

Business  
Council of  
Australia



# **Business Council of Australia**

**Submission to the**

**Joint Select Committee**

**Inquiry into Australia's Clean Energy Future**

**September 2011**

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## Why the clean energy future package lacks essential and responsible safeguards

### EXECUTIVE SUMMARY

The Business Council of Australia (BCA) has worked with both Coalition and Labor governments in an effort to ensure Australia's policy response to the risks associated with climate change is workable, fiscally responsible and does not make Australian industries uncompetitive if competitor nations do not take equivalent actions. A policy response to the risks of climate change for Australia has long been debated, and the timing for providing a workable and predictable mechanism to achieve the bi-partisan 5% reduction target by 2020 is becoming critical for industry.

The BCA's analysis demonstrates, however, that the Clean Energy Future legislation is predicated on optimistic assumptions in the Treasury modelling that have not been stress tested and do not include prudent and responsible safeguards to address a number of key risks. Also much of the operational detail of the legislation will be contained in regulations that are being progressively released and will need to be reviewed to assess the workability of the legislation.

The BCA is calling on all parliamentarians to act in the national interest and amend the clean energy future legislation to ensure it has the safeguards necessary to protect Australia's economic interests as Australia contributes to a reduction in the growth of global emissions.

It is only a strong economy with strong businesses that will have the capacity to invest in the technologies and process improvements to reduce emissions.

Members of the parliament as they debate this legislation must do so with an appreciation of the state of the global economy and the still unclear pathway to a binding international climate change agreement which includes all major emitters.

It is not economically sensible for Australia to see industries that would be competitive in the context of a global price on greenhouse gas emissions go into premature decline. Ahead of that eventuality, policies are required to maintain the relative competitiveness of Australian industries in the absence of global action.

Providing emission units under the clean energy future package to cover 94.5% and 66% of emissions at the activity level for those trade-exposed industries that meet an arbitrary emissions intensity threshold leaves such industries carrying a cost that their competitors do not from the day of implementation of the pricing mechanism.

The additional annual decay of this allocation (carbon productivity contribution) by 1.3% will continue to increase costs to these industries and reduce the capacity of these businesses to undertake greenhouse gas emissions reduction investments.

This submission discusses the key assumptions in the Treasury modelling and the inherent risks associated with these assumption and sets out five further risks that in the BCA's view have not been addressed adequately in the clean energy future package. It describes the safeguards needed to provide confidence to the business community and to the broader community that Australia can take action to reduce global emissions in a way that does not put Australia's economy or jobs at risk.

## KEY POINTS

- The BCA is not contesting the bi-partisan emissions reduction target of -5% and the need for Australia to contribute its part to a binding international agreement.
- The BCA has taken a risk management approach to climate change and undertaken research to identify a workable policy approach which responds to the risk of climate change and also to the risks that poorly designed domestic policy responses will pose to the Australian economy.
- The BCA calls on the parliament to design workable policies that will contribute to a reduction in global greenhouse gas emissions in a manner that does not jeopardise Australia's competitive advantages before our trade competitors put a comparable price on their greenhouse gas emissions.
- The BCA believes that the clean energy future package (CEFP) as currently designed presents considerable risks to Australia's long term.
- The CEFP is predicated on a number of optimistic and untested assumptions in the Treasury modelling that may not occur. There is, moreover, no modelling of alternative outcomes. This means that we have no appreciation of fall back options should the assumptions not eventuate. Sensitivity analysis around the assumptions has not been provided. These assumptions include:
  - That all other countries will implement pledges made at the Cancun UNFCCC meeting and that coordinated global action emerges by 2016 – yet presently there is no binding agreement in sight.
  - That there is sufficient international action and continued creation of projects under the clean development mechanism such that they achieve the particular permit price path in the modelling.
  - That Australia will have access to a sufficiently large pool of international permits to allow Australia to achieve approximately 60% of its emissions reduction target through the purchase of international certified emissions reduction units.
- More broadly, the legislation does not fully address:
  - The competitiveness risks for Australian industry in the absence of binding international agreements including all major emitters.
  - The risk to the Australian budgetary position. Should the carbon permit price in the Australian scheme fall to \$15.00 a tonne post the fixed price period the call on the federal budget would be some \$3 billion annually from 2015–16 to 2019–20. A low permit price would turn a projected cumulative surplus of \$9.6 billion into a cumulative deficit of \$9 billion over this period. Should this eventuate this will put more pressure on an already difficult budget position. Without amendments to the legislation the compensation arrangements under the Jobs and Competitiveness Package are then at risk of being brought into question given the household compensation package has been “hardwired”.
  - The need to achieve anticipated change in consumer behaviour. The Treasury modelling suggests 40% of the cumulative abatement to 2020 will be through the reduction in the growth of electricity demand. This will require changes in household consumption. It is difficult to see this happening when households are being fully compensated and while retail price regulation means households are not seeing the real price of electricity in many states.
- The package is not technologically neutral. The package includes constraints on the technologies that can be invested in under the clean energy funds, i.e. carbon capture and storage has been excluded and under the pricing mechanism, international permits resulting from nuclear energy projects will not be accepted. It must be accepted that the task is to reduce global greenhouse gas emissions and not pick

technology winners and losers.

- Of special concern to the BCA is the fact that the legislation does not include safeguards that will allow Australia to adapt its response to the outcomes of international negotiations, impacts on the domestic economy and competitiveness or availability of and progress in the development of low-emissions technologies.
- The BCA is calling on all parliamentarians to consider the risks associated with the package and amend the legislation to include the reasonable safeguards required.
- The essential safeguards are:
  - Ensure full consideration is given to the regulations before the bills are voted on.
  - Remove the reference to a 2050 target from the legislation. Such a target should only be set through a parliamentary vote following a comprehensive review including economic analysis of its impact and evidence of similar international actions and public consultation.
  - Adopt a national unit budget to 2020 based on Australia's -5% commitment that is fair compared to the obligations of other countries. This may require a higher annual budget in the early years before a trajectory is set to meet the -5% in 2020.
  - Make an explicit commitment in the legislation to maintaining the compensation and other arrangements in the Jobs and Competitiveness Program (JCP) until 80% of Australia's competitors on an industry sector basis have been judged by the Productivity Commission to have implemented measures on the manufacture or mining of competing products comparable to those of Australia to reduce their emissions.
  - Include in the legislation a specific review mechanism that ensures any trade exposed industry, not covered by the JCP, can be included under the program in future on providing evidence of the policy having an adverse impact on their competitiveness.
  - Make an explicit commitment in the legislation that the carbon productivity contribution will not be introduced until 80% of Australia's competitors on an industry sector basis have implemented measures on the manufacture or mining of competing products comparable to those of Australia to reduce their emissions.
  - Parliament be provided with the details of the grounds on which the government has formed the view that the electricity sector related components of the package will be sufficient to maintain the reliability and viability of the sector given previous modelling has suggested the level of assistance required could be between \$10 and \$12 billion.
  - Include in the legislation provisions to allow electricity generators to defer payment for emission units as a way to manage the possible impact on the working capital thereby reducing the risk of reliance on the government for 'loans of last resort' as currently proposed in the legislation.
  - Make explicit in the legislation that those sectors of the economy covered by the pricing mechanism are asked to only contribute their proportion of the -5% reduction target and not be burdened with the additional cost of meeting 100% of Australia's target if other measures fail.
  - Amend the default caps in the legislation so that they do not front end the -5% reduction to the early years of the pricing mechanism and do not require the covered sectors to meet all of the 5% target.
  - Remove any restrictions on businesses using international permits to meet their full liabilities under this legislation including numbers of international permits and types of permits subject to them complying with international standards and grandfathering of any existing contracts for international permits.

- Remove the price floor from the pricing mechanism and include safety valve price trajectory to 2020, which is a reasonable upper boundary on what Australia is prepared to pay for its contribution to global emissions reduction – considerably lower than the upper boundary currently in the legislation, which is \$20 a tonne above the international price and growing at 7.6% per annum.
- Start the scheme with a low price in the fixed price period reflecting international prices while businesses and households adjust to this long-term policy. The forward December 2012 price for CDM units is currently less than \$15 per tonne making Australia's starting price of \$23 excessive.
- As a precondition to the start of the pricing mechanism, take action at the local, state and federal government levels to wind up those policies that currently act to impede the reduction of emissions at lowest cost. The Productivity Commission has identified over 300 programs in operation that are contributing to more expensive than necessary greenhouse gas reductions.

## **INTRODUCTION**

The Business Council of Australia (BCA) has given substantial thought to how to progress workable policies that will support the reduction in global greenhouse gas emissions over time. The BCA recognises the importance to business and the global environment of workable policies to achieve this reduction.

It is with this as its basis that the Business Council of Australia has undertaken research and contributed to the discussion with successive governments in relation to Australia's response to climate change and in particular putting a price on greenhouse gas emissions.

### **The BCA position**

The BCA has advocated for a multifaceted approach to emissions reduction which includes an internationally linkable market-based emissions trading scheme with broad coverage, research and development in lower-emissions technologies and a focus on how Australia adapts to the impacts of climate change. The recent announcement of a Productivity Commission (PC) inquiry into climate change adaptation is a welcome development.<sup>1</sup>

An emissions trading scheme with broad coverage and international linkage provides the basis for lowest cost emissions reduction and leaves business to make the decisions on how best to manage the cost rather than have government attempt to regulate action which may not be at lowest cost.

The introduction of such a scheme starting with:

- a low price
- arrangements to ensure the competitiveness of trade-exposed industries including coal is not impacted in the absence of international action
- arrangements to ensure the reliability and viability of the electricity generation sector is maintained such that they can invest lower emissions technology

will help minimise the economic impact and risks to growth and jobs.

### **The government's CEF**

The BCA has now assessed the elements of the CEF, reviewed the modelling undertaken by Treasury and considered the draft legislation.

What is apparent is that the fiscal sustainability, cost of implementation of this package and estimated impacts on the economy of the CEF are predicated on a number of critical yet optimistic assumptions in the modelling undertaken by Treasury. These are discussed later in this submission.

One of the key benefits of modelling is its capacity to provide sensitivity analysis in relation to different assumptions. This allows for better risk assessment and the consideration of possible impacts if underpinning assumptions do not eventuate.

Modelling usually includes a base case which only includes actions that are in evidence not proposed actions. This allows for the better assessment of issues, intended consequences and implications as well as the consideration of fall back positions.

The Treasury modelling provided as part of the CEF does not provide this sensitivity analysis of the assumptions nor does it model alternative scenarios. It takes as its base case a situation where countries have implemented policies not yet legislated, but

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<sup>1</sup> Combet and Shorten joint media release, 20 September 2011.

pledged at Cancun. This raises questions as to what impact the CEFP will have on the economy, business and households should the assumptions prove to be wrong.

What is missing from the clean energy bills are the safeguards that allow for the adjustment of the policy should it have adverse economic impacts, should technology not be available or should technology breakthroughs occur or should international negotiations take a different direction to that assumed in the Treasury modelling.

This paper is structured in four parts.

The first part provides an overview of the key elements of the government's clean energy future package.

The second part of the paper discusses the key assumptions in the Treasury modelling which underpin the government's clean energy future package and the inherent risks associated with these assumptions.

The third part of the paper discusses five further related risks that have not been addressed adequately in the clean energy future package.

The conclusion of the paper summarises why safeguards are needed and what safeguards should be included before the legislation is passed. These safeguards will provide some level of confidence to the community that should this package adversely impact on the economy in the short to medium term actions can be taken to address these impacts.

## **AN OVERVIEW OF THE GOVERNMENT'S CLEAN ENERGY FUTURE PACKAGE**

The government has released its CEFP as its response to climate change following negotiations through the Multi-party Committee of Climate Change as well as Treasury modelling and the draft legislation related to the implementation of the package. The package includes:

1. pricing GHG emissions initially at a fixed price and then through an emissions trading scheme
2. targeted industry programs designed to address specific issues
3. expanding programs related to renewable energy
4. additional programs related to energy efficiency
5. land management initiatives
6. assistance for households.

Key regulations that will give effect to the clean energy bills are only now being made available for consideration. The financing and operational details of the Clean Energy Finance Corporation are yet to be released. In the case of arrangements for the electricity generators matters such as the tender to close will not be known for some time and questions remain as to whether the package does address fully the issues of viability and reliability of the sector.

The CEFP states that the household compensation package is guaranteed and ongoing and the clean energy bills prescribe the emissions reduction elements of the CEFP.

What has been left open to reviews and interpretation is the proposed arrangements for the emissions-intensive trade-exposed industries and to a lesser extent, the electricity sector.

The exclusion of a number of trade-exposed industries including coal and those that do not meet particular emissions thresholds from the Jobs and Competitiveness package also adds potential risks to the future competitiveness of these sectors.



The bills place much of the economic risk on the companies who are also required to invest in research and development and implement new technologies where available to transition Australia to a lower emissions economy.

### **Overview of key assumptions underpinning the Treasury modelling**

There is a substantial number of optimistic assumptions underpinning the comprehensive modelling done by Treasury. While not addressing each of these assumptions, there are five assumptions which warrant particular consideration, as should they not be met, the adverse impacts of the CEFPP on households, business and the economy could be significant.

At the core of the Treasury modelling are two reference cases which might be best described as possible scenarios of future international action to reduce global emissions.

The first of these is called the 'medium case'. It assumes the pledges made by countries in Copenhagen and again in Cancun to either reduce their greenhouse gas emissions or reduce the intensity of their greenhouse gas emissions by 2020 become legally binding and are put into action and then extrapolates a global emission reduction path to achieve the 550 ppm CO<sub>2</sub> concentration by 2100. Under this case industrialised countries will abate at a uniform price by 2016 and global emissions peak in 2020. World carbon prices are expected to be around A\$29.00 in 2016 in this case according to Treasury.<sup>2</sup>

The second of these called the 'ambitious case' assumes global action by 2015 and global emissions peaking by 2012 such that 450ppm CO<sub>2</sub> concentration can be achieved by 2100. World carbon prices are expected to be around A\$61.00 in 2016 in this case according to Treasury.<sup>3</sup>

Overlaid on these reference cases are two price trajectory cases for Australia:

- core policy case which has a starting price of \$20.00 per tonne of CO<sub>2</sub>e in 2012/13 rising at 5% real per annum
- high price case which has a starting price of \$30.00 per tonne of CO<sub>2</sub>e in 2012/13 rising at 5% real per annum.

The remainder of this discussion of the Treasury modelling relates to the medium reference case and the lower of the two price trajectories, i.e. a starting price of \$20.00 per tonne in 2012–13 rising at 5% real per annum.

### **Level of international activity**

Global action is required to reduce greenhouse gas emissions so as to slow the rate of increase in global temperatures. That is all countries will need to reduce their greenhouse gas emissions over time.

Progress in international negotiations, however, continues to be slow and limited to matters such as reporting and verification of emissions, the REDD scheme and the Green Fund, i.e. financial assistance to developing nations – not a binding agreement including all major emitters.

It is important to acknowledge many countries have made pledges as part of the international climate change negotiations in Copenhagen and reconfirmed these at Cancun. It is as important to acknowledge these pledges do not of themselves equate to action and they are not yet legally binding. It is very difficult to imagine this happening much before 2015.

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<sup>2</sup> Treasury, Strong Growth, Low Pollution Modelling a Carbon Price, 2011.

<sup>3</sup> Ibid

It should also be recognised that the major developing economy pledges that form part of the Copenhagen agreement are subject to overriding economic growth and poverty reduction requirements, do not include an indication of when the country will reach its emissions peak and are characterised as 'best endeavours'.

The level and robustness of international commitments has particular importance for Australia both from an environmental as well as economic perspective.

Many of Australia's export and import competing industries have their competitors in countries as diverse as the USA, Brazil, China, India and Russia. The type of actions or non actions on climate change of these countries will have a direct impact on the competitiveness of Australian industries.

In the absence of Australia's competitors putting an equivalent additional cost on their goods as will be the case in Australia once there is a price on greenhouse gas emissions, it is essential that Australia's competitiveness be maintained.

It is not economically sensible for Australia to see industries that would be competitive when there is a global price on greenhouse gas emissions go into decline now because of Australia's commitment to reduce greenhouse gas emissions. It is for this reason safeguards are required to maintain the relative competitiveness of Australian industries in the absence of global action.

The recent PC report<sup>4</sup> highlights one of the challenges is understanding the possible impact of these commitments on the competitiveness of Australian industries. For example, while China has policies in place to support reduction in greenhouse emissions intensity it also has subsidies that substantially offset the cost impact of these policies. This means there will not be an additional cost on products coming from China that will be competing with Australian products that will have a price on them.

It is still unclear what legal instrument will be put in place and what binding actions major emitting nations as diverse as the USA, China, India, Russia and Brazil will take. The United States, Japan and most recently Canada have all either rejected or postponed their programs to price greenhouse gas emissions.

The Treasury modelling is predicated on all countries that have made pledges actually implementing these pledges with a global price on greenhouse gas emissions emerging. The modelling assumes all countries implement the pledges that have made at Cancun 2010 and that global coordinated action emerges from 2016.<sup>5</sup>

The first question that should be asked is what is the likelihood of actual international activity being modelled eventuating.

Treasury modelling does not help us assess the risks of different outcomes in the international negotiations. There has been no sensitivity analysis of the base case.

Similarly Treasury has not modelled what may well be a more likely scenario, that is, fragmented and differentiated actions by only some of the advanced economies and major emitters. Australia's recent agreement with New Zealand to establish a senior officials group to work on arrangements to link the two trading schemes evidences such a scenario.<sup>6</sup>

Further modelling would provide a better appreciation of the impact on the Australian economy of different levels of international action. The absence of such modelling means

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<sup>4</sup> Productivity Commission, *Carbon Emission Policies in Key Economies*, May 2011.

<sup>5</sup> Treasury, *Strong Growth, Low Pollution: Modelling a Carbon Price*, 2011.

<sup>6</sup> Prime Minister of Australia, Media Release, 20 June 2011.

we are hard-placed to assess the likely economic and social impacts if the assumption is not achieved.

### **Price path**

A key factor contributing to the level of economic impact on Australia of the CEEP once the pricing mechanism is in the flexible price period will be the global price of emissions largely reflected through the price of units under the clean development mechanism (CDM) as the price of units under the Australian scheme will follow this international price.

Treasury has modelled only one price path for the CDM. Modelling of alternative high and low price paths would provide a better understanding of the likely costs and impacts on those covered by the pricing mechanism and the economy more broadly.

A further factor that will impact on the price path that is not modelled is variations in the cost of abatement in the near and longer term which will be dependent on the availability and costs of different abatement opportunities.

What has not been provided is a sensitivity analysis that considers different technology pathways and their impacts on the price path.

### **Reliance on international emission reduction units**

Treasury modelling assumes Australia will achieve its emissions reduction through a combination of both domestic activity and purchasing of international emission reduction units. The Treasury 2011 modelling has a higher use of international units than the modelling done in 2008. It shows some 60% of the abatement will be undertaken through the purchase of international units.

This reliance on international units and the many factors that will drive the price and access to international permits are important factors to consider when assessing the cost of implementation of the CEEP and possible risks. Costs of abatement in domestic markets, approval rates for projects under the clean development mechanism, choice of climate change policies in different countries and demand for units will all impact on the price and availability of units. Sensitivity analysis to provide some indication of the implications for Australia of price and availability variations would provide a better understanding of likely risks.

### **Marginal cost of abatement**

The 2011 Treasury modelling indicates that Australia's marginal abatement is more expensive than would have been the case in 2008. While the report is not explicit on the drivers of this result it can be posited that this is as a result of the removal of agriculture and changes to the treatment of transport in the model.

This would suggest the modelling results are quite sensitive to changes in Australian policy design and by implication changes over time in international approaches. It is not possible to gauge from the modelling provided the scale of impact on prices and GDP. Again some level of sensitivity analysis could have provided clearer parameters of risk.

### **Emissions abatement assumptions**

In the period to 2020, 40% of the cumulative abatement in the modelling will occur through the reduction in the growth of electricity demand. 60% of the cumulative abatement to 2020 will be as a result of the change in the emissions intensity of the electricity generation sector with less than 0.1% reduction in annual growth in Australia's national income.<sup>7</sup>

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<sup>7</sup> Quinn, Scrutiny of New Taxes Committee Senate 10 August 2011, p. 31.

Such a reliance on the reduction in growth of electricity demand suggests major lifestyle and production changes are required given the projected economic and population growth over the period. The capacity for the CEFP to drive such change is not assessed and sensitivity analysis has not been done. Importantly, given the persistence of retail price regulation in competitive markets, assumptions regarding electricity demand responses owing to pricing greenhouse gas emissions are highly contestable.

Similarly, Treasury modelling acknowledges the importance of carbon capture and storage (CCS). By the mid 2030s, CCS is expected to be commercially viable and play a 'significant role' in further decarbonising the electricity generating sector.<sup>8</sup>

While Treasury has recognised the importance of CCS, it has not modelled the impact of limited progress in commercialising the technology or the impact of the decisions by government to exclude CCS from funding under the clean energy fund.

### **ADDITIONAL RISKS TO BE CONSIDERED**

This section of the paper deals with five further areas of risk that have not been adequately addressed in the CEFP and related legislation.

#### **Macroeconomic impacts and fiscal sustainability**

The government has highlighted the importance of returning the budget to surplus and providing a buffer to manage the impacts of an aging population. The BCA also strongly supports a return to surplus, fiscal restraint and efficient spending.

The CEFP will have a series of macroeconomic impacts and will influence the fiscal underpinnings of the federal budget. The Treasury modelling and CEFP provide the following estimates of the impact of the package:

- Increase in household cost of living of 0.7% in 2012–13 to be offset by \$10.10 per week on average via changes in the taxation and benefits system.
- Revenue raised through permit sales and the reduction in the fuel tax credits will be \$27.3 billion over the three years to 2014–15.
- \$14.9 billion of this revenue will be allocated to the household assistance package which includes changes to the tax system and increases in benefits, i.e.
  - changes in the tax system are two increases in the tax free threshold – \$18,200 in 2012–13 and \$19,400 in 2015–16, however, there are also marginal rate increases
  - increases in the family tax benefit
  - upfront payments to pension and certain self-funded retirees
  - low-income supplement
  - additional payments for those using certain types of essential medical equipment
- \$1.2 billion of the revenue is allocated to a clean technology program which excludes carbon capture and storage and nuclear power.
- \$9.2 billion of the revenue over the period to 2014–15 is allocated to emissions-intensive and trade exposed industries.
- \$926 million over three years to the coal and steel sectors.
- Cost to the budget over the next four years is \$4.3 billion. In 2011–12 the cost will be \$2.9 billion given the upfront household payments.

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<sup>8</sup> Treasury, *Strong Growth, Low Pollution: Modelling a Carbon Price*, 2011.

- Reduction in economic growth is estimated to be 0.1 percentage point per year to 2050.
- Estimated impact on inflation is an increase in the first year of 0.7 percentage points in response to the increase in electricity costs. The Treasury forecast is that the CPI impact is 0.9% over four years. (The Treasury forecast assumes no second round impacts on prices, nor any impact on inflation expectations.)
- Treasury modelling outcomes indicated that while nominal wages will rise, real wages growth will be slower than otherwise would be the case and that productivity growth will be 0.1 per annum lower with the introduction of the carbon price.<sup>9</sup>

The BCA commissioned Deloitte to provide an analysis of the fiscal implications of the CEEP. A copy of their report is at Attachment 2. In particular Deloitte was asked to consider the impact on the federal budget if the price path modelled by Treasury was not achieved.

Deloitte found that should the price path following the fixed price period of the policy follow the floor price as described in the legislation through to 2020 there would be an additional call on the federal budget of some \$3 billion annually from 2015–16 to 2019–20. A low permit price would turn a projected cumulative surplus of \$9.6 billion into a cumulative deficit of \$9 billion over this period.

The analysis also identified the price path necessary to ensure there was not to be additional calls on the budget if all other assumptions held. These prices would be:

| Year    | Treasury price path A\$ | 'Breakeven' permit price A\$ |
|---------|-------------------------|------------------------------|
| 2016–17 | 31.21                   | 28.62                        |
| 2017–8  | 33.59                   | 22.60                        |
| 2018–19 | 36.15                   | 23.54                        |
| 2019–20 | 38.91                   | 24.54                        |

This suggests in the early years there is little room to move from the assumed price path before there is an adverse impact on the federal Budget.

Should the permit price trend below the 'breakeven' price pathway there is a risk to the emissions-intensive trade-exposed industries. Namely, will the government reduce arrangements for emissions-intensive, trade-exposed industries so as to reduce the impact on the budget given the government has hard wired the household assistance arrangements?

As a safeguard, the clean energy legislation must legislate to ensure the arrangements for the emissions-intensive, trade-exposed industries are not reduced for any other reason than 80% of trade competitors having put a measureable price on the goods made and mined with which Australian industries compete.

### **Australia's contribution to reducing global emissions**

Australia's international negotiating position is that it will reduce

“... emissions by 25 per cent on 2000 levels by 2020 if the world agrees to an ambitious global deal capable of stabilising levels of greenhouse gases in the atmosphere at 450 ppm CO<sub>2</sub>-e or lower ... and ... to unconditionally reduce

<sup>9</sup> Gruen and Quinn, Scrutiny of New Taxes Committee Senate 10 August 2011.

Australia's emissions by 5 per cent on 2000 levels by 2020, and to reduce emissions by up to 15 per cent by 2020 if there is a global agreement which falls short of securing atmospheric stabilisation at 450 ppm CO<sub>2</sub>-e, and under which major developing economies commit to substantially restrain emissions and advanced economies take on commitments comparable to Australia's"<sup>10</sup> where advanced economies are all countries with GDP per head at least as high as the Ukraine.

In a speech in 2010 the Minister for Climate Change, Greg Combet, noted that "finding an appropriately balanced outcome in the international negotiations therefore involves a very considered appraisal of the future sources of global emissions, the distributional economic impact of carbon pollution reductions, as well as consideration of the climate science".<sup>11</sup>

The distributional economic impact in Australia's circumstances should not be underestimated. The Australian economy has been built on access to lower priced energy and a range of natural resources and agriculture meaning the economic impact of moving to a lower emissions economy will be greater in Australia than in many other countries.

There is little understanding in the broader community of the scale of the challenge for Australia to achieve the bipartisan agreed target of -5% of 2000 greenhouse gas emissions in 2020. Looking at current trends or business as usual (BAU) Australia would be 24% above 2000 levels by 2020. Achieving a -5% target in 2020 will require 159 million tonnes reduction from BAU in 2020.<sup>12</sup>

It should be recognised that pledges made by both the EU and USA are far less demanding on their economies than Australia's target. Treasury analysis has previously confirmed that the economic impact of Australia's pledge will be 3 to 4 times that of the USA and the EU.<sup>13</sup>

Setting long-term emissions targets, such as the 80% included in the CEEP without a transparent and independent assessment of the economic impact of such a target relative to other countries and ensuring public consultation on the matter is a major risk.

Australia should be asked to do its share of the global reduction, however, this share should be set recognising what others are actually doing over the time period under consideration and the level of effort required to achieve this share of global effort.

### **Strength of the national economy**

It is the strength of Australia's economy and viability of its businesses that will ensure we are best able to respond to economic, social and environmental challenges including climate change.

Economic data clearly indicates that many sectors of the Australian economy are slowing. They are facing the dual headwinds of low consumer confidence and a historically high Australian dollar as well as greater uncertainty in global economic trends, all of which put growth and employment at risk.

There is a strong possibility that both industry and households will find it difficult to invest in the innovation, energy efficiency and alternative technologies to reduce emissions following the introduction of the price on greenhouse gas emissions.

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<sup>10</sup> Media release accompanying release of government white paper on climate change, 15 December 2008.

<sup>11</sup> Minister Combet, address to the Investor Group on Climate Change, 'Driving the Economy in a Carbon Constrained World', 17 December 2010.

<sup>12</sup> Comley, Scrutiny of New Taxes Committee Senate 10 August 2011.

<sup>13</sup> Treasury, *Australia's Low Pollution Future*, 2008.

Treasury modelling has taken a long-term view and does not provide any guidance as to the short to medium term impacts on the economy of individual sectors of the introduction of the greenhouse gas pricing mechanism with a starting price of \$23.00.

Given the difficulty in predicting the economic recovery and how it will affect different sectors there are two important safeguards that should be included. The first is to start with a low price in the fixed price period of the greenhouse gas emissions pricing mechanism which will assist business and the community through the introduction of the policy. The second is to require the Climate Change Authority to review the broader state of the economy and the economic impact on households and individual industry sectors prior to recommending carbon budgets, caps and trajectories.

### **Competitiveness of Australian industry**

The BCA recognises that under a global price there will be a change in the relative advantage some Australian trade exposed industries have, however, it is not possible to predict what this will be so what is essential is to maintain a 'level playing field' in the intervening period so that those businesses that will be viable under a global price are not disadvantaged in the interim.

Maintaining the competitiveness of Australia's trade-exposed industries is critical in the absence of policies putting an equivalent price on industries and products in our competitor countries. This requires policies that are trade and investment neutral.

Providing emission units under the CEEP to cover 94.5% and 66% of emissions at the activity level for those trade-exposed industries that meet an arbitrary emissions intensity threshold leaves such industries carrying a cost that their competitors do not from the day of implementation of the pricing mechanism.

The additional annual decay of this allocation (carbon productivity contribution) by 1.3% will continue to increase costs to these industries and reduce the capacity of these businesses to undertake greenhouse gas emissions reduction investments.

The first review by the PC to consider the impacts of matters such as the carbon productivity contribution and detail what is happening in competitor countries will not be until 2014, by which stage industries will be paying for 10% and 40% of their emission units irrespective of progress to a demonstrable greenhouse gas emissions price in competitor countries.

This is even though the recent PC report has highlighted Australia is already middle of the pack in emissions reduction through a range of policies that put a price on emissions such as the renewable energy target and current state-based solar PV feed in tariffs.

The BCA remains of the view that all trade-exposed industries including coal should be eligible for a 100 per cent allocation of their emission units to offset the cost impost; that the carbon productivity contribution not be introduced until at least 80 per cent of relevant competitors in the industry have introduced comparable effective greenhouse gas costs; and all Scope 1 and 2 emissions as well as Scope 3 emissions relating to non-trade exposed inputs be covered in the emission unit allocation. (See Attachment 1 for details of the BCA's position)

In the absence of this approach safeguards are essential.

Given much of the detail of the arrangements for emissions-intensive, trade-exposed industries will not be known until the draft regulations are seen, the legislation should not be passed until there has been the opportunity to consider the regulations.

The PC has not yet assessed whether Australia's trade competitors (at the industry level) have a demonstrable carbon price on their goods. Such an assessment should be undertaken before the decay rate (carbon productivity contribution) is introduced. One

way to do this is delay the introduction of the decay rate until the pricing mechanism transitions to an emissions trading scheme and use the fixed price period as a time for the PC to undertake these reviews.

The application of the decay rate should not be commenced until a review by the PC confirms that for exporters and import competing industries, 80% of trade competitors have implemented measures on the manufacture or mining of the product comparable to those of Australia to reduce their emissions.

### **Viability and reliability of Australia's electricity sector**

The Investment Reference Group report, April 2011, explained the position of the electricity sector, what was required to transform the sector and the measures required to avoid policy-induced distress and attract the capital required for long-lived investments.<sup>14</sup> It also highlighted the risk of higher electricity prices in the absence of workable policies.

The Australian Energy Market Commission in a letter to government on 7 July 2011 noted that the clean energy package can be expected to result in "some but not all, of the generation businesses with high emission intensive plant to facing (sic) a degree of financial impairment that would place them under severe financial distress".<sup>15</sup>

In light of these two reports what remains essential is access to appropriate arrangements to offset such risks.

Given previous modelling<sup>16</sup> has suggested the level of assistance required could be between \$10 and \$12 billion the government should provide details of the grounds on which it has formed the view that the electricity sector related components of the package will be sufficient to maintain the reliability and viability of the sector as well as attract the up to \$220 billion<sup>17</sup> investment required over the coming decades without a higher equity risk premiums.

The BCA also remains concerned that the legislation does not include specific reference to the contract for closure of highly emissive electricity generation plant. This is a key feature of the government's broader CEF package. Energy security and market stability to support withdrawal and substitution would be promoted if the contract for closure mechanism was enshrined in the overarching legal framework.

The BCA is disappointed to see that the previously agreed arrangements (during CPRS negotiations) to include provisions for electricity generators to defer payment for emission units as a way to manage the possible impact on the working capital have not been included in the clean energy legislation. The absence of such arrangements is likely to pose difficulties for generators and a greater reliance on the government for 'loans of last resort'.

### **Ensuring lowest-cost emissions reduction**

A key focus in reducing global greenhouse gas emissions is to do this in a manner that minimises the costs. Governments can choose from a range of policy levers including prescribing standards, regulation and market mechanisms.

The BCA has advocated for a multifaceted approach to emissions reduction which includes an internationally linkable market-based emission trading scheme with broad

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<sup>14</sup> Investment Reference Group Report, *A Report to the Commonwealth Minister for Resources and Energy* – April 2011. <http://www.ret.gov.au/energy/Documents/Energy-Security/IRG-report.pdf>

<sup>15</sup> [http://www.ret.gov.au/energy/documents/energy-security/energy-security-fund/AEMC 07 07 2011. pdf](http://www.ret.gov.au/energy/documents/energy-security/energy-security-fund/AEMC%2007%2007%202011.pdf)

<sup>16</sup> ACIL Tasman, *The Impact of an ETS on the Energy Supply Industry*, 2008.

<sup>17</sup> Minister Ferguson, 'Australia's Energy Future', speech to the Committee for the Economic Development of Australia, 4 May 2011.



coverage, research and development in lower emissions technologies and a focus on how Australia adapts to the impacts of climate change.

A linkable emissions trading scheme with broad coverage and international linkage provides the basis for lowest cost emissions reduction and leaves business to make the decisions on how best to manage the cost rather than have government attempt to regulate action which may not be at lowest cost.

The Clean Energy draft legislation includes elements of such an approach, however, it does not cover all industry sectors or all greenhouse gases. The government has also set a starting price in the fixed price period of \$23.00 some 50% higher than the price in the EU-ETS or the New Zealand scheme.

The government's approach also limits the potential for businesses to manage the cost impost of this policy through the limits it has imposed on the access and use of international emission reduction units. The legislation has limited the amount of units a company can use, does not allow for the grandfathering of units and includes clauses that give the government the capacity to reject certain units one year to the next without notice or recognition of the "life" of the unit. The government is also picking technologies in relation to international units. It intends to exclude internationally legitimate units simply because they are related to nuclear energy projects. The combination of these limits along with the introduction of a surrender fee for each international unit used for the first three years of the flexible pricing mechanism mean that businesses will not be given the opportunity to reduce emissions at least cost.

The PC report has indicated that a uniform economy wide price on emissions would be a more efficient approach than the range of policy tools already in place in Australia.<sup>18</sup> The CEEP has not heeded this advice and does not include measures to roll up the 237 current programs such as the solar rebates and renewable energy targets, identified by the PC as contributing to more expensive emission reductions.

The combination of reduced industry coverage under the pricing mechanism, the higher starting price than that found internationally, use of price floors and failure to remove less efficient policies identified by the PC are major contributors to an emissions reduction policy which will not be at lowest cost.

A further feature of the Clean Energy draft legislation is that it includes default annual caps on emissions which require the industry sectors covered by the pricing mechanism to meet the 2020 target of -5% emissions reduction on their own rather than make their proportionate contribution to the target.

For these reasons there should be a low price in the fixed price period, an assurance that the sectors covered by the pricing mechanism legislation are asked to contribute only their proportion of the -5% emissions reduction target, limits on the use of international units removed and arrangements should be put in place to wind up the 237 identified state and federal climate change related programs that add costs to reducing greenhouse gas emissions.

## **CONCLUSION**

With the introduction of a greenhouse gas emissions pricing mechanism, at a minimum there should be sufficient safeguards which provide an environment that supports long-term investment and opportunities to adjust the policy where there are likely adverse outcomes.

In particular the bills do not include adequate clauses or safeguards which:

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<sup>18</sup> Productivity Commission, *Carbon Emission Policies in Key Economies*, May 2011.

- Secure the industry arrangements in the Jobs and Competitiveness package.
- Address the risk of adverse economic impacts of the policy or to manage the impact of external economic, especially during the fixed price period.
- Address the risk of Australia being economically disadvantaged as a result of limited progress in international negotiations to put demonstrable prices on greenhouse gas emissions.
- Ensure Australia contributes its proportionate share of international action recognising the economic impact, that is, Australia should commit to a level of action reflecting its level of greenhouse gas emissions and the economic costs associated with making this contribution which will be higher than many countries given the structure of the Australian economy.
- Provide arrangements for trade-exposed industries which mean they maintain their competitiveness in the absence of international competitors having a price on their greenhouse gas emissions.
- Ensure those required to pay for emission units under the pricing mechanism have the capacity to access lowest cost options to pay the impost.

The BCA remains of the view the best way to address the risks highlighted is to implement the features (summarised at attachment one of this paper) the BCA has proposed in its two previous submissions:

- Submission on the Proposed Architecture and Implementation Arrangements for a Carbon Pricing Mechanism in May 2011
- Submission regarding the CEFP in August 2011.

Should the CEFP be pursued in its current form there are a series of safeguards that should be included in the legislation before parliament prior to its finalisation.

These safeguards are:

- Ensure full consideration is given to the regulations before the bills are voted on.
- Remove the reference to a 2050 target from the legislation. Such a target should only be set through a parliamentary vote following a comprehensive review including economic analysis of its impact and evidence of similar international actions and public consultation.
- Make an explicit commitment in the legislation to maintaining the compensation and other arrangements in the Jobs and Competitiveness Program (JCP) until 80% of Australia's competitors on an industry sector basis have been judged by the PC to have implemented measures on the manufacture or mining of competing products comparable to those of Australia to reduce their emissions.
- Include in the legislation a specific review mechanism that ensures any trade exposed industry, not covered by the JCP, can be included under the program in future on providing evidence of the policy having an adverse impact on their competitiveness.
- Make an explicit commitment in the legislation that the carbon productivity contribution will not be introduced until 80% of Australia's competitors on an industry sector basis have implemented measures on the manufacture or mining of competing products comparable to those of Australia to reduce their emissions.
- Parliament be provided with the details of the grounds on which the government has formed the view that the electricity sector related components of the package will be sufficient to maintain the reliability and viability of the sector given previous modelling has suggested the level of assistance required could be between \$10 and \$12 billion.

- Make explicit in the legislation that those sectors of the economy covered by the pricing mechanism are asked to only contribute their proportion of the -5% reduction target and not be burdened with the additional cost of meeting 100% of Australia's target if other measures fail.
- Amend the default caps in the legislation so that they do not front end the -5% reduction to the early years of the pricing mechanism and do not require the covered sectors to meet all of the 5% target.
- Remove any restrictions on businesses using international permits to meet their full liabilities under this legislation including numbers of international permits and types of permits subject to them complying with international standards and grandfathering of any existing contracts for international permits.
- Remove the price floor from the pricing mechanism and include safety valve price trajectory to 2020 which is a reasonable upper boundary on what Australia is prepared to pay for its contribution to global emissions reduction – considerably lower than the upper boundary currently in the legislation which is \$20 a tonne above the international price and growing at 7.6% per annum.
- Start the scheme with a low price in the fixed price period reflecting international prices while businesses and households adjust to this long-term policy. The forward December 2012 price for CDM units is currently less than \$15 per tonne making Australia's starting price of \$23 excessive.
- As a precondition to the start of the pricing mechanism, take action at the local, state and federal government levels to wind up current policies which impede emissions reduction at least cost. The PC has identified over 300 programs in operation that are contributing to more expensive than necessary policies to reduce greenhouse gas emissions.

Including such safeguards will provide the basis for Australia to progress the implementation of policies in response to the risks associated with climate change and do so in a manner that allows for the review and revision of such policies in response to domestic, international and technological impacts and implications.

## **ATTACHMENT 1: THE BCA POSITION**

As Australia progresses its response to the risks associated with climate change it should do so in a manner that maintains the strength of Australia's economy and the viability of its businesses. It is only strong economies that can invest in the innovation and new products and services needed to transition Australia to a lower emissions economy.

Any response should also have sufficient flexibility to ensure it reflects what is happening in the international climate change negotiations and not exacerbate the impact of adverse economic cycles. The BCA has in its recent submissions identified the features required to meet these two priorities of ensuring a strong economy and providing flexibility:

- Set Australia's emissions reduction targets following a transparent public consultation process which included assessment of actual international action, the relative economic costs of commitments and the proportionate efforts of all countries.
- Full offsetting of any cost impost on trade-exposed industries, including coal, until at least 80 per cent of relevant competitors in the industry have introduced comparable effective greenhouse gas costs on the industry.
- All Scope 1 and 2 emissions as well as Scope 3 emissions relating to non-trade-exposed inputs be covered in the emission unit allocation.
- Direct assistance to significantly impacted electricity generators to avert financial distress and consequential negative impacts on energy security and capital provider (equity and debt) sentiment.
- The PC to undertake regular reviews at the activity level to determine progress of Australia's competitors in putting an effective price on greenhouse gas emissions and to determine the rate at which the arrangements for trade-exposed industries is reduced and removed over time.
- The option for electricity generators to tender for the closure of emissions-intensive plants so as to support emissions reduction.
- Ensure retail electricity price regulation (price caps) is removed enabling a clear price signal and full cost pass through so that the viability of electricity retailers and the electricity supply industry is not put at risk.
- Wind up of policies and programs that are inflating the costs of achieving emissions reduction (some 237 such programs have been identified by the PC).
- Ensure Australia's greenhouse gas emissions pricing policy and regulatory frameworks do not add a risk premium and increase the cost of capital or make Australia a less attractive investment destination.
- Commence with a low price in the fixed-price period with a modestly increasing trajectory to reduce the need for compensation to households and business.

Such an approach is reinforced by the recent review undertaken by the PC, which found Australia is already in the "middle of the pack" of the countries it reviewed in achieving emissions reduction. Where other countries have implemented market-based mechanisms, such as emissions trading schemes, they have done so over a long introductory timeframe, with initially limited sector coverage, or progressively phased-in coverage. Taking such an approach will not, of itself, reduce the incentives for businesses to plan for and invest in emissions reduction efforts. It is the existence of a stable and long-term policy framework and technological developments that will provide businesses with the incentives and capacity to plan for and invest in a long-term transition to a lower-emissions economy.

## **ATTACHMENT 2: FISCAL RISKS OF THE CLEAN ENERGY FUTURE PACKAGE**

Report by Deloitte Access Economics commissioned by the Business Council of Australia

# Fiscal Risks of the Clean Energy Future Package

Report commissioned by  
the Business Council of  
Australia

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## Executive Summary

The Australian Government has announced plans to introduce a carbon pricing mechanism for Australia in 2012-13, with the Clean Energy Bill and associated legislation introduced in the House of Representatives on 13 September 2011.

The Clean Energy Future (CEF) package consists of two broad components: the carbon pricing scheme itself, which will raise a substantial amount of revenue; and the compensation package, which involves a substantial increase in government outlays.

If future permit prices were known and if there was sufficient flexibility in revenue and spending decisions, there would be little or no risks of failing to achieve the government's stated objective of broad budget neutrality. However, the combined effect of the "locking in" of household compensation, as well as the structure of other measures and uncertainty around future permit prices, means that there is a real risk that the policy will not be budget neutral.

This report examines the fiscal risks of the CEF package. The report conducts a sensitivity analysis, varying the permit price during the flexible price period (2015-16 and beyond). Our analysis shows that if the permit price turns out to be lower than expected and follows the floor price path announced in the CEF package, then the fiscal risks of the overall package are likely to be significant, with a cumulative fiscal shortfall (relative to baseline) of around \$18.6 billion over the period 2015-16 to 2019-20. That is, a low permit price would turn an estimated cumulative surplus of \$9.1 billion into a cumulative deficit of \$9.5 billion over this period.

For the CEF package to "break even" and produce neither surpluses nor deficits over the 2015-16 to 2019-20 period, the permit price will need to be substantially higher than the price floor path specified in the CEF package.

**Deloitte Access Economics**

# 1 Introduction

The Australian Government has announced plans to introduce a carbon pricing mechanism for Australia in 2012-13, with the Clean Energy Bill and associated legislation introduced in the House of Representatives on 13 September 2011.

The Clean Energy Future (CEF) package consists of two broad components: the carbon pricing scheme itself, which will raise a substantial amount of revenue; and the compensation package, which involves a substantial increase in government outlays.

The Government's announced objective is that the package should be broadly budget neutral<sup>1</sup>, with permit revenue being returned to Australian households in the form of pension increases, changes to personal income taxes, and to some Australian businesses in the form of free permits.

In principle, if future permit prices were known and if there was sufficient flexibility in revenue and spending decisions, there would be little or no risks of failing to achieve the objective of budget neutrality. However, the combined effect of the Government's household compensation package (which is "permanent and will not be reduced"<sup>2</sup>), as well as the structure of other measures and uncertainty around future permit prices, means that there is a real risk that the policy will not be budget neutral.

This paper examines the fiscal risks of the CEF package, by conducting a simple sensitivity analysis, varying the permit price during the flexible price period (2015-16 and beyond). The analysis is based on information contained in the Government's policy documentation, *Securing a Clean Energy Future*, and on modelling results released by the Government in the *Strong Growth, Low Pollution* document (updated as at 21 September 2011). The analysis assumes no significant fiscal policy changes to the policy measures set out in the CEF package.

The report is structured as follows. Section 2 summarises the CEF packages' major policy parameters, as well as the budget projections over the forward estimates (2011-12 to 2014-15). Section 3 then undertakes a sensitivity analysis of the flexible price period, examining the overall fiscal risks associated with different permit prices, as well as the individual components that contribute to (and reduce) these risks. Section 4 concludes, and summarises our analysis and main results.

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<sup>1</sup> See, for example, <http://www.cleanenergyfuture.gov.au/flexible-price-phase-%e2%80%94-fiscal-implications/>

<sup>2</sup> See <http://www.cleanenergyfuture.gov.au/flexible-price-phase-%e2%80%94-fiscal-implications/>

## 2 The Clean Energy Future Package

The Government's Clean Energy Future (CEF) package consists of a large number of policy measures and we do not propose to review all of them here in detail. Instead, this section summarises the broad policy architecture and the fiscal impact of the package over the forward estimates period (2011-12 to 2014-15). This policy architecture is then used in our scenario analysis of the floating price period in Section 3 below.

### 2.1 Revenue During the Fixed Price Period

In terms of its overall fiscal impact, the CEF package consists of two broad policy instruments. First, the fiscal impact of the CEF package is partly underpinned by the expected path of permit prices. The Government has announced that a three year fixed carbon price period will apply between 2012-13 and 2014-15. The starting price in this fixed price period has been set at \$23/t CO<sub>2</sub>-e. Prices in the second and third year will rise by 5 per cent in nominal terms. This is comprised of a 2.5 per cent rise in real terms and an inflation rate of 2.5 per cent per year. The level of inflation is based on the midpoint of the Reserve Bank of Australia's target range.

Following the fixed price period, permit prices will be permitted to adjust to market conditions, subject to two important caveats. During this flexible price period, which begins in 2015-16, permit prices are to be determined by international permit prices. However, the Government's CEF package adds two important features to this market mechanism for the first three years of the flexible price period:

- A price ceiling of \$20 above the expected international price, rising annually by 5 per cent in real terms. Domestic permit prices will not be allowed to rise above this price ceiling; and
- A price floor of \$15 rising annually by 4% in real terms. Domestic permit prices will not be allowed to fall below this price floor.

The floor and ceiling will be reviewed by the Climate Change Authority in 2017<sup>3</sup>, and at this stage it is unclear whether these "safety valve" arrangements will continue after 2017-18. Consistent with the Government's original modelling and recently updated modelling results<sup>4</sup>, in our baseline scenario, during the first year of the flexible price period (2015-16), we assume a price of \$29/tonne CO<sub>2</sub>-e. After 2015-16, we assume that prices in the baseline case increase by a nominal rate of approximately 7.5 per cent per year. This reflects an annual price increase of 5 per cent in real terms and assumed inflation rate of 2.5 per cent per year. This is also consistent with the Government's modelling assumptions.<sup>5</sup> The baseline price path, price ceiling and price floor are shown in Figure 1 below.<sup>6</sup>

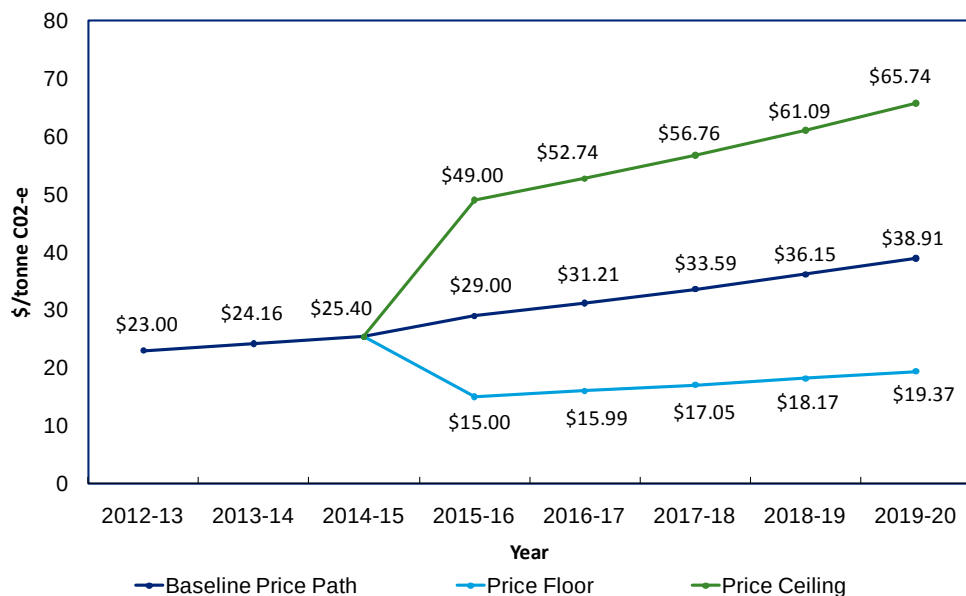
<sup>3</sup> *Securing a Clean Energy Future*, page 27.

<sup>4</sup> *Strong Growth, Low Pollution*, page 75 and *Strong Growth Low Pollution Update*, page 4

<sup>5</sup> *Strong Growth, Low Pollution*, page 75.

<sup>6</sup> Unless otherwise indicated, all dollar amounts in this report are expressed in nominal terms, rather than real terms.

**Figure 1: Baseline Permit Prices, Price Ceiling Path and Price Floor Path Under the CEF Package**



Source: Deloitte Access Economics, based on assumptions in the CEF package

The other important component on the revenue side of the CEF package is the excise rebate reduction, which is an equivalent carbon price applying to business transport emissions from liquid fuels (rail and shipping) and non-transport emissions from businesses using liquid fuels. All up, through permit revenue and excise rebate reductions, the Government expects revenue to increase by \$27.8 billion over the forward estimates.

## 2.2 Compensation and Other Outlays During the Fixed Price Period

The second broad component of the CEF package which will drive the overall fiscal impact of the CEF package is the compensation to households, selected trade exposed industries, and other outlays. Under the CEF package this assistance consists of the following broad measures (total dollar amounts over the forward estimates are in parentheses):

- Household Assistance Measures (\$15.3 billion over the forward estimates)
- Jobs and Competitiveness Program and Other Support for Jobs (\$10.3 billion)
- Clean Energy Finance Corporation (\$0.95 billion)
- Energy Security and Transformation (\$3 billion)
- Land and Biodiversity Measures (\$1.2 billion)
- Governance (\$0.38 billion)
- Coal Sector Jobs Package (\$0.74 billion)
- Steel Transformation Plan (\$0.19 billion)

## 2.3 Overall Fiscal Impact During the Fixed Price Period

These revenue and spending measures and their fiscal impact over the forward estimates (which coincides with the fixed price period) are summarised in Table 1 below. As the Government's policy documents indicate, as a result of these measures, the Government expects spending to increase by \$32.15 billion over the forward estimates.

Adding the revenue and spending components, the fiscal impact is expected to result in a negative cumulative fiscal impact or shortfall of \$4.38 billion<sup>7</sup> over the forward estimates, (which corresponds with the fixed permit price period).

**Table 1: Fiscal Impact (\$million) of the Clean Energy Future Package – 2011-12 and Fixed Price Period**

| Measure                                                    | 2011-12       | 2012-13      | 2013-14       | 2014-15     |
|------------------------------------------------------------|---------------|--------------|---------------|-------------|
| <b>Permit Price (\$/t)</b>                                 |               | \$23         | \$24.15       | \$25.40     |
| Revenue from permit sales                                  | 0             | 7,740        | 8,140         | 8,590       |
| Revenue from other measures and fuel tax credit reductions | 0             | 860          | 940           | 1,500       |
| Household Assistance                                       | -1,533        | -4,196       | -4,802        | -4,825      |
| Jobs and Competitiveness Program                           | 0             | -2,851       | -3,059        | -3,312      |
| Other Support for Jobs                                     | -26           | -166         | -416          | -461        |
| Clean Energy Finance Corporation                           | -2            | -21          | -467          | -455        |
| Energy Security and Transformation                         | -1,009        | -1           | -1,003        | -1,042      |
| Land and Biodiversity                                      | -69           | -131         | -506          | -489        |
| Governance                                                 | -78           | -90          | -106          | -107        |
| Coal                                                       | -222          | -11          | -247          | -258        |
| Steel Transformation Plan                                  | -1            | -38          | -75           | -75         |
| <b>TOTAL FISCAL IMPACT (\$ m)</b>                          | <b>-2,940</b> | <b>1,095</b> | <b>-1,601</b> | <b>-934</b> |

Source: *Securing a Clean Energy Future: the Australian Government's Climate Change Plan*, Table 1 page 131, and Table 1 page 135.

<sup>7</sup> See <http://www.cleanenergyfuture.gov.au/flexible-price-phase-%e2%80%94-fiscal-implications/>

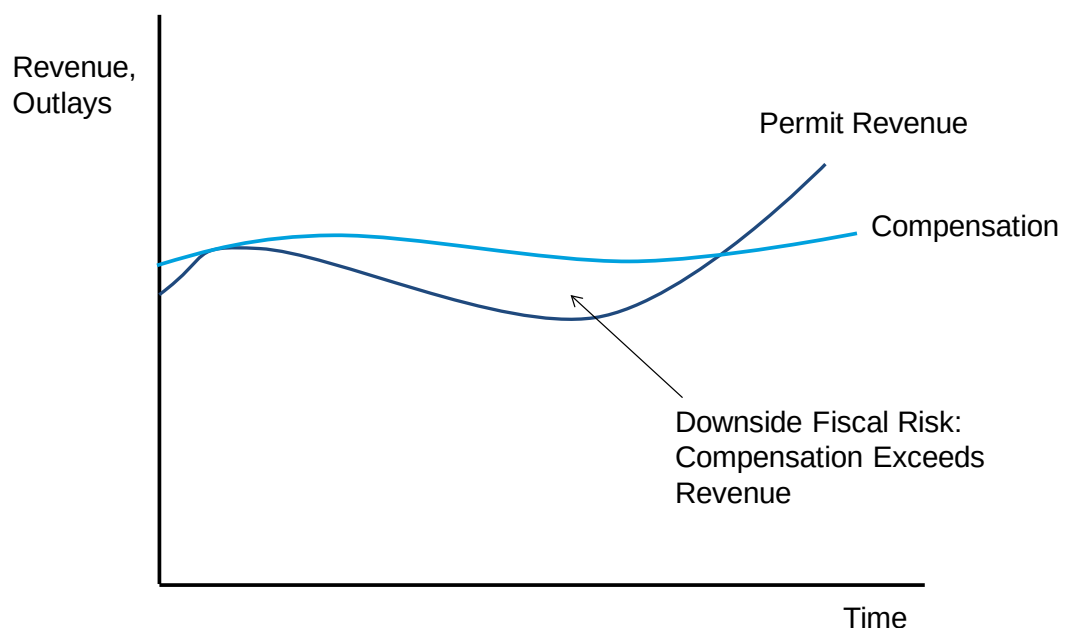
## 3 Fiscal Risks Beyond the Fixed Price Period

### 3.1 Fiscal Impact and the Structure of Compensation

This section examines the possible fiscal impacts of the CEF package over the longer term – that is, beyond the fixed price period. A key feature of emissions trading schemes in general - and the CEF package in particular - is that the future path of permit prices is uncertain. Under the CEF package, all that is known with certainty about the flexible price period is the possible range of the path of prices between 2015-16 and 2017-18, which is determined by the price ceiling and the price floor as outlined in the previous section. In this section, we investigate the likely impact of lower and higher permit price paths on the fiscal bottom line.

Figure 2 below is a conceptual illustration of the basic source of the downside fiscal risks. If some component of compensation is locked in, then permit revenues will tend to be more responsive to changes in permit prices than these “locked in” measures. Hence, it is unlikely that revenue and outlays in such a carbon pricing scheme will exactly match one another. This means that if permit prices turn out to be low, then it is unlikely that such a scheme will be budget neutral, as total revenue will tend to decline by more than total compensation. Once policy parameters around compensation are locked in, the extent of the fiscal risk depends on the assumed permit price path and how this affects the size of the components of the package that are directly linked to permit prices.

**Figure 2: Downside Fiscal Risks**



Source: Deloitte Access Economics

## 3.2 Fiscal Risks in the Low Permit Price Scenario

Carbon price analysts have recently downgraded their forecasts of European Union permit prices for the post 2015-16 period. Table 2 provides a summary of a range of recent price forecasts.<sup>8</sup> At current market exchange rates, most of these forecasts are at or below the baseline scenario price path shown in Figure 1 above.

To isolate the effects of lower than expected permit prices on the fiscal bottom line in the Government's CEF package, we undertake a sensitivity analysis on a "relative to baseline" basis. That is, we assume a baseline path of permit prices as indicated in Figure 1 above, together with a range of assumptions that draw upon the structure of the CEF package, and then vary the permit price and trace through the overall fiscal impact relative to the baseline situation.

**Table 2: Recent carbon permit price forecasts**

| Source                              | Forecast Period             | Permit Type | Price Forecast (\$/tonne) |
|-------------------------------------|-----------------------------|-------------|---------------------------|
| <b>Bloomberg New Energy Finance</b> | 2015-16                     | Australia   | \$16                      |
| <b>Barclays Capital</b>             | Phase 3 (2013-2020) average | EUA/CER     | \$36.45/ \$22.95          |
| <b>Citigroup</b>                    | Phase 3 average             | EUA         | \$33.75                   |
| <b>Deutsche Bank</b>                | Phase 3 average             | EUA         | \$35.24                   |
| <b>MF Global</b>                    | Phase 3 average             | EUA         | \$24.46                   |
| <b>Point Carbon</b>                 | Phase 3 average             | EUA/CER     | \$29.70/ \$22.28          |
| <b>Société Générale</b>             | Phase 3 average             | EUA/CER     | \$38.34/\$34.02           |

Note: EUAs are EU emissions allowances. CERs are certified emissions reductions. Source: Energy Market Price Newsletter, 6 September 2011; Bloomberg New Energy Finance, 25 August 2011. An exchange rate of 1 euro = A\$1.35 (the rate at as 22 September 2011) was applied to convert euro price forecasts into Australian dollar equivalents.

### 3.2.1 Assumptions

The assumptions of our analysis are set out in detail in the Appendix. In this section we discuss the main assumptions at a broader level, and how they drive the results.

#### 3.2.1.1 Policy Assumptions

As indicated in the previous section, for the purposes of analysing the effect of permit prices on the fiscal impact relative to a given baseline, the crucial distinction is between policy measures (on both sides of the budget) that vary with the permit price, and those that do not. Table 3 below summarises the key features of the CEF package regarding permit price sensitivity.

<sup>8</sup> Note that forecasts of CER prices are uniformly lower than forecasts of EUA prices. CERs are generally regarded as more risky and less liquid than EUAs, and so the latter tend to sell at a premium to the former. CERs may be an important source of international abatement for Australia in the future.

Based on publicly available data in the existing CEF package (that is, no significant fiscal policy changes), Table 3 summarises how sensitive policy measures are to permit price fluctuations and whether there is positive or negative correlation of the fiscal impact of policy measures to changes in permit price. The interpretation of this table is straightforward: if the permit price falls and the policy measure is assumed to have a negative fiscal impact, then the measure tends to respond in such a way as to move the fiscal balance towards a deficit.

For example, if permit prices are assumed to be lower than in the baseline case, permit price revenue is lower than it otherwise would be, and the fiscal balance worsens. On the other hand, if permit prices are assumed to be lower, then other measures elsewhere in the package (such as certain types of compensation) may change in such a way as to improve the budget bottom line, and all else being equal, the fiscal balance would move towards a surplus. The overall sensitivity of the budget bottom line to permit prices depends on the combined fiscal sensitivity of each policy measure.

**Table 3: Qualitative Fiscal Impact of CEF Measures in Response to a Fall in Permit Prices**

| Policy Measure                     | Effect of Measure on Fiscal Position in Response to a Lower Permit Price (Relative to Baseline) |
|------------------------------------|-------------------------------------------------------------------------------------------------|
| Permit Price Revenue               | Negative                                                                                        |
| Excise Rebate Reduction            | Negative                                                                                        |
| Household compensation             | None*                                                                                           |
| Jobs and Competitiveness Program   | Positive                                                                                        |
| Other Support for Jobs             | None                                                                                            |
| Clean Energy Finance Corporation   | None                                                                                            |
| Energy Security and Transformation | Positive                                                                                        |
| Land and Biodiversity              | None                                                                                            |
| Governance                         | None                                                                                            |
| Coal                               | None                                                                                            |
| Steel Transformation Plan          | None                                                                                            |

\* Our analysis assumes that the vast majority of household compensation is permanent and will not be reduced in either scenario, as per the government's announced policy. However, our analysis assumes that a small component of the fiscal impact of the household compensation package varies with the permit price in line with the impact of permit prices on the CPI. This has a very minor impact on the final results. As discussed below, if this assumption was dropped, it would only serve to make our results stronger. Source: Deloitte Access Economics,

### 3.2.1.2 Permit Price Assumptions

To analyse the possible downside fiscal risks of the CEF package, we consider two permit price scenarios, both of which are shown in Figure 1 above:

- In the baseline scenario, the permit price in 2015-16 is assumed to be \$29, growing at a real rate of 5 per cent, with an assumed inflation rate of 2.5 per cent.
- In the low price scenario, the permit price in 2015-16 is assumed to be \$15, growing at a real rate of 4 per cent, with an assumed inflation rate of 2.5 per cent. In other



words, in the low price scenario, we assume that the permit price follows the floor price path that is set out in the CEF package.

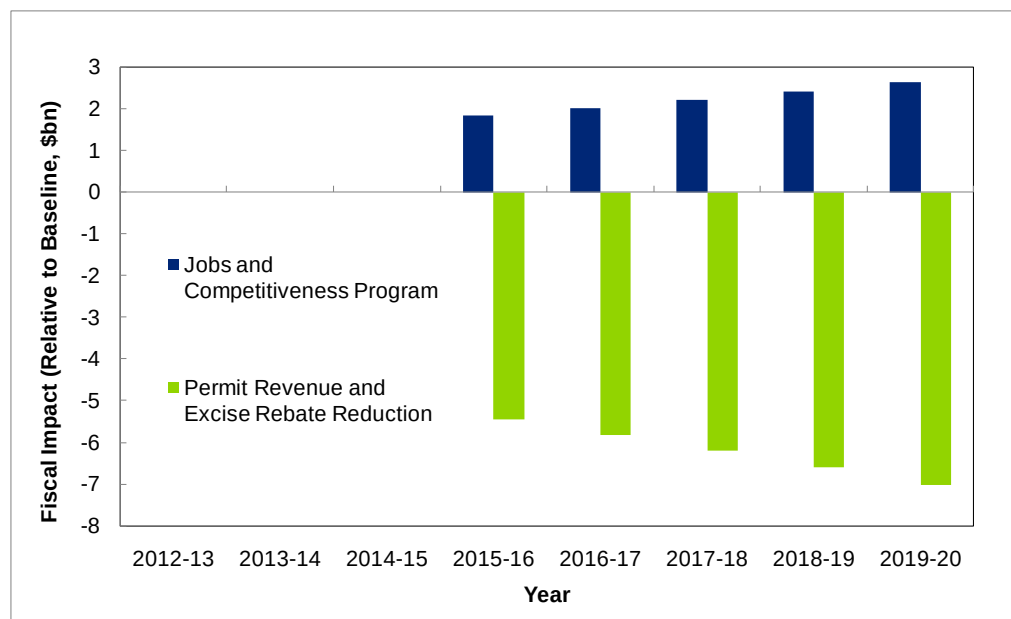
### 3.2.2 Results

The main results of the sensitivity analysis are shown in Figures 3 and 4 below.

Figure 3 shows the contribution of the major policy measures to the overall fiscal impact of lower permit prices, relative to the baseline scenario. With a low permit price path, assistance under the Jobs and Competitiveness Program (which consists of free permits to industry) falls in line with the fall in permit prices.

Figure 4 shows, however, that household assistance remains largely unchanged in dollar terms, with a very small positive fiscal impact due to a lower effect of permit prices on consumer prices. Permit revenue and the revenue gain from the excise rebate reduction are both linked to permit prices, and both fall accordingly in the low price scenario.<sup>9</sup>

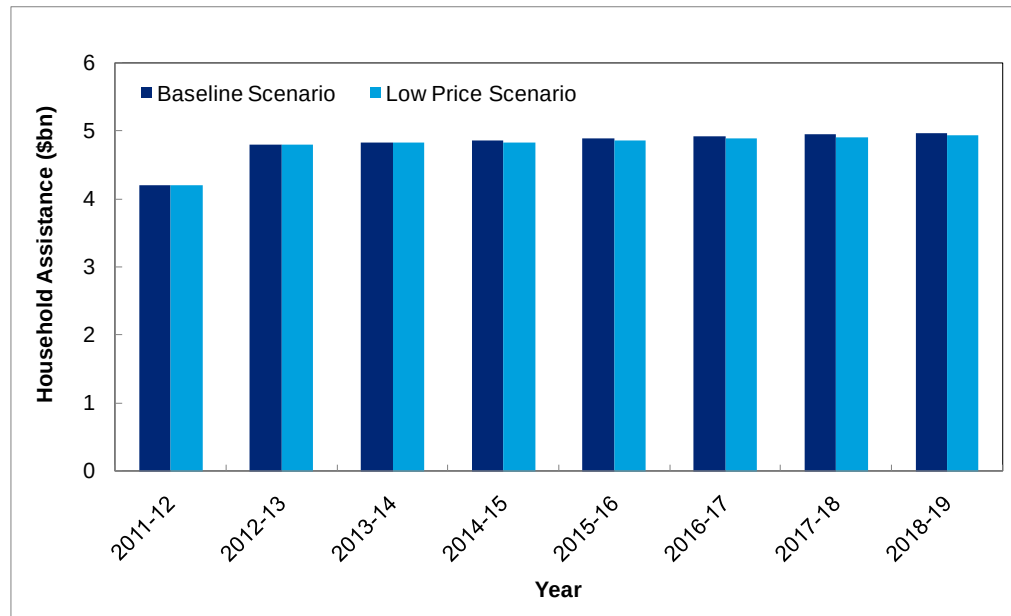
**Figure 3: Estimated Contribution (Relative to Baseline) of Major Policy Measures to Fiscal Impact in the Low Price Scenario, 2012-13 to 2019-20**



Source: Deloitte Access Economics

<sup>9</sup> Note that the Energy Security and Transformation would also make a minor contribution to cost savings in the event of a lower permit price path.

**Figure 4: Estimated Household Assistance in Baseline and Low Price Scenarios, 2012-13 to 2019-20**



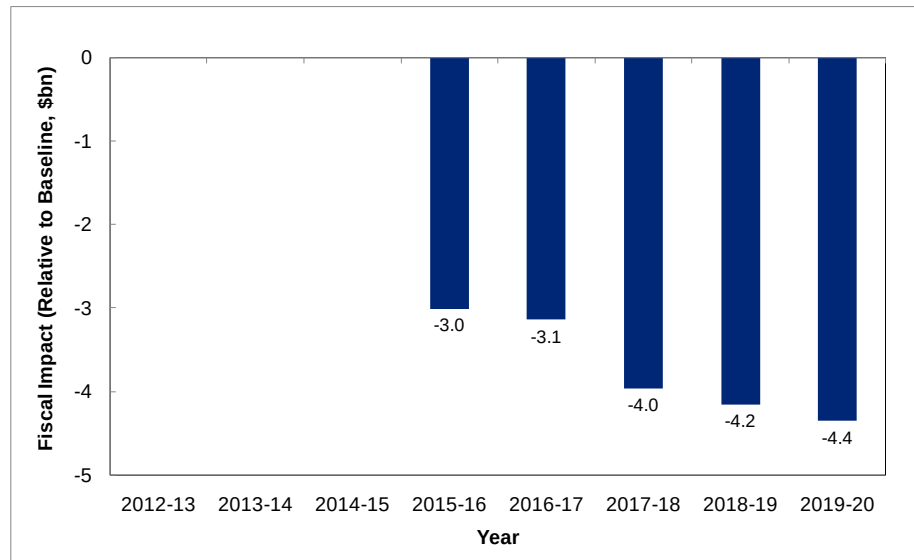
Source: Deloitte Access Economics

Figure 5 below shows the overall fiscal impact of low permit prices over the longer term, relative to the baseline scenario. The figure shows that the fiscal risks are substantial, exceeding \$3 billion over each year of the 2015-16 to 2019-20 period. As discussed above, these results are driven by the fact that large components of the CEF package (particularly on the revenue side) are driven by permit prices, whilst some others (on the outlays side) are not. When permit prices are low, this means that revenue will respond negatively, but outlays will remain relatively high and will not adjust downwards with permit prices.

The overall results show a significant cumulative negative fiscal impact in the low price scenario, relative to baseline. If the permit price turns out to be lower than expected and follows the floor price path announced in the CEF package, then our analysis suggests a cumulative fiscal shortfall (relative to baseline) of around \$18.6 billion over the period 2015-16 to 2019-20. That is, a low permit price would turn an estimated cumulative surplus of \$9.1 billion into a cumulative deficit of \$9.5 billion over this period.

Our analysis also indicates that one of the main ways in which the CEF package could be altered to move it towards budget neutrality would be to alter the structure of the Jobs and Competitiveness Program, by making this component even more sensitive to permit prices during the flexible price period (that is, reduce the dollar value of assistance under this program even further than shown in Figure 3 above). Hence, if permit prices turn out to be lower than expected and negative fiscal pressures begin to emerge, there is a risk that this pressure will translate into changes in this component of the CEF package.

**Figure 5: Estimated Overall Fiscal Impact (Relative to Baseline) in the Low Price Scenario, 2012-13 to 2019-20**



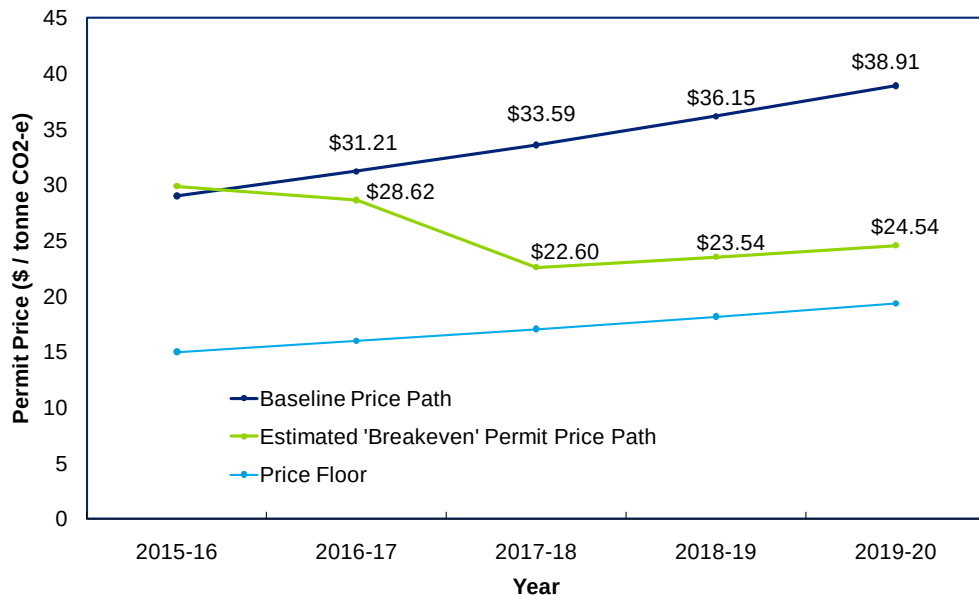
Source: Deloitte Access Economics

### 3.3 “Breakeven” Permit Prices

The previous section shows the fiscal impact, relative to the CEF baseline case, of lower permit prices. In the baseline price path scenario, our estimates suggest that the CEF package will begin to accumulate surpluses from 2016-17 onwards. Figures 3 and 4 show the fiscal impact relative to this baseline. But how much do permit prices have to fall in order for the negative fiscal impact to be just enough to completely wipe out the surpluses that would have emerged in the baseline case? In other words, what is the fiscal “margin of error” in the baseline price path?

This “breakeven” permit price path is straightforward to estimate – it is the permit price which, as a matter of simple arithmetic, equates revenues and outlays in each year, given other policy parameters and assumptions. The breakeven path is plotted in Figure 6 below, together with the baseline price path and the price floor from Figure 1. The results show that there is relatively little “margin for error” in the early years of the flexible price period. For example, Figure 6 shows that if permit prices are \$28.62 in 2016-17 instead of the \$31.21 as set out in the baseline case – a price reduction of less than 10 per cent relative to the baseline case – then the CEF package will move into deficit territory in that year. Permit prices will need to be around double the floor price in some years, and at least 30 per cent higher than the floor price from 2017-18 onwards, in order for the CEF package to just break even.

Note that in 2017-18 there is slightly more fiscal leeway relative to the baseline case than in other years. That is, the “breakeven” price is closer to the floor price than it is to the baseline price path. This occurs because in our baseline scenario projections, the CEF package generates a surplus of over \$2 billion in 2017-18 (see Appendix B). Hence, in the baseline scenario there is a greater “fiscal buffer” in this year than in 2016-17. This surplus in the baseline scenario in 2017-18 translates directly into a lower “breakeven” price in that year.

**Figure 6: Estimated “Breakeven” Permit Price Path, 2015-16 to 2019-20**

Source: Deloitte Access Economics

### 3.4 Fiscal Impact of High Permit Prices

In the absence of any other policy changes, the fiscal impacts of high permit prices should be broadly opposite to those under a low price scenario. That is, with some component of compensation “locked in”, any increase in permit revenue as a result of higher permit prices would outweigh increases in the dollar value of spending, resulting in surpluses relative to the baseline case.

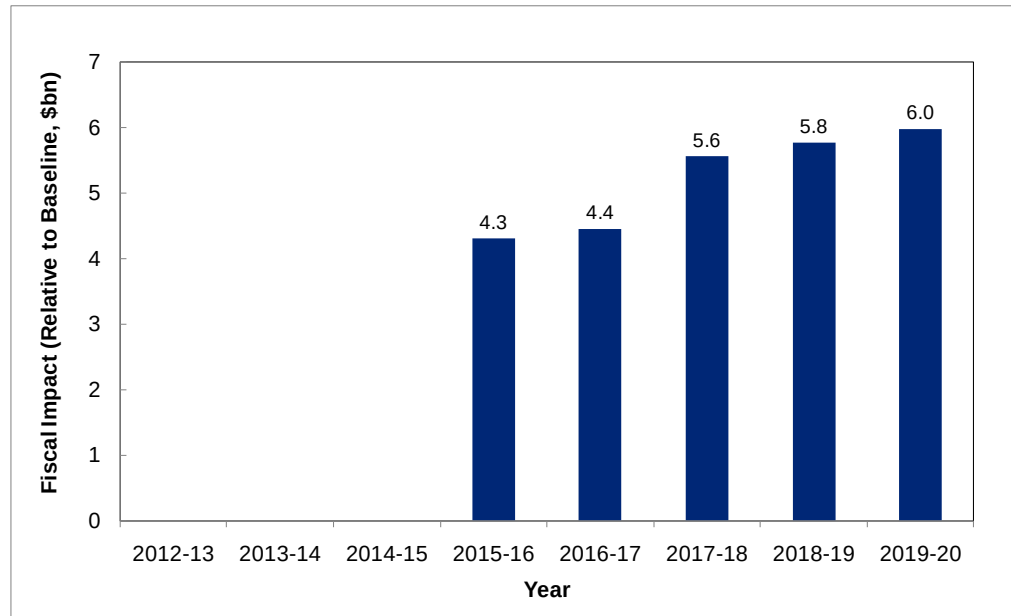
Figure 7 below shows the overall fiscal impact of high permit prices over the longer term, relative to the baseline scenario, assuming that there is no policy-induced “ratcheting up” of household compensation in response to higher permit prices. Note that under our assumptions, there is some increase in household assistance due to the effect of higher permit prices on the CPI.

With a high permit price path, assistance under the Jobs and Competitiveness Program rises in line with the rise in permit prices. Permit revenue and the revenue gain from the excise rebate reduction are both linked to permit prices, and both rise accordingly in the high price scenario.

However, it does not seem reasonable to expect that policies would not be implemented to increase household compensation in the event of higher permit prices. In other words, the large surpluses that are shown in Figure 7 below are unlikely to eventuate because of the political reality that further household compensation may be required. Hence, the fiscal risks of the CEF are asymmetric, and would seem to be more apparent on the downside. The risk

of deficits due to lower permit prices is unlikely to be matched by a similar symmetric “risk” of surpluses due to higher permit prices.<sup>10</sup>

**Figure 7: Estimated Overall Fiscal Impact (Relative to Baseline) in the High Price Scenario, 2012-13 to 2019-20 (Assuming no Additional Household Compensation)**



Source: Deloitte Access Economics

<sup>10</sup> In effect, the CEF package puts Government (and taxpayers) in the same position as the seller of an American put option – they are taking on relatively little upside risk, but a considerable amount of downside risk.

## 4 Conclusion

The combined effect of “locking in” household compensation in the CEF package, together with the structure of other measures, as well as uncertainty around future permit prices, means that there is a real risk that the Government’s climate change policy will not be budget neutral.

This paper has examined these risks by conducting a simple sensitivity analysis, varying the permit price during the flexible price period (2015-16 and beyond). Our analysis shows that if the permit price turns out to be lower than expected and follows the floor price path announced in the CEF package, then the fiscal risks of the overall package are likely to be significant, with a cumulative fiscal shortfall (relative to baseline) of around \$18.6 billion over the period 2015-16 to 2019-20. That is, a low permit price would turn an estimated cumulative surplus of \$9.1 billion into a cumulative deficit of \$9.5 billion over this period.

Our results also show that if the CEF package is to at least “break even” during the floating price period, permit prices will need to be around double the floor price in some years, and at least 30 per cent higher than the floor price from 2017-18 onwards.

# Appendix A: Key Modelling Assumptions

This section sets out the assumptions that are used in the baseline and low price scenarios.

- **Permit prices:** In the baseline scenario the permit price in 2015-16 is assumed to be \$29, growing at a real rate of 5 per cent, with an assumed inflation rate of 2.5 per cent. In the low price scenario, the permit price in 2015-16 is assumed to be \$15, growing at a real rate of 4 per cent, with an assumed inflation rate of 2.5 per cent. In the high price scenario, the permit price in 2015-16 is assumed to be \$20 above the baseline price, rising annually by 5 per cent in real terms, with an assumed inflation rate of 2.5 per cent. These assumptions are identical to those used in the CEF policy document (see page 104 of *Securing a Clean Energy Future*).
- **Excise rebate reduction:** The revenue impact from the excise rebate reduction is assumed to follow the change in permit prices, but in both the baseline and low price scenario incorporates an assumption of heavy-vehicle transport activity growth of 1 per cent per year from 2015-16 onwards. This is consistent with data from the Bureau of Infrastructure, Transport and Regional Economics, which indicates that the number of kilometres travelled by rigid and articulated trucks has increased at an average rate of 1.14 per cent per year over the last three years.<sup>11</sup>
- **Household compensation:** In both the baseline and low price scenarios, total compensation to households is permanent and is assumed to grow at an annual nominal rate of 0.5 per cent, with compensation of 0.035 per cent for every dollar increase in the permit price. The latter incorporates the effect that changing permit prices may have on the Consumer Price Index (CPI). Hence, if permit prices rise (fall), this allowance increases (reduces) household compensation by 0.035 per cent for every dollar rise (fall) in the permit price. Overall, the assumed CPI component is very small and, as a result, household compensation is on the whole not sensitive to permit price assumptions. The Government's modelling indicates that in 2015-16, an increase in the (real) permit price from \$20.20 to \$24.60 increases the CPI by 0.2 percentage points (see *Strong Pollution Low Growth*, Chart 5.39)
- **Jobs and Competitiveness Program:** In both the baseline and low price scenarios, assistance under this component is assumed to depend on the permit price, with two additional components. First, in each scenario, overall economic activity of industries covered under the Jobs and Competitiveness program is assumed to grow at a nominal rate of 2 per cent per year. Second, in each scenario, in line with the CEF package, the quantity of free permits is assumed to fall by 1.3 per cent per year. The latter assumption is identical to that used in the CEF policy document (see page 55 of *Securing a Clean Energy Future*).
- **Other support for jobs (including the Clean Technology Program):** In both scenarios it is assumed that this measure allocates \$0.4 billion in 2015-16, but ends after that year. This is consistent with the Government's announcement of a total allocation of \$1.2 billion for the CTP in the CEF package.
- **The Energy Security and Transformation Package:** In both scenarios this measure is assumed to allocate a fixed number of permits each year, ending in 2016-17. This component has a minor fiscal impact across the scenarios in 2015-16 and 2016-17.

<sup>11</sup> See BITRE (2011) *Yearbook 2011: Australian Infrastructure Statistics*, page 76.

- **The Clean Energy Finance Corporation:** In both scenarios this measure is assumed to involve spending a constant annual amount of \$0.455 billion in each year between 2015-16 and 2019-20. This is identical to the amount put aside for this program in 2014-16 and is consistent with the Government's policy of allocating a total of \$10 billion to this program.
- **Governance:** In both scenarios, spending on governance measures is assumed to increase by \$1 million each year between 2015-16 and 2019-20. This is consistent with the increase in the last two years of the fixed price period as specified in the Government's policy documentation. (See page 131 of *Securing a Clean Energy Future*).
- **Other Policy Measures:** In both scenarios, the Land and Biodiversity Measures, the Coal Sector Jobs Package and Steel Transformation Plan are assumed to spend amounts that are not sensitive to fluctuations in permit prices. This is consistent with the CEF package.



## Appendix B: Data Appendix

**Table B1: Baseline Price Scenario Estimates, 2015-2016 to 2019-20**

|                                          | 2015-16      | 2016-17      | 2017-18      | 2018-19      | 2019-20      |
|------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Nominal Permit Price (\$/t)</b>       | <b>29.00</b> | <b>31.21</b> | <b>33.59</b> | <b>36.15</b> | <b>38.91</b> |
| <b>Permits (million)</b>                 | <b>330</b>   | <b>322</b>   | <b>314</b>   | <b>306</b>   | <b>297</b>   |
| Permit value (\$m)                       | 9571         | 10046        | 10537        | 11046        | 11570        |
| Excise Rebate Reduction (\$m)            | 1730         | 1880         | 2044         | 2222         | 2415         |
| <b>Individual Measures</b>               |              |              |              |              |              |
| Household Assistance (\$m)               | 4855         | 4883         | 4912         | 4941         | 4970         |
| Energy security and transformation (\$m) | 1209         | 1302         |              |              |              |
| Other Support for jobs (\$m)             | 400          |              |              |              |              |
| Jobs and competitiveness program (\$m)   | 3807         | 4125         | 4469         | 4842         | 5247         |
| Coal (\$m)                               | 280          | 282          |              |              |              |
| Steel (\$m)                              | 75           | 36           |              |              |              |
| Land (\$m)                               | 300          | 200          |              |              |              |
| Clean Energy Finance Corporation (\$m)   | 455          | 455          | 455          | 455          | 455          |
| Governance (\$m)                         | 108          | 109          | 110          | 111          | 112          |
| <b>Surplus/Deficit (\$m)</b>             | <b>-188</b>  | <b>534</b>   | <b>2635</b>  | <b>2919</b>  | <b>3201</b>  |

Source: Deloitte Access Economics, based on assumptions and data as outlined in Appendix A

**Table B2: Low Price Scenario Estimates, 2015-2016 to 2019-2020**

|                                          | 2015-16      | 2016-17      | 2017-18      | 2018-19      | 2019-20      |
|------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Nominal Permit Price (\$/t)</b>       | <b>15.00</b> | <b>15.99</b> | <b>17.05</b> | <b>18.17</b> | <b>19.37</b> |
| <b>Permits (million)</b>                 | <b>330</b>   | <b>322</b>   | <b>314</b>   | <b>306</b>   | <b>297</b>   |
| Permit value (\$m)                       | 4950         | 5147         | 5347         | 5552         | 5760         |
| Excise Rebate Reduction (\$m)            | 895          | 963          | 1037         | 1117         | 1202         |
| <b>Individual Measures</b>               |              |              |              |              |              |
| Household Assistance (\$m)               | 4831         | 4857         | 4883         | 4910         | 4936         |
| Energy security and transformation (\$m) | 626          | 667          |              |              |              |
| Other Support for jobs (\$m)             | 400          |              |              |              |              |
| Jobs and competitiveness program (\$m)   | 1969         | 2113         | 2268         | 2434         | 2612         |
| Coal (\$m)                               | 280          | 282          |              |              |              |
| Steel (\$m)                              | 75           | 36           |              |              |              |
| Land (\$m)                               | 300          | 200          |              |              |              |
| Clean Energy Finance Corporation (\$m)   | 455          | 455          | 455          | 455          | 455          |
| Governance (\$m)                         | 108          | 109          | 110          | 111          | 112          |
| <b>Surplus/Deficit (\$m)</b>             | <b>-3199</b> | <b>-2610</b> | <b>-1332</b> | <b>-1241</b> | <b>-1153</b> |

Source: Deloitte Access Economics, based on assumptions and data as outlined in Appendix A

**Table B3: Comparison of Estimates of Fiscal Impact: Baseline Scenario versus Low Price Scenario (\$million), 2015-2016 to 2019-20**

|                           | 2015-16      | 2016-17      | 2017-18      | 2018-19      | 2019-20      | TOTAL         |
|---------------------------|--------------|--------------|--------------|--------------|--------------|---------------|
| <b>Baseline Scenario</b>  | -188         | 534          | 2635         | 2919         | 3201         | 9101          |
| <b>Low Price Scenario</b> | -3199        | -2610        | -1332        | -1241        | -1153        | -9535         |
| <b>Difference</b>         | <b>-3011</b> | <b>-3144</b> | <b>-3967</b> | <b>-4160</b> | <b>-4354</b> | <b>-18636</b> |

Source: Deloitte Access Economics, based on assumptions and data as outlined in Appendix A

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