Submission

Australia's emissions budgets, targets, caps and trajectories:

Response to the Climate Change Authority's *Caps and Targets Review Issues Paper*

May 2013

Contents

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1 Summary

The Climate Institute (TCI) welcomes this opportunity to make a submission on the Climate Change Authority's (CCA) *Caps and Targets Review Issues Paper*.

TCI endorses the CCA's focus on options to raise Australia's emission reduction ambitions above the minimum, unconditional five-per-cent reduction target, and to examine options for setting longer-term emission budgets and pathways for 2030 and 2050.

We also note that the 5-25 per cent 2020 target range has bipartisan political support in Australia.

1.1 Delivering the national interest in avoiding 2°C

The CCA takes it as a given, as set out in the Clean Energy Future Act, that it is in Australia's national interest to avoid a 2°C increase in global temperature. The CCA also recognises the importance of avoiding 2°C in setting Australia's emission reduction goals and anchoring actions in science. Under the UNFCCC's Cancun Agreements and Durban Platform for Enhanced Ambition Australia has also made undertakings to help avoid a 2°C increase in global temperature and increase short-term emission reduction ambitions.

However, the CCA is not explicit about how Australia's national interest in and international undertakings to avoid 2°C will be used to define national emission goals.

There are a number of considerations flagged by the CCA that implicitly exclude consideration of Australia's national interest. For example, the Issues Paper makes no reference to Australia's international undertakings to, and national interest in contributing to, avoiding a 2°C increase in global temperature in setting emission goals.

Also, while the CCA should consider the current 80-per-cent-by-2050-emission-reduction target in its deliberations, it should not have primacy over the national interest of avoiding a 2°C increase, and Australia's international undertakings in this regard.

While consideration of a 2°C increase is implicit in a number of sections, Australia's national interest and international undertakings to contribute to avoid 2°C should be explicit considerations in the setting of Australia's emission reduction goals in the short and long term.

TCI recommends setting a long-term Australian carbon budget to 2050 that gives a transparent and direct link to a global carbon budget consistent with climate science, international undertakings and Australia's national interest. This budget should provide explicit guidance to Australia's 2020, 2030, and 2050 emission trajectories.

Long-term budgets also provide a clearer, longer-term investment signal to guide investment decisions on emitting activities - encouraging, for example, greater research and development expenditure in innovative technologies.

Setting a long-term national budget based on avoiding a 2°C increase in global temperature also clearly signals Australia's willingness to play its fair part in global emission reductions and meet current international undertakings.

TCI recommends the CCA sets an Australian carbon budget that:

+ **Is consistent with the national interest (as defined by the Act)**. Australia's carbon budget should be based on a global budget that has a high probability of 'ensuring that average global temperatures increase by not more than 2 degrees Celsius above pre-industrial levels'.
+ **Focuses on the long term**. The CCA should outline an Australian carbon budget to 2050. This would provide guidance to short-term cap-setting processes and the longer-term indicative emissions pathway to 2030 and 2050. This budget could be reviewed through time in line with new science and other relevant developments.
+ **Hedges against the need for stronger action**. The budget and associated emission reduction pathways should be set to hedge against the possibility of even more ambitious action becoming imperative in the future (e.g. 1.5^{o}C global goal currently under consideration under the UNFCCC).

1.2 Marrying Australia's climate national interest and international action

The 'facilitative' approach to international climate agreements that has emerged since Copenhagen has contributed to the majority of major emitters making international commitments to constrain emissions.

The development of the new international climate architecture requires fresh thinking and ambitious approaches to domestic policy making.

The 2015 agreement currently under negotiation will very likely involve:

+ countries advancing self-selected emission reduction targets and contributions;
+ that these commitments be reviewed by the international community; and
+ that, after this review, targets will be inscribed in the new agreement and be subject to transparency provisions: measurement, reporting and verification (MRV).

This underscores that the self-selection of credible national goals is paramount to effective global action in the short-term. At present, solid self-selected commitments that are consistent with 2^{o}C are the only way Australia's national interest will be achieved.

A domestic policy that can meet ambitious targets is central to building the credibility of the emerging architecture, facilitating global ambition, and to avoiding negative responses from other major economies (e.g. border tariffs).

1.3 Implication for emission goals

Some of the implications for emission reduction goals include:

+ Australia's short-term carbon budget and 2020 emission reduction target should be based on an assessment of Australia's fair share of the global carbon budget consistent with avoiding a 2^{o}C increase in global temperature. Specifically, Australia's national 2020 emissions reduction target should be set at 25 per cent below 2000 levels.
+ Australia's long-term emissions trajectory should not be solely defined by the 80-per-cent-by-2050 emission

target. This goal should define the *minimum* not maximum contribution Australia makes to avoiding dangerous climate change. The CCA should set a national carbon budget based a 1.5°C-2°C global carbon budget temperature, and in doing so define a range of national contribution trajectories. This range of possible emission reductions would define the broad indicative national emission pathway to 2050.

1.4 Summary of responses to specific issues raised in the Issues Paper

Issue	TCI response	Page
Whether Australia's emissions reduction goals should be aligned with its commitments under the Kyoto Protocol	Short-term carbon budgets and emission caps should be aligned to ensure, with a high degree of certainty, that international obligations, undertakings and commitments are met.	19
The role of international bunker fuels	The CCA should identify and articulate a clear timeline and processes for the possible inclusion of the international shipping and aviation sectors emissions under Australia's domestic emission cap as part of the CCA's 2016 review. The CCA should also identify the possible scale of international financing contributions from Australia, international shipping and aviation as part of the broader national contribution to avoiding dangerous climate change.	19
How targets, trajectories, budgets, and caps might be framed to help reduce uncertainty and managing risks	Emission goals should be set based on the precautionary principle and support a strategy that ensures that short-term actions do not compromise long-term objectives. This implies stronger, not weaker, emission goals.	19
The global emissions budget of most relevance to Australia	The global carbon budget most relevant to Australia has a high probability of achieving the national interest as defined in the Act - 'ensuring that average global temperatures increase by not more than 2 degrees Celsius above pre-industrial levels'. A global carbon budget based on the current commitments and actions of the global community to 2020 could also be defined to illustrate the implications of redirecting to a global budget consistent with the national interest after this time. A global carbon budget that seeks to limit global temperatures below 1.5ºC by 2100 should also be used to inform and hedge against the greater action that is currently being discussed by the UNFCCC.	19-20

Different principles and approaches to determine Australia's fair share of a global emissions budget	No single metric or approach will be sufficient. Current and future Australian emission commitments should then be compared under a range of approaches. The CCA should focus on approaches that are simple and transparent, recognise different national capacities and take into account historical responsibilities from when harm could have been reasonably foreseen (e.g. 1990).	20-21
Government's existing 2020 target conditions	Based on these conditions, Australia's minimum 2020 emission reduction commitment would be a 12–15 per cent reduction on 2000 levels by 2020. However, TCI agrees that the target considerations are not the only measure of what Australia's final 2020 target should be. Guidance provided by a global carbon budgets consistent with the national interest will also be critical.	21, 26-29
The countries Australia should compare itself with	This confuses two separate issues. The most important consideration is Australia's fair contribution to avoiding a 2°C increase in global temperature. The second issue includes competitiveness concerns and the potential of carbon leakage. This will largely be determined by the policy used to achieve a given emission reduction goal and the measures that are put in place to avoid carbon leakage. The CCA should assess the economic impact of different emission commitments and the extent to which existing programs such as the Jobs and Competitiveness Program negate, or even subsidise, emission intensive trade exposed industries.	21
The role Australia plays in building an agreement which covers commitments from all major economies	Australia's actions influence other countries, including: + *Building an agreement which covers commitments from all major economies*: Ratification of the Kyoto Protocol, subsequent commitment to a second commitment period target and implementation of a Clean Energy Future package have been strongly welcomed by the international community. This has allowed Australia to play a more proactive and positive role in brokering agreements between different negotiating blocs (e.g. our role of the Cartagena Dialogue and as a counter balance to countries like Canada in the Umbrella Group).	21-23

	+ *Having credible domestic policy setting*: Current discussions of a 'spectrum of commitments' and the inscription of 'national contributions' with peer review rest on the credibility of national actions. A policy that can meet stated international targets is central to building the credibility of the emerging architecture, building global ambition, and avoiding negative responses from other major economies (e.g. border tariffs). + *Meeting other international commitments*: Australia's contributions to global action on climate change also extend to meeting other international commitments (e.g. public and private sector finance under the UNFCCC). + *Learning by doing and exporting expertise*: Australia's positive and negative experiences with the establishment of a domestic carbon market provide valuable lessons for other countries currently establishing their own systems (e.g. China and South Korea). Our extractive industries and the challenges that Australia faces in its decarbonisation efforts lend us credibility with many key middle income economies such as South Africa and Brazil. + *Strategic use of carbon markets to build global ambition*: Transformative ambition 'clubs' or coalitions could be used to build greater levels of international action. Australia is yet to fully capitalise on the potential for building linking arrangements and emission-trading coalitions.	
How Australia's carry over of emission units should be used	Surplus units should not be used to weaken domestic ambition. These units should cancelled.	23
The likely impact of emission-reduction goals on the carbon price	Australia will likely be a price-taker on global markets. However, the extent of this will depend on a number of factors. For example, there is a risk that in the first few years of the floating price period that a combination of a weak emission cap and stable, or even declining, liable party emissions could see the pricing shaped by the Kyoto, not the European Union, market.	23

Whether tighter caps might provide a hedge against the uncertainty	Setting tighter caps to hedge against global and domestic policy uncertainty is consistent with the general approach recommended by TCI.	23-24
Whether emissions caps should follow the path of the national trajectory on a year-by-year basis	The pathway of emission caps should be set in a way that is consistent with Australia's long-term carbon budget. In addition, in the first years of the scheme, tighter caps may be required to hedge against the possibility that Australian prices are not shaped by Kyoto markets.	24
An evaluation framework to assess Australia's future progress	The development of this framework should be guided by Australia's long-term carbon budget. In addition to the definition of strategic milestones for the power sector, a similar approach should be used for the carbon productivity of the economy overall.	24
Opportunities and risks associated with linkages between domestic and international carbon markets	The development of ambitious carbon market coalitions provides an opportunity to use the benefits of trade to encourage greater global ambition. Lower abatement costs also provide an opportunity for Australia to be more ambitious in its emission reduction commitments. In addition, carbon markets offer the opportunity to drive substantial private sector financing in developing nations. However, there are risks associated with links to global markets as the current international market is immature. While this remains the case and global prices are low (or subject to substantial political risks), Australian investors may commit to long-term assets that are excessively emissions intensive. As a result, the nation risks deadweight losses from stranded assets and will have to spend on more costly abatement later on. With immaturity also comes less price certainty and risk premiums for new investment are increased. This reduces economic efficiency and increases the cost of the low-carbon transition. In the absence of a carbon-price floor, the immaturity of the global market and short-term low-carbon prices together strengthen the case for complementary policies such as the Renewable Energy Target, vehicle standards and the proposed national Energy Savings Initiative.	24-25

2 Introduction

The Climate Institute welcomes this opportunity to make a submission on the Climate Change Authority's (CCA) *Caps and Targets Review Issues Paper*.

Established in late 2005, The Climate Institute (TCI) is a non-partisan, independent research organisation that works with community, business and government to catalyse and drive the change and innovation needed for a low pollution economy and culture. Our vision is for a resilient Australia prospering in a low-carbon global economy; participating fully and fairly in international climate change solutions.

This submission is structured in two parts:

+ **Key considerations**. This section addresses the key overriding issues raised by the Issue Paper. It includes, for example, a discussion of how the national interest, as defined by the Act, should guide decision-making and the benefits of Australia taking early ambition action to reduce emissions.
+ **Reponses to the specific issues that the CCA has raised**. This section addresses the specific question raised by the CCA.

Importantly, TCI welcomes the CCA's focus on options to raise Australia emission reduction ambitions above the minimum, unconditional five-per-cent reduction target (pp 12 and 14), and examine options for setting longer-term emission budgets and pathways for 2030 and 2050 (pp vii and 15).

We also note that the 5-25 per cent 2020 target range has bipartisan political support in Australia.

3 Key considerations

3.1 Guided by the national interest of avoiding 2°C

Australia is likely to be more adversely impacted by climate change than other comparable countries. This implies that Australia has a stronger interest than most in arguing for deeper and more rapid cuts in global emissions.

It is also important to recognise that lags in climate change mean that precise impacts will only be known with certainty after they are too late to avoid, at which point they will be irreversible or, at least, likely to take decades or centuries to correct. This is in contrast to the economic impacts of emissions reductions, which are reasonably well known, and in most cases involve a delay of a few months or years to reach a given level of economic activity or per-capita income.[1]

The CCA states that (p 3):

> *The objectives of the Clean Energy Act 2011 and Australia's international commitments recognise Australia's overarching interest in limiting warming to 2 degrees. The Authority accepts this view as given in approaching this Review.*

The Issues Paper recognises the importance of this goal in setting Australia's emission reduction goals (p 4) and anchoring actions in science (p 7).

However, it is not explicit about how Australia's national interest in avoiding 2°C[2] will be used to define national goals.

Specifically, there are a number of considerations flagged in the Issues

Paper that implicitly exclude consideration of Australia's national interest:

+ **Emission reduction goals** (p 12). In this section, the Issues Paper makes no reference to Australia's international undertakings to and national interest in contributing to avoiding a 2ºC increase in global temperature above preindustrial levels.

+ **Longer term outlook for emission reductions** (pp 14 and 15). The CCA recognises the benefits in providing guidance to the scale and pace of Australia post 2020 emission reductions. However, the CCA proposes to use the 80-per-cent-by-2050-emission-reduction target as 'an important reference point' and 'a given'.

  While the Authority should consider this emission-reduction goal in its deliberations, it should not have primacy over the national interest of avoiding 2ºC, and Australia's international undertakings in this regard. This is pertinent given that a number of assessments conclude that an 80-per-cent-reduction-target for Australia would not be an equitable contribution to avoid a 2ºC increase in global temperature.[3]

While consideration of the 2ºC is potentially implicit in a number of sections (e.g. pp 17 and 18), Australia's national interest and international undertakings to contribute to avoid 2ºC should be explicit considerations in the setting of Australia's emission reduction goals in the short and long term.

As outlined in TCI's recent policy brief, the setting of a long-term carbon budget gives a transparent and direct link to a global carbon budget consistent with Australia's national interest.[4] This budget can provide explicit guidance to Australia's 2020, 2030, and 2050 emission trajectories (see Figure 1, Figure 3 and also Section 4.1.1).

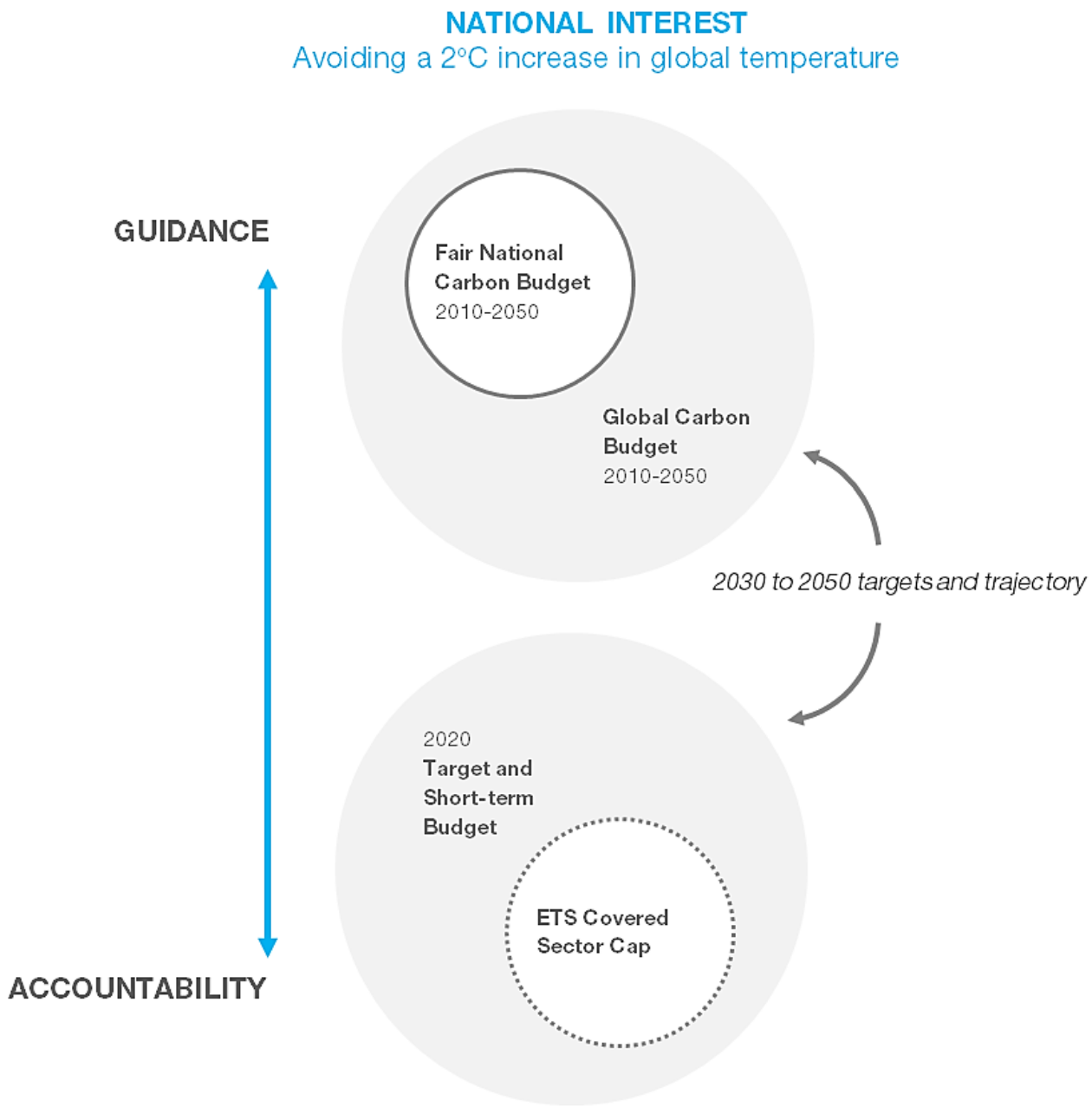
Figure 1: Proposed national carbon budget framework.

1. Guided by the national interest established in the Act a global carbon budget is defined that gives a high level of certainty to avoid a 2°C increase in global temperature.

2. A fair 2010-2050 carbon budget for Australia is then developed based on an equitable contribution to the global budget.

3. This national budget guides decisions on Australia's final 2020 target, short-term carbon budget and emission cap on covered sectors. It also influences 2030 and 2050 emission pathways.

4. Short-term accountability is set by the 2020 target, short-term budget and the legal requirements on liable industries under the cap on covered sector emissions.



3.1.1 Marrying the climate national interest and international action

The Issues Paper asks how Australia's actions can influence others (p 24) and raises questions around the extent of international action (p 19).

A clear Australian commitment to decisive emission reductions would help to build the confidence and willingness of others to take comparable actions, and provide greater credibility and leverage in mobilising international action to reduce emissions. An associated benefit is that Australia may find it easier to pursue other climate policy objectives, such as linking to global carbon markets if it is clear that Australia is not seeking to delay effective global action to reduce emissions (See also Section 4.1.8).

TCI's recent policy paper on defining an Australian carbon budget notes that:

> *Setting a long-term national budget based on avoiding a 2°C to 1.5°C increase in global temperature would also signal Australia's willingness to play its fair part if global emission reductions. While, setting a long-term emission reduction pathway could also potentially achieve this goal, a national budget based on a global budget gives an explicit and transparent link avoiding an agreed change in global temperature.*

Figure 2 illustrates the tensions in current conceptual frameworks governing the potential shape of the new agreement and positions of the major negotiators.[5]

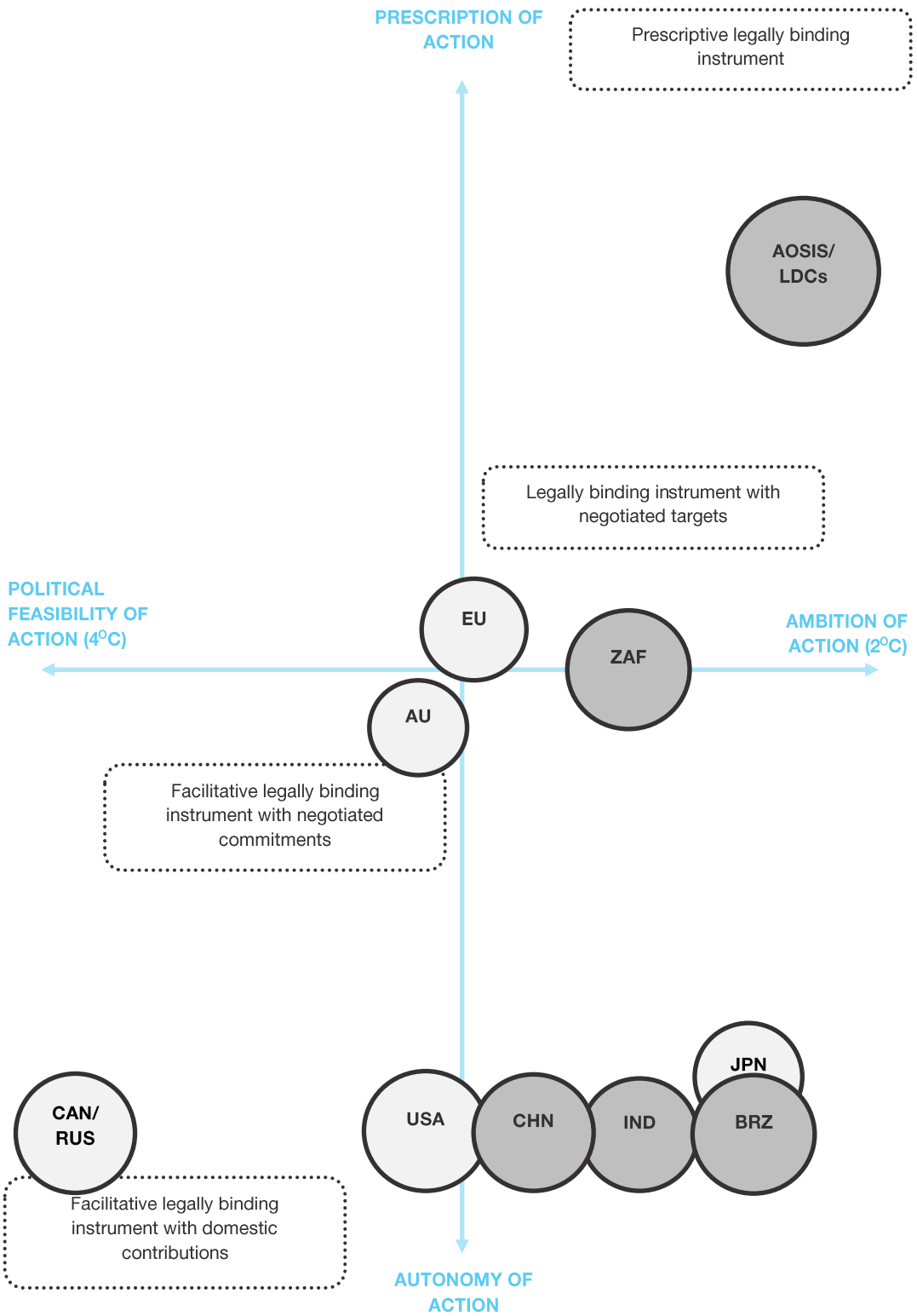
The more 'facilitative' approach that as emerged since Copenhagen has contributed to the majority of major emitters making international commitments to constrain emissions[6, 7] and current discussions[8] of a 'spectrum of commitments' and the inscription of 'national "contributions' with peer review underscore this approach.

Figure 2 shows that the 2015 agreement will very likely involve countries advancing self-selected targets and contributions, that these commitments to be reviewed by the international community, and, after this review, targets will be inscribed in the new agreement and subject to a strong transparency provisions: measurement, reporting and verification (MRV). That later is likely to be very important to both the USA and China as they seek to overcome perceived competitiveness concerns in domestic constituencies.

In this scenario, the credibility and ambition of domestic policy settings will become more important under the new 2015 agreement.[9] A policy that can meet stated international targets is central to building the credibility of the emerging architecture, building global ambition, and avoiding negative responses from other major economies (e.g. border tariffs).

This has a number of implications for Australia's emission goals. Importantly, it illustrates that the self-selection of credible goals is paramount to effective global action in the short-term. At present, solid self-selected commitments consistent with 2°C are the only way Australia's national interest will be achieved.

Figure 2. Illustrative options for the 2015 agreement and countries' positions. 'Prescriptive' approaches include targets/actions backed by a Kyoto-style compliance system. 'Facilitative' approaches include self-selected conditional targets/actions complemented by the emerging Cancun Agreement MRV system. Further differentiation is possible as some suggest the spectrum of targets/actions ought to be multilaterally agreed and based on an ambitious global goal; others advocate that targets/actions should be based on self-selection set to an aspirational global goal; while still others suggest that targets/actions be enshrined in domestic law. Here, these approaches are mapped against the climate outcomes and the level of autonomy and ambition of country contributions. Note: ZAF is South Africa.



4 Response to specific issues

4.1.1 Recommendations for emissions reduction goals beyond 2020

(CCA, 2013, Section 3.1.1)

These issues are dealt in detail in TCI's recent policy brief *Operating in Limits: Defining an Australian Carbon Budget*[10] and outlined again in Section 3.1 above.

In summary, by themselves, both short-term carbon budgets and longer-term trajectories provide only a weak link to:

+ the global carbon budget the CCA 'must' consider;
+ Australia's national interest of avoiding 2ºC; and
+ the undertakings Australia has made under the United Nation's Framework Conventions on Climate Change (UNFCCC) (to contribute to avoiding a 2ºC and possibly 1.5ºC increase in global temperature above pre industrial levels).

This increases the risks that shorter-term targets may be set without explicit reference to avoiding dangerous climate change.

The principle strength of a long-term budget is that provides a transparent and direct link to a defined climate outcome. Australia is highly vulnerable to the impacts of climate change and the Clean Energy Act's objectives state that Australia's national interest lies in ensuring that global temperatures do not increase by more than 2ºC above pre-industrial levels.

Also, climate impacts are driven by cumulative emissions or the overall stock of greenhouse gases in the atmosphere. Therefore, any change in an emission trajectory towards a lower atmospheric stabilisation or carbon budget target needs to offset the stock of past emissions in addition to reducing future emissions. Delayed or overly modest emissions targets risk both an 'investment overhang' in plant and equipment with high emissions (at risk of early retirement) and an 'emissions overhang' of past emissions that need to be offset.

Setting a long-term national budget based on avoiding a 2ºC to 1.5ºC increase in global temperature also clearly signals Australia's willingness to play its fair part in global emission reductions (Section 4.1.8). Setting a long-term emission reduction pathway could also achieve this goal; a national budget based on a global budget gives an explicit and transparent link avoiding the need for agreement on an acceptable global temperature rise.

Long-term budgets also provide a clearer, longer-term investment signal to guide investment decisions on emitting activities—encouraging, for example, greater research and development investment in innovative technologies.

TCI recommends the CCA sets an Australian carbon budget that:

+ **Is consistent with the national interest (as defined by the Act)**. Australia's carbon budget should be based on a global budget that has a high probability of 'ensuring that average global temperatures increase by not more than 2 degrees Celsius above pre-industrial levels'.
+ **Focuses on the long term**. The CCA should outline an Australian carbon budget to 2050. This would provide guidance to short-term cap-setting processes and the longer-term indicative emissions pathway to 2030 and 2050. This carbon can be

periodically reviewed in little of new relevant information.

+ **Hedges against the need for stronger action**. The budget and associated emission pathways should be set to ensure it hedges against the possibility of even more ambitious action becoming imperative in the future (e.g. 1.5ºC global goal currently under consideration under the UNFCCC).

Figure 3 outlines TCI's proposed national emission goals, commitments and contributions underpinned by long-term global and national carbon budgets.

Figure 3: National commitments and contributions underpinned by carbon budgets.

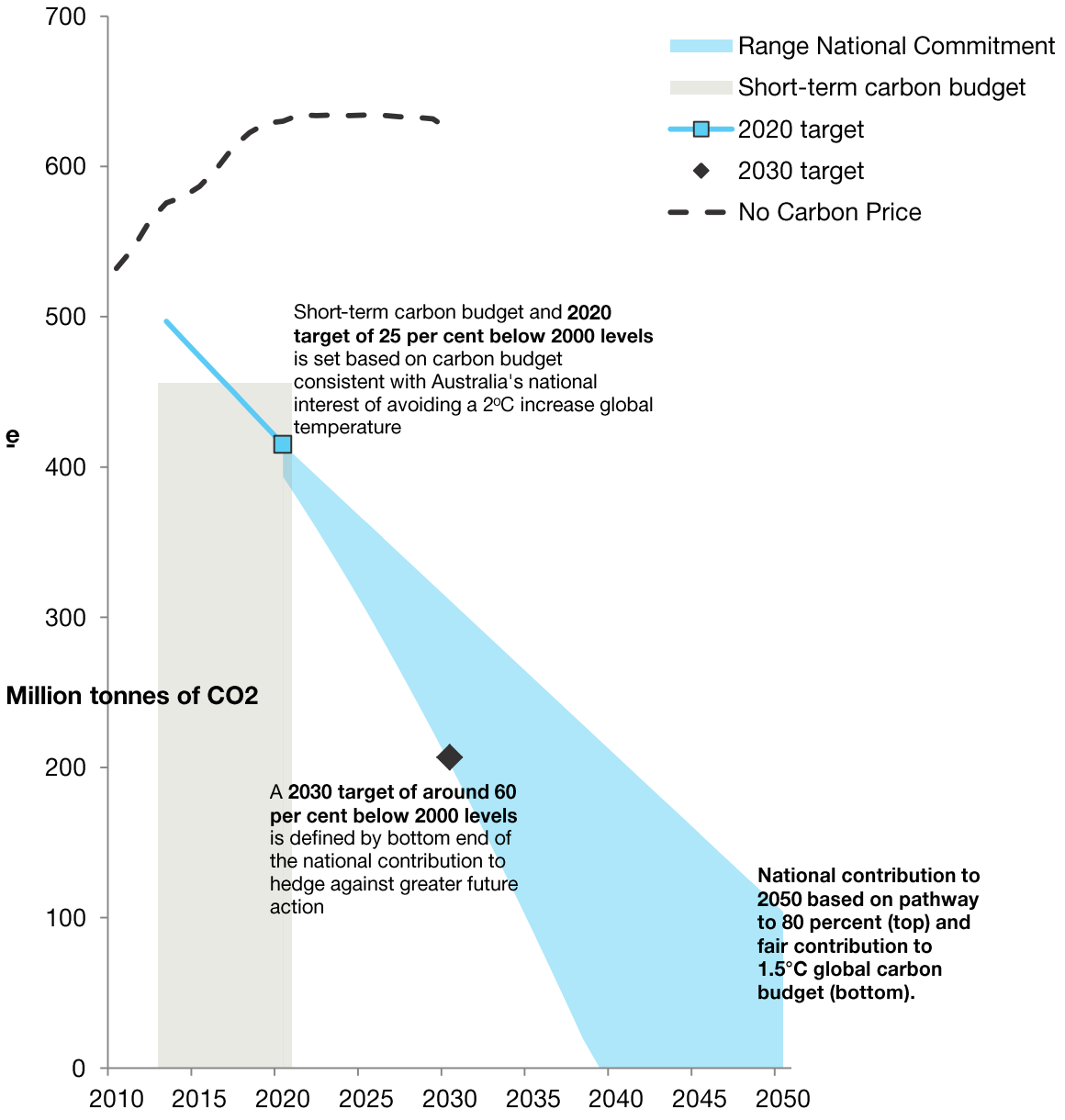
1. Define a national carbon budget to 2050 consistent with a fair contributions to a 1.5ºC -2ºC global carbon budget.

2. Guided by this carbon budget define a national 2020 target and short-term carbon budget.

3. Define a range of national contribution trajectories based on the minimum 80 per-cent reduction by 2050 and more stringent and fair contributions to a 1.5ºC -2ºC global carbon budget.[11] This range of possible emission reductions defines the broad indicative national emission pathway to 2050.[12]

4. Define 2030 target at bottom end of national contribution to hedge against greater future action.

5. Note that additional contributions possible through negative emission technology or Government purchase of international emission units.



4.1.2 Whether Australia's emissions reduction goals should be aligned with its commitments under the Kyoto Protocol?

(CCA, 2013, Section 3.1.2)

Any short-term carbon budgets and emission caps should be aligned to ensure, with a high degree of certainty, that international obligations and commitments are met. Failure to do so weakens Australia's ability to play a constructive role in a new agreement that covers commitments from all major emitters.

TCI notes that as inventory data for base years is updated the relative level of ambition to achieve either Australia's Kyoto Protocol obligation or its Cancun Agreement commitments may change. Accounting changes associated with, for example, including the Kyoto Protocol's Article 3.4 can also impact on the stringency of national targets. The CCA should use the most ambitious obligation or commitment as the basis for considering international commitments and undertakings.

International bunkers: Emissions from international shipping and aviation are growing global emission sources.[13] Pollution charges in these sectors could be used to support Australian and other developed-country commitments to public and private financing of US$100 billion by 2020.[14]

TCI recommends the CCA:

+ Include international shipping and aviation in modelling of global and national emissions. Also, define the role of these sectors in the global and Australian carbon budgets to 2050.
+ Examine the progress made under the UNFCCC, International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) to address emissions from these sectors. Also, examine the impact of unilateral measures by the European Union to capture international aviation emissions under their emission trading scheme and the role this has played in driving multilateral solutions.
+ Identify the possible scale of international financing contributions from Australia under these sectors as part of the broader national contribution to avoiding dangerous climate change (Section 4.1.8).
+ Identify and articulate a clear timeline and processes for possible inclusion of these sectors under Australia's domestic emission cap as part of the CCA's 2016 review.

4.1.3 How targets, trajectories, budgets, and caps might be framed to help reduce uncertainty and managing risks

(CCA, 2013, Section 1.2.3.)

Regardless of the types of targets, trajectories, budgets, and caps that are set they should be based on the precautionary principle and a 'hedging' strategy to better deal with uncertainty. That is, ensure that short-term actions do not compromise long-term objectives.

Making more rapid early reductions also helps to manage the economic risks to Australia from uncertainty about climate impacts and the pace of global action in response to it.[15] This is because it is much more difficult and costly to accelerate emissions reductions than to decelerate them in response to improved climate science or changing international circumstances. These risks are potentially reduced, but not eliminated, by links to global carbon markets (see Section 4.1.14).

4.1.4 The global emissions budget of most relevance to Australia

(CCA, 2013, Section 3.2.1)

The most relevant global carbon budget is one that is based on the national interest

and a high probability of 'ensuring that average global temperatures increase by not more than 2 degrees Celsius above pre-industrial levels'.

A global budget—one based on the current commitments and actions of the global community to 2020—could also be defined to illustrate the implications of redirecting to a global budget consistent with the national interest.

This 'redirection' budget could be useful to identify the risks to Australia of delayed global action. This would be important in two areas:

+ Australia will be impacted by the actions of other countries through impacts on our export industries, learning by doing in technology costs and the price of international emission units; and

+ it is hard to conceive of a scenario where all other major emitters are rapidly decarbonising and Australia is not participating. This has implications for Australia's post 2020 emission trajectory.

Finally, a global budget should be developed for a world that seeks to limit global temperatures below 1.5°C by 2100 (noting that this may involve some initial overshoot and may not have a strong impact on actions to 2050). The budget would be used to inform and hedge against the greater action that is currently being discussed by the UNFCCC.

4.1.5 Different principles and approaches to determine Australia's fair share of a global emissions budget

(CCA, 2013, Section 3.2.3)

The CCA should define a range of possible contributions from Australia and be explicit about the equity implications of each. No single metric or approach will be sufficient. Current and future Australian emission commitments should then be compared to these contributions. For example, work undertaken for the German government[16] and Climate Tracker[17] use this approach in comparing the adequacy of country commitments.

The risk with this approach is that the range of possible emission reductions is so large that this does not give guidance to Australia's fair contribution. To limit the number of approaches accessed the CCA could focus on approaches that are simple and transparent (e.g. approaches based on per-capita approaches that link directly to global carbon budgets), recognises different national capacities (e.g. per capita income) and takes into account historical responsibilities from when harm could have been reasonably foreseen (e.g. the release of the IPCC first assessment report in 1990).

Finally, many of the approaches to differentiating national contributions stem from attempts to define these contributions under a prescriptive multilateral climate agreement. This is unlikely over the short to medium term (see Section 3.1.1). The purpose of this exercise is not to define the perfect allocation method but to assess Australia's contribution to global effects under a range of reasonable assumptions.

4.1.6 Government's existing 2020 target conditions

(CCA, 2013, Section 3.2.2)

TCI's assessment is that based on these conditions Australia's minimum 2020 emission reduction commitment should be a 12–15 per cent reduction on 2000 levels by 2020 (Appendix 1). However, TCI agrees that the target considerations are not the only measure of what Australia's final 2020 target should be. Guidance provided by a carbon budgets consistent with the national interest will also be critical, for instance.

The CCA also proposes metrics by which national targets can be measured and compared (p 24). TCI probably agrees with the metrics proposed with the caveat that deviations from business-as-usual emission (BAU) trends are very uncertain and will tend to reward countries that have taken little action to-date. The CCA should present a range of possible below BAU reductions across a range of scenarios and where possible illustrate the impact of policies in place since 1990.

4.1.7 The countries Australia should compare itself with

(CCA, 2013, Section 3.2.2)

This question confuses two separate issues.

The first is Australia's fair contribution to global action and avoiding a 2°C increase in global temperature. The second includes economic impacts, competitiveness concerns and the potential of carbon leakage.

The second point will largely be determined by the policy used to achieve a given emission reduction goal and the measures that are put in place to avoid carbon leakage. For example, to an extent, Australia will be a carbon price-taker on global markets and this separates the level of emission reduction ambition from the impact on domestic industries. If global action is lower so are prices and vice versa.

The risks of carbon leakage can also be addressed through mechanisms such as the Jobs and Competitiveness Program (JCP) which provides (over-generous) shielding to emissions-intensive trade-exposed industries.[18]

TCI recommends that the CCA:

+ Define and assess Australia's fair contribution as outlined in Sections 3.1, 4.1.1 and 4.1.2.
+ Separately assess the economic impact of different emission commitments and the extent to which existing programs such and the JCP negate, or even subsidise, emission intensive trade exposed industries.

TCI notes the modelling the CCA is undertaking on the broader economic and social impacts of different emission commitments. Along with WWF and the Australian Conservation Foundation, we provide a separate submission on the proposed approach.[19]

4.1.8 Whether Australia's actions might influence other countries

(CCA, 2013, Section 3.2.2)

In addition to the ambition and credibility of domestic policy settings (See Section 3.1.1), Australia's actions influence other countries by:

+ **The role Australia plays in building an agreement which covers commitments from all major economies**. Australia is an important middle power: our good relations with both China and the USA, and our role as chair of the influential Umbrella

Group and participation in all the major plurilateral climate forums (e.g. Major Economies Forum on Energy and Climate), are just a few examples.

Ratification of the Kyoto Protocol, the subsequent commitment to a second commitment period target and implementation of a Clean Energy Future package have been strongly welcomed by the international community.

This has allowed Australia to play a more proactive and positive role in brokering agreements between different negotiating blocs. For example, Australia's credibility in the Cartagena Dialogue has been strongly influenced by our domestic policy settings and participation in the Kyoto Protocol. The Cartagena Dialogue played a pivotal role in securing the Cancun Agreement's in 2010.

To further illustrate, Australia's real economy looks very similar to Canada's except Australia has 'skin in the game'. Australia's participation in the legally binding regime and enacted domestic policies means we are more credible and have more leverage than Canada. This diplomatic capacity and political leverage provides a progressive voice to contrast to our counterparts.

+ **Meeting other international commitments.** Australia's contributions to global action on climate change also extend to meeting other multilateral and plurilateral commitments. Specifically these include ongoing commitments to scale up public and private sector finance under the UNFCCC[20] and the phase-out of fossil fuel subsidies under the G20.[21]

+ **Learning by doing and exporting expertise.** Australia's positive and negative experiences with the establishment of a domestic carbon market provide valuable lessons for other countries currently establishing their own systems (e.g. China and South Korea). This is demonstrated by the active high level engagement between Australia and these countries in the development of their markets, and through forums like the World Bank's Partnership for Market Readiness. Australia's chair of the G20 in 2014 offers the opportunity to actively engage finance ministers from major economies in shaping institutions and frameworks required in the emerging and fragmented global carbon market.

Extending this further, Australia has more influence internationally than many of our other counter-parts as we are seen as a credible development analogue by countries like South Africa and Brazil. Our extractive industries and the challenges that Australia faces in its decarbonisation efforts lend it more credibility with many middle income economies. This contrasts for example Europe who has relatively limited amounts of industry. Middle income economies are a critical target audience to influence in the international negotiations, so Australia's decarbonisation efforts can make an impact on these economies and how they envisage the process and politics of decarbonisation domestically.

+ **Strategic use of carbon markets to build global ambition.** Australia's link with the European Union's emission trading scheme will likely provide a template for future linking arrangements with other markets. Transformative ambition 'clubs' or coalitions could be used to build greater levels of international action.[22]

Australia is yet to fully capitalise on the potential for building linking arrangements and emission-trading coalitions.[23]

4.1.9 How Australia's carry over of emission units should be used

(CCA, 2013, Section 3.1.2)

Australia's desire to carry over its surplus emission units was justified internationally by the requirement to cover emission growth in 2013–2014 and until the emission cap was implemented in 2015.[24]

This strong projected emission growth is now unlikely given declines in electricity emissions and the cancellation of a number of emission-intensive resource projects.

Under no circumstances should the carry-over of surplus units be used to weaken domestic ambition and these units should not be used to weaken the emission cap.

These units should be cancelled to increase ambition (or at least be held in reserve to cover any unexpected emission growth in emissions not covered by the emission cap).

4.1.10 The likely impact emission-reduction goals on the carbon price

(CCA, 2013, Section 3.2.4)

While most observers expect that Australia will be a price-taker on global markets this will depend on a number of factors:

+ **Which price is shaping Australia's market?** Liable entities can choose a mix of domestic units, Kyoto credits and European Union units to meet part of their emission liabilities. There is a risk that in the first few years of the floating price period that a combination of a weak emission cap and stable or even declining liable party emissions could see the pricing shaped by the Kyoto market (See Section 4.1.12). This is consistent with some market forecasts.[25, 26]

+ **The strength of the emissions cap.** A strong emission cap and/or higher than expected emissions could see strong demand for units from the European Union. While the longer-term fundamentals of the European Union market are likely to have a greater impact, this could result in Australia's demand affecting the European Union carbon price.[27] Higher European Union prices would also create stronger incentives for domestic emission reductions in Australia.

  (Note that given the same is not true to Kyoto markets, the potential supply of CERs from projects already registered is in the order of 4–5 billion tonnes in the period 2013–20, and more projects are being registered. The impact on this market of Australian demand will remain negotiable.)

4.1.11 Whether tighter caps might provide a hedge against the uncertainty

(CCA, 2013, Section 4.2.1)

Setting tighter caps to hedge against uncertainty is consistent with the general approach recommended by TCI (see Section 4.1.3).

4.1.12 Whether emissions caps should follow the path of the national trajectory on a year-by-year basis

(CCA, 2013, Section 4.1)

The pathway of emission caps should be set in a way that is consistent with Australia's long-term carbon budget.

In addition, in the first years of the scheme, tighter caps may be required to hedge against the possibility that Australian prices are not set by Kyoto markets (see Section 4.1.10).

In theory, businesses should seek to bank emission units up to their Kyoto unit limit. However, this may not happen in practice, because:

+ multiple changes to policies in recent years mean that while the market is immature businesses may not buy instruments unless they are worth their face value following (inevitable) policy change; and
+ banking behaviour has not been common in the early years of carbon markets. Companies have largely chosen to purchase low-priced permits for forward delivery and let financial institutions wear the cost and carry risk.

(As an alternative to a tighter cap, the Government could enter the market and bank units for sale at future auctions. Given the Government's lower cost of carry-over this may also be more economically efficient than business banking in the early years.)

4.1.13 An evaluation framework to assess Australia's future progress

(CCA, 2013, Section 5.2.2)

The development of this framework should be guided by Australia's long-term carbon budget. Given its contribution to national emissions and technological options to reduce emissions, a definition of strategic milestones for the power sector is warranted. One possible approach is to define a range of emission-intensity pathways for the sector consistent with the national carbon budget, against which progress could be judged. This would be based on both top down[28] and bottom up[29] modelling approaches.

In addition, a similar approach is warranted for the carbon productivity of the economy overall. Under a global carbon budget, the right to emit becomes a scarce and valuable resource—like minerals, fertile soil, water, financial capital, and skilled workers. In this carbon-constrained world, prosperity will depend on generating maximum value for each tonne of carbon emitted. Defining carbon productivity milestones would also allow comparisons with other nations.[30,31]

4.1.14 Opportunities and risks associated with linkages between domestic and international carbon markets

(CCA, 2013, Section 5.2.2)

As indicated above (see Section 4.1.8), the development of ambitious carbon market coalitions provides an opportunity to use the benefits of trade to encourage greater global ambition. Lower abatement costs also provide an opportunity for Australia to be more ambitious in its emission-reduction commitments. Finally, carbon markets offer the opportunity to

drive substantial private sector financing in developing nations.[32]

However, there are risks associated with links to global markets (see for example, (see Section 4.1.10).

The current international market is immature. While this remains the case and global prices are low (or subject to substantial political risks), Australian investors may commit to long-term assets that are excessively emissions intensive. As a result, the nation risks deadweight losses from stranded assets and will have to spend on more costly abatement later on.

With immaturity also comes less price certainty and risk premiums for new investment are increased. This reduces economic efficiency and increases the cost of the low-carbon transition.

In the absence of a carbon-price floor, the immaturity of the global market and short-term low-carbon prices together strengthen the case for complementary policies such as the Renewable Energy Target, limitations on the import of international units and long-term strategic investments in the technologies that will be required to avoid dangerous climate change (e.g. CCS, energy efficiency, low/zero emission transport).

These policies help to grow a lower-carbon Australian economy until global prices better reflect the benefits of reducing emissions in the medium to long term.

Once global emissions markets are more developed, the advantages these interventions might be outweighed by emerging domestic and international considerations. However, this is unlikely to occur before 2020.

The final issue worth considering is the growing realisation by investors of the risks associated with future and systematic carbon-repricing events. While this has to-date focused on impact on the value of fossil-fuel reserves and resources[33,34] and the knock-on effects to the broader investment community[35], large increases in global carbon prices over short-term periods of time could pose risks to an economy overly exposed to global markets.

5 Appendix 1. Australia's emission targets and conditions

The table below updates TCI's previous assessments of Australia's target conditions.[36,37,38] It also includes more specific clarity on the Government's conditions as was documented in internal Department of Climate Change and Energy Efficiency papers obtained under Australia's Freedom of Information laws. The table also provides some commentary as to whether the various conditions have been met or not.

TCI have broken the conditions into two groups: primary conditions are those that indicate the overall intent of the conditions and indicate the high level commitments the Government has made to the international community; secondary conditions elaborate the kinds of actions that may add up to achieving the primary conditions but are not necessarily individually binding.

Note that, while included in the tables, conditions associated with CO_2 concentrations are misleading. There are many pathways possible to achieve any given stabilisation level and it is not possible to prove or disprove that current commitments are consistent or not with this goal.[39] Using these conditions as justification for not moving to higher targets would be quickly discredited among the international community and rightly be seen as not acting in good faith with the commitments the Government has made.

Progress that has been made since Copenhagen indicates that Australia's minimum emission reduction target should be 12–15 per cent on 2000 levels by 2020. This is consistent with independent assessments to date that suggest Australia's 5-per-cent target is not a fair contribution to current global actions and/or that the conditions for moving to higher targets have been satisfied.[40]

Table 1. Australia's 2020 target ranges and associated conditions

2020 TARGET	PUBLIC CONDITION (MINISTER OF CLIMATE CHANGE, 2009)[41]	AN INTERPRETATION OF DOCUMENTS OBTAINED UNDER FREEDOM OF INFORMATION ACT FROM THE DEPARTMENT OF CLIMATE CHANGE AND ENERGY EFFICIENCY (THE CLIMATE INSTITUTE, 2010[42] AND DCCEE, 2009)[43] (Code: 'need' indicates requirement. 'seek' and 'ideally' indicate strong preference but not requirement.)	THE CLIMATE INSTITUTE'S ASSESSMENT AND NOTES
5% below 2000 levels	Unconditional		Policy settings in the emission trading legislation should see target achieved unless the Act is repealed. In the advent of the Parliament not agreeing an emission target, a default cap is triggered. This cap is consistent with the unconditional target.
Up to 15% below 2000 levels	**International agreement where major developing economies commit to substantially restrain emissions and advanced economies take on commitments comparable to Australia's.**	**International agreement with specified contributions from advanced and major developing economies, ideally COP mandate to conclude simultaneous legal outcome for KP and LCA (may be one treaty or two).**	**CONDITION MET** **The combination of the Cancun Agreements and the Durban Platform for Enhanced Ambition satisfies this condition.**
	SECONDARY CONDITIONS		
	Global action on track to stabilisation between 510–540ppm CO_2-e.	Contributions consistent with pathway to stabilisation at less than 550ppm.	**CONDITION LARGELY MET** The assumptions in the Government's domestic policy surround a 550 ppm world. The Commonwealth Treasury (2011)[44] states: "*The medium global action scenario [central case] assumes countries implement the less ambitious end of their mitigation pledges made in the Cancun Agreements and Copenhagen Accord, and stabilise greenhouse gas concentrations at 550 ppm by around 2100.*"
	Advanced economy reductions in aggregate, in the range of 15–25% below 1990 levels. (Advanced economy refers to Annex 1 parties to the UNFCCC and at least some other high/middle income emerging economies.)	Seek 15–25% off 1990. Need most/all to confirm pledges at the top end of current ranges.	**CONDITION MET IN PART** Department states, 'Norway's conditional target comparable to Australia's 25; majority of advanced economies (EU, Japan, US, NZ) have conditional targets comparable to Australia's 15'. Separately, the Department (2009b)[45] has stated that matching the average emission reductions for developed countries would be fair contribution from Australia. This balances, in their view, higher aggregate emission reduction costs for Australia versus undertaking

		ambition action in line with the national interest of avoiding a 2°C increase in global temperature. Based on current pledges from other developed countries this implied a minimum 2020 target of around 12 per cent (Climate Action Tracker, 2012)[46]. This is comparable to the overall commitment if the USA, which Professor Garnaut has suggested as a useful benchmark.[47]
Substantive measurable, reportable and verifiable commitments and actions by major developing economies, in the context of a strong international financing and technology cooperation framework, but which may not deliver significant emissions reductions until after 2020.	In 2009, the Department stated that this condition would be satisfied if the commitments from that time were 'reflected … in a COP decision/future treaty'.	**CONDITION MET** The current emission pledges from developing economies in combination with the Cancun Agreements and the Durban Platform for Enhanced Ambition satisfies this condition. Starting in December 2014, developing countries must submit biennial update reports that will include a national greenhouse gas inventory report; information on mitigation actions and their effects, including methodologies, assumptions, and descriptions of domestic MRV processes; and information on support needed and received.
Progress toward inclusion of forests (REDD) and the land sector, deeper and broader carbon markets, low carbon development pathways.	Must retain current provisions to include land clearing in our base year, voluntary Art. 3.4 activities, no cap on LULUCF sinks. Ideally, agreement to create a REDD market mechanism. Need continued unrestricted access to KP market mechanisms, agreement to enhance mechanisms, and links between tracks. Ideally, developed country pledges to provide substantial public finance to enable developing country mitigation.	**LARGELY ACHIEVED** The Australian Government has accepted new Kyoto Protocol LULUCF accounting rules including taking on mandatory and voluntary 3.4 activities. Australia has access to Kyoto markets through its participation in the second commitment period. Developed countries have contributed to fast start financing and have pledged but not yet delivered significant public and private finance to 2020. The Government does not define "*substantial*".
Ambitious agreement including comprehensive global action capable of stabilising CO_2-e concentrations at 450ppm CO_2-e or lower.	**COP decision with draft national schedules (or variation) for all major emitters; ideally mandate to conclude single treaty.**	**CONDITION NOT MEET (BUT PROGRESS HAS BEEN MADE)** **The combination of the Cancun Agreements and the Durban Platform for Enhanced Ambition in part satisfies this condition.** **Actions are unlikely to be not consistent with a 450ppm-e world.**
SECONDARY CONDITIONS		
Comprehensive coverage of gases, sources and sectors, with inclusion of forests (REDD) and the land sector (including soil carbon initiatives (e.g. biochar) if scientifically	Seek inclusion of REDD and the land sector (soil carbon, if scientifically demonstrated).	**CONDITION MET IN PART** Ongoing negotiations on REDD and new mechanisms.

	demonstrated) in the agreement.	Must retain current provisions to include land clearing in our base year, voluntary Art. 3.4 activities, no cap on LULUCF sinks. Need adequate treatment for natural disturbance. Need agreement to create a REDD market mechanism.	Natural disturbance treatment has been resolved for forest management (see also above).
25% below 2000 levels (up to 5 percentage points through Government purchase)	Clear global trajectory, where the sum of all economies' commitments is consistent with 450ppm CO_2-e or lower, and with a nominated early deadline year for peak global emissions not later than 2020.	Contributions consistent with pathway to stabilisation at 450ppm or less; ideally adoption of 2 °C goal and/or global peak by 2020.	**CONDITION NOT LIKELY TO BE MET** 2°C goal adopted but current commitments inconsistent with 450ppm or less (without very rapid emission reductions post 2020).
	Advanced economy reductions, in aggregate, of at least 25 per cent below 1990 levels by 2020.	Need most or all (except Norway and Australia) to increase ambition.	**CONDITION NOT MET** Current unconditional pledges indicate around 12 per cent reduction below 1990 levels by 2020.
	Major developing economy commitments that slow emissions growth and then reduce their absolute level of emissions over time, with a collective reduction of at least 20 per cent below business-as-usual by 2020 and a nomination of a peaking year for individual major developing economies.	Seek commitments delivering at least 20 per cent off BAU; nominated peaking years.	**CONDITION NOT MET** Current assessments indicate emission pledges from developing countries are in the order of 3–4 per cent below business as usual.[48]
	Global action which mobilises greater financial resources, including from major developing economies, and results in fully functional global carbon markets.	Seek progress towards fully functional global carbon markets. Need unrestricted access to KP market mechanisms, agree to develop new mechanisms, broad coverage (sectors, technologies), and links between tracks. Seek to mobilise greater financial resources, including from major developing economies. Ideally all countries except LDCs pledge to contribute to global finance.	**CONDITION LARGELY NOT MET** New mechanisms being developed. Access to Kyoto market mechanisms is certain due to Australia's participation in the second commitment period. Developed countries have contributed to fast start financing and had pledged but not yet delivered significant public and private finance to 2020. Major developing economies have not pledged financing commitments.

Endnotes

[1] Treasury, 2011, *Strong Growth, Low Pollution, Modelling a Carbon Price*, Australian Government, Canberra.

[2] References to 2ºC throughout this submission refer to "above preindustrial levels" as per the objects of the Clean Energy Future Act and commitments under the UNFCCC.

[3] For example: R. Garnaut, 2008, *Garnaut Climate Change Review*, Cambridge University Press, Melbourne.

[4] TCI, 2013a, *Operating in Limits: Defining an Australian Carbon Budget*, The Climate Institute, Sydney.

[5] Modified from L. Rajamani, 2012, *Designing the 2015 Climate Agreement: Legal Form, Architecture and Differentiation*, Presentation to WPIEI Workshop on Climate Change, Centre for Policy Research, New Delhi, India.

[6] E. Jackson and W. McGoldrick, 2010, *Post-Copenhagen Progress and Prospects, Discussion Paper*, The Climate Institute, Sydney.

[7] Bodansky (2013) uses 'contractual' as an alternative to prescriptive. See also D. Bodansky, 2013, *The Durban Platform: Issues and Options for a 2015 Agreement*, Center for Climate and Energy Solutions, Washington D.C.

[8] ENB, 2013, 'Summary of the Bonn Climate Change Conference: 29 April – 3 May 2013', *Earth Negotiations Bulletin* 12, No. 568.

[9] TCI, 2011a, The Durban Climate Summit: Implications For Australia, The Climate Institute, Sydney.

[10] TCI, 2013a, *op cit*.

[11] TCI calculations suggest that to 2050 Australia allocation under a 1.5ºC or 2ºC carbon budget are similar.

[12] In this graph the range of post 2020 emission reductions where defined after first calculating linear reductions to 2050 based on Contraction and Convergence (C&C) or Equal cumulative per capita emissions allocations under two carbon budgets – 1.5ºC (avoided with ~50% probability) and 2ºC (avoided with ~75% probability). Under C&C, per capita emissions converge to levels consistent with these temperature goals in 2050. Under the Equal cumulative per capita emissions approach it is assumed that average Australian per capita emissions do not exceed that of other UNFCCC Annex 1 countries over the period to 2050. In this case, negative emissions are required from around 2040. Emission targets are therefore set to 100 per cent reductions and it is assumed that Australia will either have access to below zero emission technology (e.g. bio energy and CCS, afforestation) and/or access to international carbon markets to make up Australia's carbon budget short fall.

[13] IEA, 2013, *CO_2 Emissions from Fuel Combustion*, International Energy Agency, Paris.

[14] High-level Advisory Group on Climate Change Financing, 2010, *Report of the Secretary-General's High-level Advisory Group on Climate Change Financing*, United Nations, New York.

[15] S. Hatfield-Dodds, et al., 2007, *Leader, follower or free rider? The economic impacts of different Australian emission targets*, The Climate Institute, Sydney.

[16] H. Fekete, et al., 2013, *Emerging economies – potentials, pledges and fair shares of greenhouse gas reduction*, German Federal Environment Agency (UBA), Germany.

[17] Ecofys, Climate Analytics, PIK, 2012, *Climate Action Tracker*, Climate Action Trackers Partners, Germany.

[18] Treasury, 2011, *op cit*.

[19] ACF, TCI and WWF, 2013, *Joint submission to the CCA on modelling assumptions*, Australian Conservation Foundation, The Climate Institute, World Wildlife Fund, Melbourne/Sydney.

[20] F. Jotzo, et al., 2011, *Fulfilling Australia's International Climate Finance Commitments: Which Sources of Financing are Promising and How Much Could They Raise*? CCEP working paper 1115, Australian National University, Canberra.

[21] D. Koplow, 2012, *Phasing Out Fossil-Fuel Subsidies in the G20, A Progress Up-date*, Oil Change International, Washington, D.C.

[22] L. Weischer, J. Morgan and M. Patel, 2012, 'Climate Clubs: Can Small Groups of Countries make a Big Difference in Addressing Climate Change?' *Review of European Community & International Environmental Law* 21 (3): 177–192, DOI: 10.1111/reel.12007.

[23] S. Mazouz and E. Jackson, 2012, *Emissions Trading Coalitions – Leveraging Emissions Trading to Achieve Greater Levels of Global Mitigation Ambition, Discussion paper*, The Climate Institute, Sydney.

[24] Australian Government representatives articulated this in the question and answer sections of the AWG-KP (Doha, Qatar) after their presentation of the proposed national QELRO.

[25] Reputex, 2013a2013, *Reputex Carbon Price Outlook (EU ETS & Australia)*, April 2013, Melbourne.

[26] Reputex, 2013b, *Will a Linear Emissions Cap Send the Australian Market Long?* May 2013, Melbourne.

[27] BNEF, 2013, *Global Renewable Energy Market Outlook 2013*, Bloomberg New Energy Finance, New York.

[28] Treasury, 2011, *op cit.*

[29] B. Elliston, I. MacGill and M. Diesendorf, 2013, *Least cost 100% renewable electricity scenarios in the Australian National Electricity Market*, University of New South Wales, Sydney

[30] TCI, 2013b, *Global Climate Leadership Review 2013*, The Climate Institute, Sydney.

[31] Vivid Economics, Norton Rose, 2011, *Protecting prosperity: Lessons from leading low carbon economies*, GE, Melbourne/Sydney.

[32] High-level Advisory Group on Climate Change Financing, 2010, *op cit.*

[33] N. Robins, A. Keen, Z. Knight, 2012, *Coal and carbon, Stranded assets: assessing the risk*, HSBC Global Research, London.

[34] P. Spedding, K. Mehta, N. Robins, 2013, *Oil & carbon revisited, Value at risk from 'unburnable' reserves*, HSBC Global Research, London.

[35] Carbon Tracker and TCI, 2013, *Unburnable Carbon: Australia's carbon bubble*, Carbon Tracker and The Climate Institute, London/Sydney.

[36] TCI, 2010, *Summary of Freedom of Information Request from The Climate Institute to the Department of Climate Change and Energy Efficiency: Documents regarding the influence of foreign emission reduction targets on Australian emission reduction targets, Media Summary*, The Climate Institute, Sydney.

[37] TCI, 2011b, *Durban, Australia and the Future of Global Climate Action A Fresh Look at the Progress of International Climate Change Negotiations*, The Climate Institute. Sydney.

[38] TCI, 2012, *Doha Climate Summit: Time to focus global climate talks*, The Climate Institute. Sydney.

[39] To illustrate, assuming Annex 1 countries reduced emissions by 25 per cent on 1990 levels by 2020 and non-Annex I reduce to 10% below business as usual emission levels by 2020, global emissions between 2030 and 2050 would need to be reduced by about -2% of 1990 emissions per year to stabilise concentrations at 450 ppm CO_2-e. Starting with the current pledges on the table to 2020, a reduction rate of -6% of 1990 emissions is required to reach an equal probability to stay below 2°C by 2100 as this 450 ppm scenario. See: M. Schaeffer and W. Hare, 2009, *How feasible is changing track? Scenario analysis on the implications of changing emission tracks after 2020, from an insufficient global deal on 2020 reductions, to 2°C and 1.5°C pathways*, Report commissioned by The Climate Institute, PIK-PRIMAP team and Climate Analytics, Potsdam, Germany and New York, USA.

[40] For example, Professor Ross Garnaut notes that current commitments to limit pollution by major developing and advanced economies mean that Australia's unconditional 5 per cent target would not be a fair contribution towards global mitigation. See R. Garnaut, 2011, Australia in the Global Response to Climate Change, Summary, *Garnaut Climate Change Review*, Melbourne.

[41] Minister of Climate Change, 'A new target for reducing Australia's carbon pollution', 4 May 2009, Press Release, Australian Government.

[42] E. Jackson and W. McGoldrick, 2010, *op cit.*

[43] Department of Climate Change and Energy Efficiency, 2010, *Background Target conditions - where do we stand, December 2009, Obtained under the Freedom of Information Act by The Climate Institute* [web document] <http://www.climateinstitute.org.au/verve/_resources/41_Background_Target_conditions_-_where_do_we_stand_December_2009.pdf>, accessed 27 Sept. 2012.

[44] Treasury, 2011, *op cit.*

[45] Department of Climate Change and Energy Efficiency, 2010, *Notes on 25 per cent aggregate target for advanced countries, December 2009, Obtained under the Freedom of Information Act by The Climate Institute* [web document] <http://www.climateinstitute.org.au/verve/_resources/38_Notes_of_25_per_cent_aggregate_target_for_advanced_countries_December_2009.pdf>, accessed 27 Sept. 2012.

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[47] 'Match the US on 2020 emissions cuts: Garnaut,' *CE Daily*, 07 May 2013.

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