CLIMATE ACTION TRACKER

Australia

History: 2017 2016 2015 2014 2013 2012 2011

Page last updated: 11th December 2014

Assessment

In a world first for climate policy, the Australian Government repealed core elements of Clean Energy Future Plan, effectively abolishing the carbon pricing mechanism, sought to reduce the Australian renewable target, and block other clean energy and climate policy measures in Australia. The carbon pricing mechanism introduced had been working effectively, with emissions from the electricity and other covered sectors reducing by about 7% per annum.

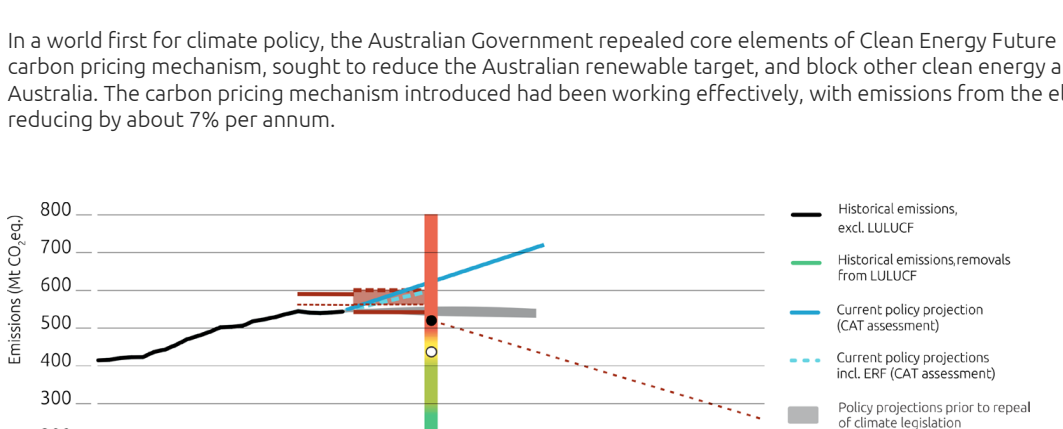


Figure 1 - Historic emissions, Copenhagen pledge, Kyoto commitments, and current emission trends in Australia

Up until the time of repeal, the implemented climate policy was effective and was projected to have been sufficient to meet Australia's unconditional Copenhagen pledge for a 5% reduction from 2000 levels by 2020. Our new, post-repeal assessment shows, however, that this target is no longer in reach and the currently proposed new legislation will result in emissions increasing by 49-57% above 1990 levels. Set against Australia's pledge base year of 2000, the repeal of the climate legislation by Australia will likely lead to an increase of about 12-18% above year 2000 base level emissions, rather than the 5% reduction pledged.

Australia's Copenhagen pledge of a 5% emission reduction below 2000 base level emissions by 2020, is equivalent to approximately a 26% increase above 1990 levels of GHG emissions excluding LULUCF after taking into account Australia's inclusion of afforestation, reforestation and deforestation (ARD) emissions in year 2000 base level emissions and in the 2020 target year. This estimate assumes deforestation continues a slow downward trend, however if deforestation rates begin to increase as projected by the Australian Government, GHG emissions excluding LULUCF would have to decrease to 20% above 1990 to comply with the 5% reduction pledge. In 2012, emissions of industrial greenhouse gases, excluding LULUCF, were approximately 31% higher than in 1990.

In addition to the 2020 pledge, Australia has a commitment under the Kyoto Protocol's second commitment period (2013-2020) to limit average yearly emissions to 99.5% of 1990 base levels (a 0.5% reduction). However, after taking into account special provisions of the Kyoto Protocol that apply to Australia - that allow it to include deforestation emissions in 1990 its base year - and the CAT assessment of likely aggregate credits due to Kyoto land use change activities (and other factors explained below), Australia's actual allowed industrial GHG emissions (excluding LULUCF) could be **increased** in 2020 to 47-59% above 1990 levels of GHG emissions excluding LULUCF. Of this, the CAT assessment of likely aggregate credits due to Kyoto land use change activities contributes about 21.2% to the allowed industrial GHG emissions in 2020: without these LULUCF credits the allowed emissions would be 26-37% above 1990 levels of industrial GHG emissions.

The Government's published assessment of aggregate credits due to Kyoto land use change activities is the opposite sign to the CAT: it indicates a **debit** equivalent to about 4.9% of 1990 industrial GHG emissions, which would **reduce** the allowed emissions in 2020 by about 9.8% in reference to 1990 industrial GHG emissions. Even if emissions from the LULUCF sector were to provide net debits, as calculated based on Climate Change Authority projections, Australia's allowed 2020 industrial greenhouse gas emissions under Kyoto would exceed their 1990 levels by 28.2%.

Further clarity from the Australian Government regarding base year emissions and projections data for newly elected activities is needed to better constrain the likely available credits and debits from LULUCF activities during the second commitment period.

It is clear there is a substantial inconsistency in Australia's allowed increase in industrial GHG emissions by 2020 between the 5% from 2000 levels pledge and the actual effect of its 0.5% below 1990 levels target (QERLC of 99.5%) under the Kyoto protocol, taking into account all of the accounting rules which apply and to which Australia is likely to be committed.

Under its 5% Copenhagen pledge, Australia's industrial GHG emissions would reduce slowly from present levels of about 30% above 1990 to about 26% above 1990 by 2020, whereas under the Kyoto Protocol, Australia could increase its emissions to around 47-59% above 1990 levels.

This is close to the range of current policy projections, taking into account the repeal of the climate legislation and the new Direct Action programme for 2020 (49 to 57% above 1990 levels of industrial GHGs by 2020). In other words, Australia may not need to do anything to meet its Kyoto obligations, a situation that also prevailed for the first commitment period (2008 to 2012).

The same current policy projections show that Australia, with present measures, would not come close to meeting its 5% reduction from 2000 emission levels Copenhagen pledge.

Pledge description

Kyoto Protocol Second Commitment Period Target

As Australia has both a pledge for a 5% reduction from 2000 based levels by 2020, and a Kyoto target for the second commitment period(2013 to 2020), it is essential to review both in ordertoquantify the country's likely future emissions allowances in 2020.

Should Australia ratify the Kyoto protocol, it is this target that would be legally binding and not the pledge for 2020, which is non-binding. This analysis therefore gives priority to the Kyoto protocol target, where a conflict occurs between the outcome of the Copenhagen pledge and the Kyoto system.

For the second commitment period of the Kyoto Protocol, Australia nominated a provisional Quantified Emission Limitation or Reduction Commitment (QELRC) level of 99.5 over the period 2013-2020. This represents an average yearly emissions level of 99.5% of 1990 base levels. However, this does not give any real indication, unlike most other countries, of the real increase or decrease of emissions.

To quantify the likely outcome of this target in terms of emissions of industrial greenhouse gases, excluding land use, land use change and forestry, it is important to step through the key elements of the Kyoto architecture and quantify these. In Australia's case, the application of the accounting rules, notably the second sentence of article 3.7 (often referred to as "the Australia clause") have a unique effect in converting an apparent reduction of emissions to a very substantial and ongoing increase.

- **Article 3.7 and "the Australia Clause"**

Unlike other industrialised countries, the 1990 base emissions levels under Article 3.7 of the Kyoto Protocol include Australia's deforestation emissions in that year, as well as industrial GHG emissions excluding LULUCF sources and sinks.

Article 3.7 states that if a country has positive emissions from land use, land use change, and forestry (LULUCF, green line in Figure 1) in its base year (usually 1990), the emissions from deforestation will be added to the industrial GHG base year emissions (Kyoto Annex A emissions). For Australia, this has a significant impact, adding as much as 132.7 $MtCO_2e$ or 32% of 1990 industrial GHG emissions to the base year emissions (Figure 2). The base year emissions are then used to calculate the emission allowances (depicted in the right of Figure 1). The Article 3.7 rule adds one-third to the emissions allowances for industrial GHG emissions, allowing Australia to have higher fossil fuel-related emissions than in 1990, despite a Kyoto target of reducing emissions by 0.5% compared to 1990.

Assuming the same base year emissions as for the first commitment period, a QELRC of 99.5% of 1990 base levels translates into about a 32% increase over 1990 levels of industrial GHG emissions in 2020 assuming a linear trajectory from 2020 emissions. This, however, is not the final estimate, as several other factors need to be accounted for in order to give a realistic estimation of the likely allowed emissions of GHGs excluding LULUCF in 2020.

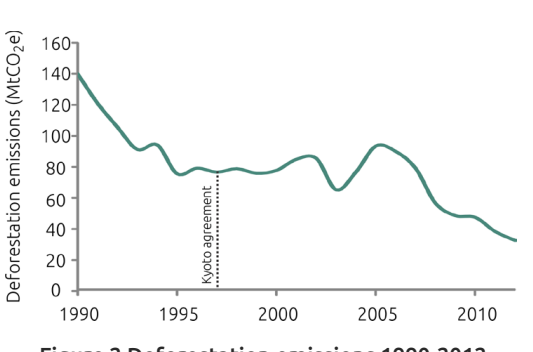


Figure 2 Deforestation emissions 1990-2012

- **First commitment period surplus due to Article 3.7**

Due in large part to the substantial amount of emission allowances given to Australia by the application of Article 3.7, the country's emission allowances in the period 2008 to 2012 exceeded its emissions of industrial greenhouse gas emissions, as well as the emissions due to the combined effect of activities since 1990 relating to afforestation, reforestation and deforestation (ARD).

We have estimated ARD to have been a cumulative net source of 145 $MtCO_2e$ equivalent in the first commitment period, GHG emissions excl. LULUCF to be cumulatively 2,711 $MtCO_2e$, totalling around 2,856 $MtCO_2e$. Australia was allocated approximately 2,958 $MtCO_2e$ in allowances, leading to a surplus of approximately 97 $MtCO_2e$.

Recent estimates by the Australian Climate Change Authority and Australia's National Greenhouse Gas Inventory gave surplus estimates of 116 $MtCO_2e$ and 130.8 $MtCO_2e$ respectively. For CAT calculations we assume the conservative estimate of 97 $MtCO_2e$.

Australia has indicated it would use at least part of this surplus in meeting its second commitment period obligations. This adds a further 6% to allowed emissions in 2020, bringing the increase to around 38% above 1990 levels. To make its target more ambitious, Australia could instead cancel these surplus units, as has been done by other countries, e.g. the United Kingdom, and as recommended by the Australian Climate Change Authority.[10]

- **Article 3.7ter (the cap) and the Australian submission**

When the details of the second commitment period (CP2) of the Kyoto Protocol were decided in Doha in 2012, a cap on emission allowances was introduced to ensure the environmental integrity of the protocol. If the annual initial emissions allowances in CP2 exceed the average fossil fuel-related emissions of a reference period from 2008 to 2010 they are capped to the reference period emissions.

This new rule would have a slight influence on the Australian emission allowances, and result in the cancellation of 80 $MtCO_2e$ of emission allowances.

In October 2014, Australia submitted a proposal to change the application of the cap, with the result that, for Australia, no units are cancelled. Their proposal is to use the Article 3.7 (that allows Australia to add emissions from deforestation to its Kyoto base year emissions) for its calculation of the CP2 emission allowances cap. The consequences of the proposed change to the cap are much smaller than the original impact of Article 3.7, but still undermine the environmental integrity of the Kyoto Protocol because it would allow Australia to increase emissions.

Over the second commitment period, 80 $MtCO_2e$ would increase the allowed Annex A emissions for Australia by about 2.7% - the emissions equivalent of flying at least 15 million people from Lima to Paris and back.

In figure 3 we show the impact of Article 3.7ter on Australia's emission allowances in original form, and under the proposed changes. In the original proposal, the annual emissions allowance cap is calculated from average fossil fuel related emissions in 2008 – 2010. All units above this level have been cancelled to prevent countries from using Kyoto targets to increase emissions. In figure 3, we illustrate this cap with the black line, and we show the cancelled part of the assigned amount for CP2 above this level in blue.

The Australian submission redefines the emissions used to calculate the cap to also include deforestation emissions as defined in Article 3.7. The dashed red line shows the deforestation emissions that can be counted under Article 3.7. In the period from 2008-2010, these were significant for Australia. This new calculation would raise the cap to the level of the dashed black line and consequently no CP2 units would be cancelled.

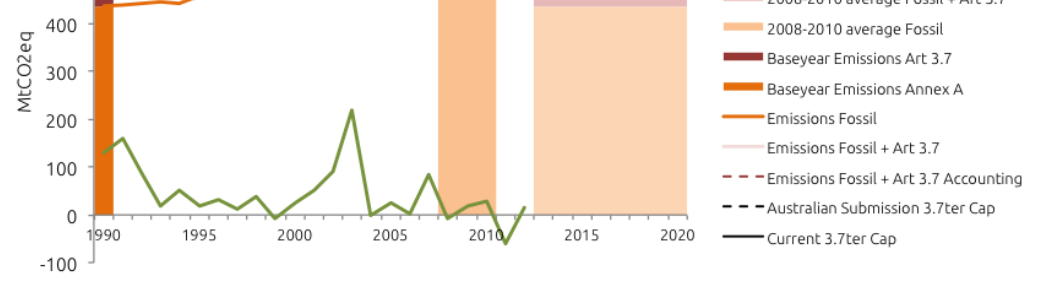


Figure 3 Effect of Article 3.7 ter on allowed emissions in second Kyoto commitment period for Australia. Please note that quantities presented here are based on AR4 global warming potentials.

A final consideration of the implementation of Article 3.7ter is on the availability of surplus units. When the application of 3.7ter results in the cancellation of units from a Parties' assigned amount, that Party is prevented from using CP1 surplus units to replace them.In our calcuation of Australia's emissions allowance under the KP for CP2, we assume that Australia's proposal succeeds, and that the 80 $MtCO_2e$ are not cancelled.

- **Kyoto land-use change and forestry accounting**

In the second commitment period, parties must account for afforestation, reforestation and deforestation (ARD) activities that have occurred since 1990, and are also required to account for forest management activities. In the case of forest management activities, the debits or credits are calculated with respect to a reference level set by the party. We have estimated that the cumulative ARD debits over the second commitment period will be approximately 127 $MtCO_2e$, and credits from forest management to be approximately 280 $MtCO_2e$.

Parties can also opt to account for additional accounting activities during CP2. The Australian government has indicated that it will account for emissions and removals from cropland management and grazing land management. Final confirmation will not be received until they submit their initial reports for CP2 in April 2015. We estimate that inclusion of these activities will allow an additional 189 $MtCO_2e$ of Annex A emissions over the commitment period.

Our estimates of available credits from LULUCF activities differ substantially from those provided in a 2013 analysis by Australia's Climate Change Authority. Our estimates would allow Australia additional Annex A emissions in 2020 of 21.2% of 1990 emissions levels. The CCA instead conclude that LULUCF accounting will result in net debits, and therefore a restriction on Annex A emissions in 2020 of 9.6% of 1990 emissions levels.

The large differences between our analysis and that of the CCA results from differences in the projection of emissions for each activity, and uncertainty regarding the reference levels for accounting. The greatest uncertainties arise from the grazing land management and forest management activities. For further explanation, please see the explanation under data sources and assumptions below.

- **Final Allowances under all Rules**

We estimate the impact of these accounting rules on allowed 2020 Annex A emissions by calculating the trajectory of emissions from 2012 until 2020. In 2020, the net effect of these rules would allow Australia's 2020 Annex A emissions to be 610 $MtCO_2e$, which is **47% above 1990 levels of industrial GHG emissions** (Figure 4). If Australia elects additional LULUCF activities (cropland management and grazing land management) for accounting during CP2, we estimate their allowed emissions in 2020 would be raised to 657 $MtCO_2e$, which is **59% above 1990**. We evaluate our analysis of potential credits from LULUCF accounting as being at the upper end of the possible range. The CCA analysis instead provides a lower bound, and using their analsysis for LULUCF accounting would result in alllowed 2020 emissions that are **28% above 1990**.

If the **Australian submission** re-interpreting 3.7ter is not accepted, and 3.7ter, as it was adopted in Doha, is applied to Australia's initial assigned amount, the cumulative allowed emissions over this period would be reduced by 80 MtCO2e . Assuming a growth trajectory, allowed year 2020 emissions are reduced by 22.5 $MtCO_2e$. This would result in 2020 Annex A emissions of 588 or 635 $MtCO_2e$ (42% and 53% above 1990 levels) depending on whether new LULUCF activities are included. In addition, Australia would be required to use LULUCF accounting credits or additional bought units of 80 $MtCO_2e$ before CP1 surplus units could be used for compliance with the Kyoto Protocol. Under our LULUCF accounting estimates, Australia will have sufficient available credits that **no additional costs would be needed to comply with surplus use rules.**

In summary:

1. The Kyoto Protocol's second commitment period average target for the 2013-2020 period of 99.5% of 1990 emissions would result in a reduction of 32% **below** 1990 industrial GHG emissions if Article 3.7 were not counted. Emissions start at 31% above 1990 levels in 2012 and declining to 2020.
2. With Article 3.7, Australia's allowed industrial GHG emissions would remain around present levels and would be at about 32% **above** 1990 industrial GHG emissions in 2020.
3. The first commitment period surplus arising from Article 3.7 for Australia would add a further 6% to the allowed emissions, lifting this to 38% above 1990 levels in 2020.
4. During the second commitment period it is mandatory to account for Kyoto Article 3.3 afforestation, reforestation and deforestation and, under Article 3.4, forest management. These are estimated by the CAT to **add** about a further 9% to the allowed emissions, lifting this to 47% above 1990 levels in 2020.
5. Australia has also signalled it would also include cropland and grazing land management which could add a further 11% to the allowed emissions, bringing Australia's industrial GHG emissions to a total of 59% above 1990 levels in 2020.
6. If Australia's proposed interpretation of Article 3.7ter is not accepted, then it would, in effect lose the benefit of the Article 3.7 surplus from the first commitment period, and the allowed emissions, in 2020 would be reduced by about 6% to 52% above 1990 levels in 2020, or 21% above 1990 levels if the Climate Change Authority LULUCF accounting estimate is used.
7. The Australian Government published estimates indicate the opposite with a **reduction** in allowed emissions, however the CAT believes it assessment represent a reasonable, scientifically based estimate based on the available raw data and application of the Kyoto rules as the are generally understood. The lack of fully transparent data does not permit at this time a scientificallly based verification of the published Australian Government estimates of Kyoto LULUCF credits or debits for the second commitment period of the Kyoto Protocol: under these estimates allowed emissions of industrial GHG emissions could be limited to 27% above 1990 levels in 2020. In the absence of further information, the CAT believes it is likely that an increase of 47-59% in industrial GHG emissions could be permitted. We look forward to further data on Australian projections and estimates in order to revise and improve our estimates.

For reference, under the first commitment period, the QELRO for Australia was 8% above 1990 base emission levels over the period 2008-2012 which, applying the Kyoto protocol rules for Australia, permitted an increase of between 136 to 143% in emissions of industrial greenhouse gases excluding LULUCF above 1990 levels. Unlike other industrialized countries, the 1990 base year emission levels under Article 3.7 of the Kyoto Protocol included its deforestation emissions in that year, as well industrial GHG emissions excluding LULUCF sources and sinks, effectively adding about 32% to its base year emissions. The year 1990 was a historic high for deforestation emissions, which have dropped significantly since.

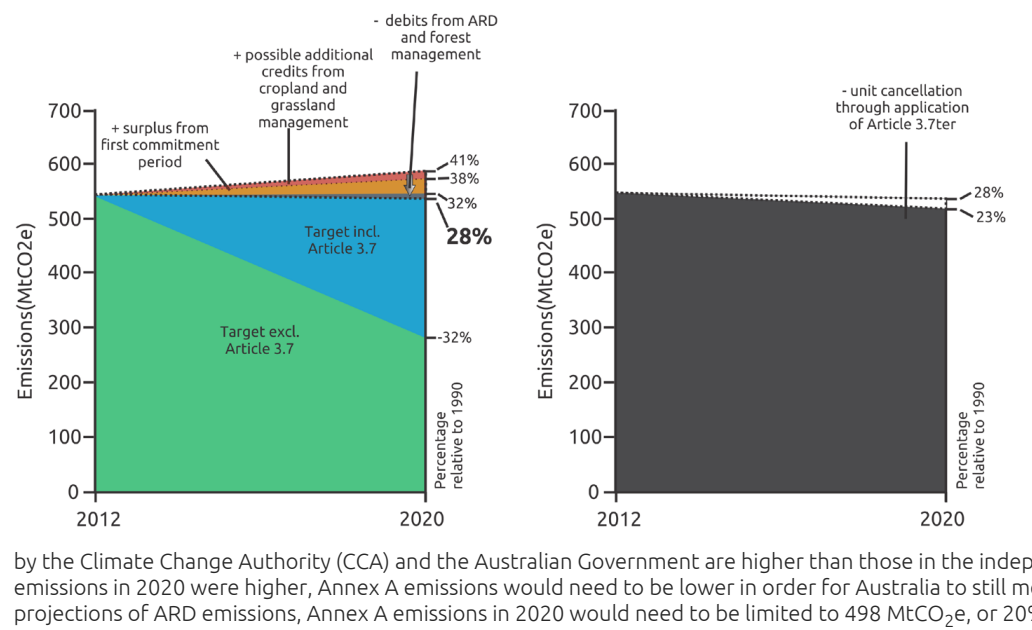


Figure 4 - Australia's allowed emissions levels in 2020 and their percentage relative 1990 industrial GHG emissions levels (right hand axis) considering different sets of Kyoto accounting rules including Article 3.7, Article 3.4 (taking into account different subs subsets of LULUCF activities) and Article 3.7ter. Upper panel: numbers based on CAT assessment. Lower panel: same analysis based on government's own published assessment.

Australia's 5% reduction below 2000 by 2020 pledge

Australia's Copenhagen pledge is to reduce emissions by 5% below 2000 emissions by 2020. The Australian government has stated: "in defining its targets for 2020, Australia considered that these targets refer to its net emissions from the sector and source categories included in Annex A to the Kyoto Protocol as well as from afforestation, reforestation and deforestation activities, for the base year (2000) and 2020."

Based on projections of emissions from the ARD sector, we calculate that the Annex A emissions resulting from this 5% reduction target would be 524 $MtCO_2e$ - 26% above 1990 levels. Projections of deforestation emissions by the Climate Change Authority (CCA) and the Australian Government are higher than those in the independent CAT assessment. If net ARD emissions in 2020 were higher, Annex A emissions would need to be lower in order for Australia to still meet the 5% target. Using CCA projections of ARD emissions, Annex A emissions in 2020 would need to be limited to 498 $MtCO_2e$, or 20% above 1990 levels.

For 2020, Australia has proposed three targets with different conditions, -5%, -15%, and -25% relative to 2000. Australia has provided absolute allowed emission levels in 2020 of 524 $MtCO_2e$, 468 $MtCO_2e$, and 413 $MtCO_2e$ for the -5%, -15% and -25% targets respectively (these figures assume 5 $MtCO_2e$ from ARD in 2020).

In Australia's submission of its QELRC for the second commitment period of the Kyoto Protocol in 2012, Australia quantitatively defined its conditions for moving to higher levels of ambition. However, the election of the new Government has changed the political landscape of climate policy in Australia (for more information see Current Policy Projections Description). The targets and conditions for meeting these conditions have had bipartisan support in the past, however there is increasing doubt on whether the current Government will move to a more ambitious goal. The -5% goal currently stands as their unconditional pledge.

The -15% target is conditional on a global agreement which implies atmospheric stabilisation at between 510 and 540ppm CO_2e and under which major developing economies commit to restrain emissions in the range of 15 to 25% below 1990 levels, and advanced economies take on commitments comparable to Australia's. The condition requires 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 and progress toward inclusion of forests (REDD) and the land sector, deeper and broader carbon markets, low carbon development pathways (Government of Australia 2012a).

Adoption of the most ambitious target of -25% is conditional on an ambitious global deal capable of stabilising levels of greenhouse gases in the atmosphere at 450 ppm CO_2e or lower. The condition includes the need for a clear pathway to achieving an early global peak in total emissions with a nominated early deadline year for peak global emissions not later than 2020. It also requires major developing economies slowing the growth and then reducing their emissions over time, with a collective reduction of at least 20% below business-as-usual by 2020 and a nomination of a peaking year for individual major developing economies. It further requires advanced economies taking on reductions and commitments comparable to Australia, in aggregate, of at least 25% below 1990 levels by 2020, and access to the full range of international abatement opportunities through a broad and functioning international market in carbon credits.

Current policy projections

Current policy projections are expected to lead to an emissions level of 597-623 $MtCO_2e$ excluding LULUCF by 2020 and around 720 $MtCO_2e$ by 2030.

The election of the new Abbott Government has dramatically changed the political landscape of climate policy in Australia. Most of the core instruments of the national climate policy and legislation included in the previous Government's Clean Energy Future package, such as the Carbon Pricing Mechanism[1] and the cap-and-trade scheme, have been repealed.

The Government has now employed the Direct Action Plan[2] to reduce Australia's emissions to meet the 5% below 2020 goal. At the heart of that plan is the Emissions Reduction Fund (ERF), intended to function as a reverse auction mechanism with the goal of buying back the lowest-cost abatement. Legislation is currently being passed to establish a $2.55 billion fund to serve as an incentive pool for companies to voluntarily find ways to reduce their carbon footprint.[3]

Current policy projections are expected to lead to an emissions level of around 620 $MtCO_2e$ excluding LULUCF by 2020 (50% above 1990 emissions excluding LULUCF) and around 720 $MtCO_2e$ (73% above 1990 emissions excluding LULUCF) by 2030. Emissions excluding LULUCF have seen a significant increase since 1990 with the financial crisis mainly resulting in halting growth of emissions. Land use plays an important part in Australia's total emissions profile. LULUCF emissions have fluctuated widely since 1990. For example, from 2010 to 2011, they moved from being a source of emissions by 29 $MtCO_2e$ to being a sink with -60 $MtCO_2e$. The annual fluctuations are primarily from changes in emissions and sinks from forest management activities.

The Australian 'Current policy projections (CAT assessment)' is based on a scenario that excludes the carbon price but includes existing policies such as the Renewable Energy Target, energy efficiency standards and land clearing controls (CCA, 2014). According to our assessment, Australia's remaining cumulative abatement challenge is of 507 $MtCO_2e$ until 2020, which is comparable to one year of Australian emissions in the early 90's.

This scenario does not include abatement from the Emissions Reduction Fund (ERF), which is currently being implemented. An independent assessment forecasts that, as currently designed, the ERF will purchase around 67 $MtCO_2e$ of greenhouse gas cumulative abatement by 2020 (Reputex, 2014). To our base scenario, we added the potential abatement from the ERF until 2020 and present that as the alternative 'Current Policy projections – incl. ERF' scenario. Such a scenario would still leave a shortfall of around 440 $MtCO_2e$ against Australia's remaining abatement challenge of 507 $MtCO_2e$.

Australia's previous climate policy and its supporting legislation has proven successful in reducing GHG emissions. Due to a well-functioning combination of policy instruments, the carbon intensity of the Australian economy has halved since 1990, and deforestation emissions were significantly reduced. O'Gorman & Jotzo (2014) conclude that the carbon price has worked as expected in terms of its short-term impacts. Independent analysis has also shown that in the 100 days after the repeal of the carbon tax, the electricity sector saw significant growth in emissions, and those might grow by a few more million tonnes and exceed 10% over the year (The conversation, 2014).

It is clear from our present assessment that Australia is unlikely to meet its target. The substantial turnabout in Australian climate policy implies a clear shift away from a targeted national climate policy designed to meet concrete goals in line with international climate policy targets, and the required emission reductions identified by the climate science community. Under the new Government, Australia's position on climate finance was reversed, but that changed on 9 December when the Government announced a $200m contribution to the GCF over four years, taken directly from the aid budget.

The Abbott Government's Direct Action policy is expected to lead to a re-carbonisation of the power sector, which, along with the repeal of the climate legislation, will very likely mean that Australia will not meet its target.

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[1] Through the passing into law of a package of 8 bills amongst which was the "Clean Energy Legislation (Carbon Tax Repeal) Act 2014".

[2] Enabled by the Amendment of the Carbon Farming Initiative Amendment Act 2014.

[3]http://www.smh.com.au/federal-politics/political-news/direct-action-climate-plan-passes-the-senate-with-help-from-palmer-united-party-20141031-3j9bq.html

Date of pledge: November 2012

Data sources and assumptions

Copenhagen Pledge

We calculated targets for 2020 from the most recent national inventory submissions (CRF 2014).

We have applied LULUCF accounting to Australia's pledge, following special criteria in line with the definition of their pledges. As of COP 17 in Durban, it has been decided that forest management is a mandatory activity under article 3.4 and shall be accounted by all Annex I parties. We have therefore interpreted Australia's pledge as a target including ARD and forest management.

We did not use Party-provided ARD projections, instead obtaining the 2020 ARD value by linear trend over the 1990-2010 period. We calculated LULUCF accounting quantities for forest management using a net-net approach with a projected reference level for 2013-2020. While Australia provided a range of possible outcomes on the force majeure (natural disturbances) provision, our reference level is without this provision and would change if this provision were included.

To keep consistency with the first commitment period, for post 2012 we assumed Australia will continue to use Article 3.7, which allows deforestation emissions to be included in the base year for those parties with a net source of emissions from the land use change and forestry sector and applies to the target in the first KP commitment period. Some parties have proposed amending Article 3.7 to remove this provision. Australia wishes to retain it.

The Australian Government has also committed to a long-term target to cut pollution by 80 per cent below 2000 levels by 2050.

Current trends

For the current trend analysis we used scenarios from the Australian Climate Change Authority (2014). Alternative scenarios presented here use forecasts from Reputex, 2014 for potential abatement from ERF.

Calculation of Australia's Accounting Credits and Debits from Kyoto Protocol Article 3.3 and Article 3.4 LULUCF activities.

In order to quantify the anticipated accounting quantities from **Article 3.3 and 3.4** LULUCF activities during the second commitment period (CP2) of the Kyoto Protocol (KP) for each Party, an estimate of the projected emissions from each activity is needed. For the Climate Action Tracker we have generated projections to 2020 based on historical emissions trends for each accounting activity. The Australian Government has produced its own forward estimates. The CAT and Australian Government estimates are divergent in both sign and magnitude. The Australian Climate Change Authority estimates result in net debits, rather than the net credits that the CAT estimates for Australia during the second commitment period. Understanding of likely credits and debits from Article 3.3 and 3.4 are fundamental in the case of Australia to determining allowed emissions of industrial GHG emissions for the second commitment period.

CAT Approach

A single historic pathway for each country and each activity is generated by selecting the best sources from available datasets. Parties with quantified emission reduction commitments under the KP have directly reported emissions data relating to their mandatory (Article 3.3) and elected Article 3.4 accounting activities only for the years of the first commitment period (CP1, 2008-2012). In order to build a full historic timeline, the data must be supplemented by calculating emissions from the KP accounting categories indirectly from the corresponding categories reported in CRF tables. In most cases, there is reasonable agreement between sources, but where there is strong disagreement, only the direct data is used. For activities elected for CP2, but not CP1, there is currently no direct data available unless it is voluntarily provided by the country itself. In the second commitment period Article 3.3 (afforestation, reforestation and deforestation) remains mandatory and in addition forest management under Article 3.4 must be reported. Other activities under Article 3.4 such as cropland and grazing land management remain optional.

These historical pathways are then projected from last historical year (2012) up to 2020 by either taking the long-term trend or the historical mean (Figure 5). Projections are performed using the mean when the historic data has high variability, but have no clearly defined trend. Such high variability is a common feature of emissions/removals from forest management. Please see the PRIMAP documentation for further explanation of how the historic and projected data series are derived.

For each activity we describe the underlying data and assumptions made in order to calculate credits and debits, and the uncertainty due to currently available data.

Deforestation

Accounting for deforestation under the Kyoto Protocol Article 3.3 is done on a gross-net basis; that is any emissions from deforestation activities count as debits for that year.

Deforestation rates in Australia have generally decreased since 1990 but are still a significant portion of Australia's emissions in recent years.

For the Climate Action Tracker, we take a regression of historic data since 1990 to project emissions from 2013 to 2020. The cumulative emissions over this period are therefore projected to be 264 $MtCO_2e$, or an average of 33 $MtCO_2e$ per year.

Analysis by the Australian Climate Change Authority released in September 2013 estimates that deforestation rates will increase from recent levels & stabilize in the coming years at 52 $MtCO_2e$ per year. These estimates are higher than those using the CAT methodology and indicate a policy assumption that the long term declining deforestation emissions trend will stop and stabilize above recent levels.

However, the consequences for accounting is complicated by links to credits obtained under forest management activities. Depending on the number of credits available from forest management activities, the difference between our projection and that of the CCA could have minimal impact on available credits, due to the ability under forest management rules to offset some of (or even most, up to a limit set by the minimum of 45 $MtCO_2e$/year or a fraction of the country's forest management credits) a country's deforestation emissions.

The actual rates of deforestation and associated emissions will depend on national and regional policies implemented between now and 2020.

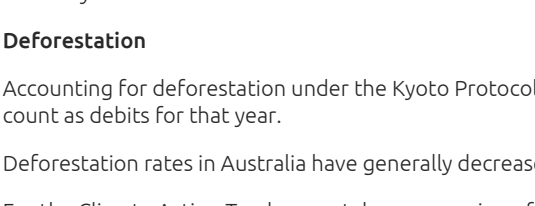


Figure 5: Historic trends and CAT calculated projections of Kyoto Protocol LULUCF activities in Australia.

Afforestation and Reforestation (AR)

Since 1990, afforestation & reforestation (AR) activities in Australia have been providing a growing emissions sink. Over the second commitment period, we therefore estimate that credits due to this activity will continue to grow at a moderate rate and cumulatively provide 134 $MtCO_2e$ of credits, or an average of 17 $MtCO_2e$ of credits per year over the commitment period.

The Australian Government analysis projects a slow-down in the increasing sink from this activity after 2012. Under their projections, this activity would only provide a cumulative sink of ~124 $MtCO_2e$, or 15.5 $MtCO_2e$/year, during CP2. Only graphical data is available for this value and actual values underlying the visual data may therefore vary by an average of 2-3 $MtCO_2e$/year.

Kyoto Protocol Article 3.3 ARD

The net effect of these considerations is that the CAT Article 3.3 ARD debits averaged over CP2 of 16 $MtCO_2e$ are less than half those of the Government at 36.5 $MtCO_2e$. The CAT assessment is not convinced of the change in trends assumed by the Government post-2012 towards increased deforestation and a slow-down in AR action. These assumptions need further justification.

Forest Management (FM)

Forest management activities are calculated with respect to a reference level that was submitted to the AWG-KP during 2009-2011. Australia's initial submission included several options that depend on the treatment of force majeure, primarily wildfires, in the agreed accounting methods. The options for the reference level range from -0.1 to 4 $MtCO_2e$. Further, the credits available under forest management activities are limited to 3.5% of the Parties' base year emissions. In Australia's case, this amounts to 19.2 $MtCO_2e$ /year, equivalent to about 4.6% of 1990 industrial GHG emissions. What is important in determining the real limit, however, is that before applying this limit, or cap, Parties can first offset debits from ARD activities if they have net positive emissions from these two categories combined. Consequently for Australia, with projected ARD debits of 16 $MtCO_2e$/year (equivalent to 3.8% of 1990 industrial GHG emissions) or with the Government's estimate of 36.5 $MtCO_2e$/year (equivalent to 8.8% of 1990 industrial GHG emissions), the theoretical maximum (FM) credit approaches 8.2-13.4% of 1990 industrial GHG emissions averaged over the commitment period.

Based on these rules, we calculate that the cap only results in a minor restriction on available credits for Australia, and with our forest management projections Australia will gain 293 $MtCO_2e$ credits cumulatively, 36 $MtCO_2e$ / year, equivalent to 8.7% of 1990 industrial GHG emissions. In terms of the outcome for allowed emissions in 2020, assuming smooth growth in emissions from 2012 to 2020, this would add about 17.4% to the allowed 2020 emissions of industrial GHG (referenced to 1990).

The Climate Change Authority assessment is based on a forest management reference level of -4 $MtCO_2e$/year, and estimates that an average of 8.1 $MtCO_2e$ of credits will be gained each year, or cumulatively 65 $MtCO_2e$ over the second commitment period. This is equivalent to 2% of 1990 industrial GHG emissions. In terms of the outcome for allowed emissions in 2020, this would add about 4% to the allowed 2020 emissions of industrial GHG (referenced to 1990).

Estimating the credits that will be generated from Forest Management is therefore difficult because there is a lack of clarity surrounding both Australia's forest management reference level and the trajectory of emissions/removals from this activity. Results differ significantly depending on the treatment and assumptions of force majeure.

Cropland Management

Debits and credits for remaining Article 3.4 Activities, including cropland management, grazing land management and revegetation, are calculated on a net-net basis relative to 1990.

The magnitude of emissions from cropland management is low in comparison to the three previously described activities. We estimate that this activity will result in 0.6 $MtCO_2e$ / year (0.1% of 1990 emissions) of debits, whereas the Climate Change Authority Analysis identified 2.3 $MtCO_2e$ / year of credits (0.6% of 1990 emissions).

Grazing Land Management

Emissions from grazing land management could provide a significant source of credits for Australia under the KP accounting rules. Accounting

for Article 3.4 activities, except for forest management, is done on a net-net basis with base year emissions as the reference.

According to our calculation of grazing land management emissions, Australia's 1990 base year reference level for grazing land management is 35 $MtCO_2e$ / year (equivalent to 8.4% of 1990 emissions). As emissions from this activity have dropped significantly since then we estimate that an average of 24 $MtCO_2e$ of credits, equivalent to 8.4% of 1990 emissions, will be generated during CP2. In terms of the outcome for allowed emissions in 2020, this would add about 16.8% to the allowed 2020 emissions of industrial GHG (referenced to 1990).

Our estimate differs significantly from that developed by the CCA, who calculated that this activity will result in -0.8 $MtCO_2e$ (equivalent to 0.2% of 1990 emissions) of annual credits per year from this category.

Revegetation

We currently have no independent estimates for this activity. The CCA indicates that it will provide the equivalent of 5 $MtCO_2e$ / year of credits, equivalent to 1.2% of 1990 emissions, over CP2, adding about 2.4% to the allowed 2020 emissions of industrial GHG (referenced to 1990).

Aggregate Accounting under Kyoto Protocol Article 3.3 and Article 3.4

On aggregate, we calculate that LULUCF accounting could generate up to 44 $MtCO_2e$/year **credits** equivalent to 10.4% of 1990 emissions, over CP2, **increasing** by about 10.8% to the allowed 2020 emissions of industrial GHG (referenced to 1990).

The Climate Change Authority Analysis makes very different assumptions, and on aggregate results in ~20 $MtCO_2e$/yr of **debits** for the same time period, equivalent to 4.8% of 1990 emissions, over CP2, **reducing** by about 9.6% the allowed 2020 emissions of industrial GHG (referenced to 1990).

Primary reasons for differences in the two estimates are (1) historical data assumption, and (2) methods for projections. The activities with the highest uncertainty are forest and grassland management. In April 2015, Australia are expected to provide their initial submission to the KP for the second commitment period. At minimum, this submission should provide clarity on the reference levels used for these two activities and therefore assist in evaluating the available credits.

Accounting Activity Emissions and available credits (negative) or debits (positive)								
Accounting activity	CAT Analysis (MtCO2e)				Australian Government estimate[1] (MtCO2e)			
	Reference level / Base Year emissions	Projected average (2013 – 2020)	Credits or Debits /year	Cumulative	Reference level / Base Year emissions	Projected average (2013-2020)	Credits or Debits /year	Cumulative
Article 3.3								
Deforestation	[Gross-Net]	33	33	263.7	[Gross-Net]	52	52	416
Afforestation / Reforestation	[Gross-Net]	-17	-17	-135.8	[Gross-Net]	-15.5	-15.5	-124
Article 3.3 ARD	[Gross-Net]	16	16	127.9		36.5	36.5	292
Article 3.4								
Forest Management[2]	-0.2 [3]	-36.4	-36.4	-291.3	-4	-12.1	-8.1	-65
	2.1	-36.4	-36.4	-291.3				
	4.7	-36.4	-36.4	-291.3				
Cropland Management	2.9	3.5	0.6	4.7			-2.3	-18.4
Grassland Management	35.8	11.6	-24.2	-193.6			-0.8	-6.4
Re-vegetation		- [4]					-5 [5]	-40
Aggregate Total for Article 3.3 and 3.4 activities			-44	-352.3			20.3	162.2

1. Australia's National Greenhouse Gas Accounts: Australian Land Use, Land Use Change and Forestry Emissions Projections to 2030 (September 2013)

2. Forest Management Cap of 19.2 MtCO2e used for calcuations (3.5% Base year emissions incl. Article 3.7)

3. The forest management reference level in this row is used for aggregate calculations.

4. There is currently no CAT assessment available for this activity.

5. This value estimated from a graph and not directly reported.

Calculation Australia's surplus from the first Kyoto commitment period (CP 1)

We use information from the national registries and reported emissions from afforestation, reforestation, and deforestation under Article 3.3 of the Kyoto Protocol to calculate the Australian surplus emission allowances.

First we take a look at the national registry (end of 2013). Australia has a total of 3028.03 million units (each worth the equivalent of a ton of CO_2 emissions), 152.28 million of which have been cancelled. The majority of the cancelled units covers emissions from deforestation (149.7 million). According to the registry Australia has 2875.75 million units left to use for compliance under the KP. 70.13 million units originate from afforestation and reforestation activities under Article 3.3 of the KP.

Table 1 Overview over the Australian national registry

	AAUs	ERUs	CERs	RMUs	Total
All units in registry	2957.58	0.15	0.17	70.13	3028.03
Art 3.3. cancellation (deforestation)	103.41	0.00	0.00	46.29	149.70
Other cancellation	2.30	0.15	0.13	0.00	2.58
Totals units cancelled	105.71	0.15	0.13	46.29	152.28
Units remaining for compliance	2851.87	0.00	0.05	23.83	2875.75

To assess if Australia needs to cancel further units to cover emissions from deforestation activities we use the numbers reported by Australia under the KP. Afforestation and reforestation amount to 79.53 $MtCO_2e$ of removals while deforestation contributes 224.57 $MtCO_2e$ of emissions. This means that 9.4 million RMUs are still to be added to the registry, while 74.87 million units still have to be cancelled to account for emissions from deforestation. The cancelled units have to be subtracted from the number of units available for compliance which reduces to 2810.29 million. 2712.86 million units will be needed for compliance to cover fossil fuel related emissions leading to a surplus of 97.43 million units that can be carried over to the second commitment period of the KP.

Table 2 Calculation of Australia's CP1 surplus

Surplus calculation (in million units)	
Units for compliance	**2875.75**
Additional Article 3.3 credits (afforestation, reforestation)	**9.40**
Article 3.3 debits (deforestation)	224.17
Cancelled for Article 3.3	149.70
Still to cancel for Article 3.3	**74.87**
Remaining units	**2810.29**
Fossil emissions	**2712.86**
Surplus CP1	**97.43**

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