price regulators in each state (the essential services commissions or similar agency). The interaction between the CPRS and the national electricity market will be complex, with many small but significant details yet to be determined.

The risk of 'second-round' retail price increases will be present for some time after 2010.

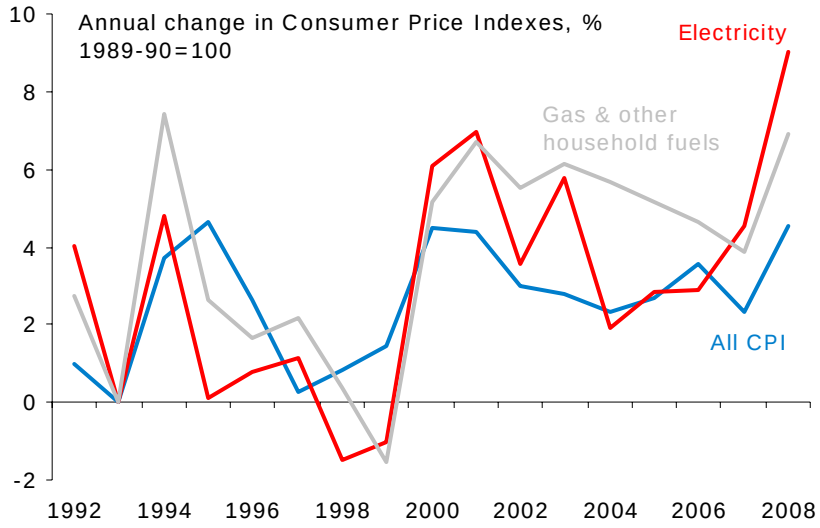
There are probably no businesses anywhere in Australia that use no electricity. And all businesses will, to some degree, need to pass this cost increase on to their customers. It is these 'second round' price rises that have the potential to bump up inflation by more than the one-off 0.9% already identified, and that the RBA and other policy-makers will be watching most intently. As with introduction of the GST in Australia and elsewhere and the introduction of the euro in the EU, there is potential for unscrupulous businesses to use this policy change as a mask to raise their prices by more than their cost increases, in order to generate a windfall profit. The ACCC will be closely watching — and responding to — such opportunistic pricing behaviour.

Electricity prices increased by 10% in the year to March 2008, due to the drought and commodity price increases.

To put these potential price rises for energy into perspective, they are of a similar magnitude to the retail energy price rises seen over the past few years due to drought and sharply escalating energy commodity prices. National average retail electricity prices have risen by more than the CPI (that is, by more than the average increases for all retail prices) in most years since 2000. In 2007, electricity prices rose by 4.5%, nearly double the headline CPI rate of 2.3%. Gas and other household fuels also rose by more than the CPI increase in 2007, up 3.8%, while water prices were up 5.5% over the year. By March 2008, electricity prices were 10% higher than a year earlier, and 16.7% higher than three years earlier. Retail gas prices increased by 14.4% over the same period. For the 2008 calendar year, we anticipate electricity prices will rise by 9%, gas by 7% and water and sewerage by 10.7% (against an all-CPI rate of 4.5%).

The CPRS will add a similar margin again to these retail energy prices in 2010. With utilities accounting for only 2% of household final consumption expenditure in 2007 (down from 2.5% three decades ago), the Green Paper estimates that in total, the CPRS-induced price increases will add only 0.8 to 1.2% to household expenses (including the flow-on price rises in other goods and services). The Government proposes to compensate low to medium income households for this cost increase, so the net effect for many households will be neutral. This should help to minimise the effect on consumer spending for small businesses.

Retail energy prices have been rising faster than all CPI since 2000



Source: ABS

Other than inflation, the CPRS should have no significant macroeconomic effects because it is in practice going to redistribute rather than remove funds from the economy. This inflation effect is difficult to avoid, since creating a strong price signal for CO_2-e is essential to the successful operation of the CPRS. Indeed, the whole point of the scheme is to change the relative prices of goods and services based on their carbon intensity, and therefore to change our consumption of carbon pollution. This can only be achieved if the price signal is strong enough.

More information on the expected macroeconomic effects of the CPRS will be available when the Treasury's modelling results are released in October. The Garnaut Review's Final Report in September will also help to shed more light. By then, the process of negotiating the details of scheme and its associated compensation and assistance packages will be well under way.

Business opportunities arising from the CPRS

With all this talk of rising costs and potential inflation effects, it is important to remember that **the CPRS will also bring significant new opportunities** to Australian businesses. And it goes without saying that if the CPRS is successful, it will also bring non-economic benefits in the form of reduced pollution and reduced severity of climate change, at least at a local if not global level.

In practice, the CPRS will mean reducing carbon-intensive goods and services in favour of less intensive ones and/or reducing their carbon-intensity, as far as technology allows. The main focus will be on **electricity generation**, but demand (and Government support) is growing for research, development and implementation of new, low-carbon technologies across the board. The business opportunities this will create include the obvious and not-so obvious:

- Research, infrastructure, engineering and construction opportunities are growing in electricity generation, as it moves from old to new technologies, initially from coal to gas and later to renewables and other formats. The industry expects large new investments will be required to keep up with the new environment. Even in the oldest and dirtiest energy technologies (brown coal), the Government's 'Clean Coal Fund' is supporting heavy R&D investment, through better processing of coal (e.g. drying brown coal), better waste filtering and eventually, through 'carbon sequestration'.
- Renewable electricity generation must be developed to a commercial scale, including solar, wind, wave, thermal and possibly other forms. McKinsey and Co recently estimated that global venture capital in solar power alone was worth US$3.2bn in 2007 and that solar power will be price competitive (without subsidies) in many parts of the world including Australia by 2020, as production costs keep coming down and competing fossil fuels keep rising.
- Despite recent adverse changes to tax rebates for home-based solar electricity generation technologies, these systems are likely to become increasingly popular as retail electricity prices continue to rise and as the production costs of home-based systems come down.
- Carbon-abatement technologies and methods will be in high demand across all heavy industries that are required to buy CO_2-e permits each year.
- The CPRS will require companies directly involved in carbon trading to have their carbon accounts audited by an authorised third party each year. This is set to create a whole new industry of environmental accounting and auditing.
- Business consulting firms the world over are creating 'climate change' and 'climate management' practices, as companies seek to understand and maximise their opportunities. Even businesses not directly involved in carbon trading are seeking to reduce their emissions and energy consumption in order to pre-empt future cost increases and for PR and marketing purposes.
- Financial trading and investment services are gearing up for active trading in CO_2-e permits and are designing and implementing the secondary financial market instruments that will be required to ensure the CO_2-e market runs smoothly. Many in this sector have gained direct experience from the EU trading system and closer to home, the NSW Carbon Abatement Scheme.

For further information on this topic, see our other publications on our website:

Business and the Carbon Pollution Reduction Scheme: 10 things you need to know, July 2008.

ANZ Industry Update: Emissions Trading, July 2008.

ANZ Industry Update: Emissions Trading, April 2008.

"Update on Australian Climate Change Policy", *ANZ Economic Outlook,* March 2008, pp. 21-24.

"The Road to an Emissions Trading System", *ANZ Australian Economics Weekly*, 8 June 2007.

ANZ Industry Report: Emissions Trading, June 2007.

"Sources of Carbon" *ANZ Australian Economics Weekly*, 23 March 2007.

"Carbon Trading", *ANZ Economic Outlook*, March 2007, pp. 21-24.

Contacts

ANZ Economics & Markets Research

Saul Eslake
Chief Economist
+61 3 9273 6251
Saul.Eslake@anz.com

Fiona Allen
Business Manager
+61 3 9273 6224
Fiona.Allen@anz.com

Tony Pearson
Deputy Chief Economist, Industry and Strategic Research
+61 3 9273 5083
Tony.Pearson@anz.com

Mark Rodrigues
Senior Economist, Industry and Strategic Research
+61 3 9273 6286
Mark.Rodrigues@anz.com

Julie Toth
Senior Economist, Industry and Strategic Research
+61 3 9273 6252
Julie.Toth@anz.com

Warren Hogan
Head of Australian Economics and Interest Rates Research
+61 2 9227 1562
Warren.Hogan@anz.com

Katie Dean
Senior Economist, Australian Economics and Interest Rates Research
+61 3 9273 1381
Katie.Dean@anz.com

Riki Polygenis
Economist, Australian Economics and Interest Rates Research
+61 3 9273 4060
Riki.Polygenis@anz.com

Dr. Alex Joiner
Economist, Australian Economics and Interest Rates Research
+61 3 9273 6123
Alex.Joiner@anz.com

Patricia Gacis
Strategist, Australian Economics and Interest Rates Research
+61 2 9227 1272
Patricia.Gacis@anz.com

Jason Hill
Credit Analyst
Jason.Hill@anz.com

Amy Auster
Head of Foreign Exchange and International Economics Research
+61 3 9273 5417
Amy.Auster@anz.com

Tony Morriss
Senior Currency Strategist, Foreign Exchange and International Economics Research
+61 2 9226 6757
Tony.Morriss@anz.com

Jasmine Robinson
Senior Economist, Foreign Exchange and International Economics Research
+61 3 9273 6289
Jasmine.Robinson@anz.com

Amber Rabinov
Economist, Foreign Exchange and International Economics Research
+61 3 9273 4853
Amber.Rabinov@anz.com

Mark Pervan
Head of Commodities Research
+61 3 9273 3716
Mark.Pervan@anz.com

Amber Rabinov
Economist, Commodities Research
+61 3 9273 4853
Amber.Rabinov@anz.com

Paul Braddick
Head of Property and Financial System Research
+61 3 9273 5987
Paul.Braddick@anz.com

Ange Montalti
Senior Economist, Property and Financial System Research
+61 3 9273 6288
Ange.Montalti@anz.com

Dr. Alex Joiner
Economist, Property and Financial System Research
+61 3 9273 6123
Alex.Joiner@anz.com

Stephanie Wayne
Research Analyst, Property and Financial System Research
+61 3 9273 4075
Stephanie.Wayne@anz.com

Paul Gruenwald
Head of Economics, Asia
+65 6419 7902
Paul.Gruenwald@anz.com

Ivy Tan
Associate Director, Credit Research, Markets Asia
+65 419 7914
Ivy.Tan@anz.com

Research & Information Services

Mary Yaxley
Head of Research & Information Services
+61 3 9273 6265
Mary.Yaxley@anz.com

Marilla Rough
Senior Information Officer, R&IS
+61 3 9273 6263
Marilla.Rough@anz.com

Manesha Jayasuriya
Information Officer, R&IS
+61 3 9273 4121
Manesha.Jayasuriya@anz.com

ANZ New Zealand Research

Cameron Bagrie
Chief Economist
+64 4 802 2212
Cameron.Bagrie@anz.com

Khoon Goh
Senior Economist
+64 4 802 2357
Khoon.Goh@anznational.co.nz

Philip Borkin
Economist
+64 4 802 2199
Philip.Borkin@anznational.co.nz

Steve Edwards
Economist
+64 4 802 2217
steve.edwards@anznational.co.nz

Kevin Wilson
Rural Economist
+64 4 802 2361
TKevin.Wilson@nbnz.co.nz

Important Notice

Australia and New Zealand Banking Group Limited is represented in:

AUSTRALIA by:

Australia and New Zealand Banking Group Limited ABN 11 005 357 522

14th Floor 100 Queen Street, Melbourne, Victoria, 3000, Australia

Telephone +61 3 9273 6224 Fax +61 3 9273 5711

UNITED KINGDOM by:

Australia and New Zealand Banking Group Limited

ABN 11 005 357 522

40 Bank Street, Canary Wharf, London, E14 5EJ, United Kingdom

Telephone +44 20 3229 2121 Fax +44 20 7378 2378

UNITED STATES OF AMERICA by:

ANZ Securities, Inc. (Member of NASD and SIPC)

6th Floor 1177 Avenue of the Americas

New York, NY 10036, United States of America

Tel: +1 212 801 9160 Fax: +1 212 801 9163

NEW ZEALAND by:

ANZ National Bank Limited

Level 7, 1-9 Victoria Street, Wellington, New Zealand

Telephone +64 4 802 2000

This document ("document") is distributed to you in Australia and the United Kingdom by Australia and New Zealand Banking Group Limited ABN 11 005 357 522 ("ANZ") and in New Zealand by ANZ National Bank Limited ("ANZ NZ"). ANZ holds an Australian Financial Services licence no. 234527 and is authorised in the UK by the Financial Services Authority ("FSA").

This document is being distributed in the United States by ANZ Securities, Inc. ("ANZ S") (an affiliated company of ANZ), which accepts responsibility for its content. Further information on any securities referred to herein may be obtained from ANZ S upon request. Any US person(s) receiving this document and wishing to effect transactions in any securities referred to herein should contact ANZ S, not its affiliates.

This document is being distributed in the United Kingdom by ANZ for the information of its market counterparties and intermediate customers only. It is not intended for and must not be distributed to private customers. In the UK, ANZ is regulated by the FSA. Nothing here excludes or restricts any duty or liability to a customer which ANZ may have under the UK Financial Services and Markets Act 2000 or under the regulatory system as defined in the Rules of the FSA.

This document is issued on the basis that it is only for the information of the particular person to whom it is provided. This document may not be reproduced, distributed or published by any recipient for any purpose. This document does not take into account your personal needs and financial circumstances. Under no circumstances is this document to be used or considered as an offer to sell, or a solicitation of an offer to buy.

In addition, from time to time ANZ, ANZ NZ, ANZ S, their affiliated companies, or their respective associates and employees may have an interest in any financial products (as defined by the Australian Corporations Act 2001), securities or other investments, directly or indirectly the subject of this document (and may receive commissions or other remuneration in relation to the sale of such financial products, securities or other investments), or may perform services for, or solicit business from, any company the subject of this document. If you have been referred to ANZ, ANZ NZ, ANZ S or their affiliated companies by any person, that person may receive a benefit in respect of any transactions effected on your behalf, details of which will be available upon request.

The information herein has been obtained from, and any opinions herein are based upon, sources believed reliable. The views expressed in this document accurately reflect the author's personal views, including those about any and all of the securities and issuers referred to herein. The author however makes no representation as to its accuracy or completeness and the information should not be relied upon as such. All opinions and estimates herein reflect the author's judgement on the date of this document and are subject to change without notice. No part of the author's compensation was, is or will directly or indirectly relate to specific recommendations or views expressed about any securities or issuers in this document. ANZ, ANZ NZ, ANZ S, their affiliated companies, their respective directors, officers, and employees disclaim any responsibility, and shall not be liable, for any loss, damage, claim, liability, proceedings, cost or expense ("Liability") arising directly or indirectly (and whether in tort (including negligence), contract, equity or otherwise) out of or in connection with the contents of and/or any omissions from this communication except where a Liability is made non-excludable by legislation.

Where the recipient of this publication conducts a business, the provisions of the Consumer Guarantees Act 1993 (NZ) shall not apply.