

# Australia set to overshoot its 2030 target by large margin

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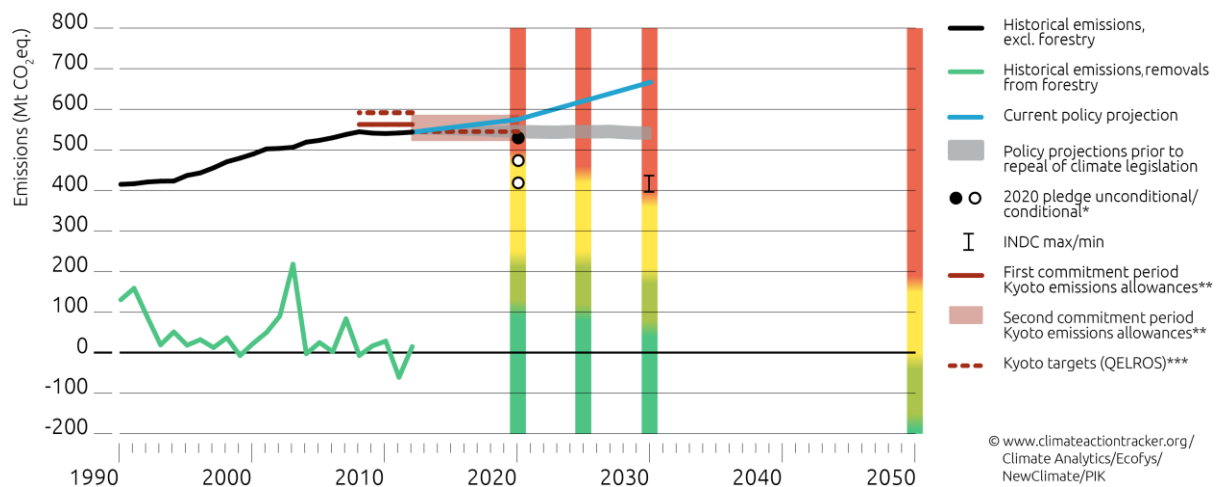
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Assessment .....	2
Australia's 2020 pledge and post-2020 INDC .....	4
Post-2020 INDC Target .....	4
Kyoto Protocol First Commitment Period Target (2008-2012).....	6
Kyoto Protocol Second Commitment Period Target (2013-2020).....	7
Copenhagen 2020 Pledge .....	8
Fair Share .....	9
Effort Sharing .....	9
Improvements in emissions per-capita and emissions intensity.....	9
Current Policy Projections .....	11
Emission Reduction Fund.....	12
Renewable Energy Target .....	13
Data sources and assumptions .....	15
New 2015 reporting guidelines .....	15
Copenhagen Pledge .....	15
Post 2020 target .....	16
Current policy projections .....	17
Calculation of Australia's Accounting Credits and Debits from Kyoto Protocol Article 3.3 and Article 3.4 LULUCF activities.....	18
Sources.....	21

## Assessment



On 11 August 2015, Australia submitted its Intended Nationally Determined Contribution (INDC). We rate Australia's INDC 2030 target to reduce greenhouse gas (GHG) emissions by 26–28% from 2005 levels including land-use, land-use change and forestry (LULUCF) by 2030 as “inadequate.” **After accounting for LULUCF, this target is equivalent to a range of around 5% below to 5% above 1990 levels of GHG emissions excluding LULUCF in the year 2030.**

All other industrial countries, except Canada and New Zealand, have proposed 2025 or 2030 goals significantly below 1990 levels. The “inadequate” rating indicates that Australia's commitment is not in line with most interpretations of a “fair” approach to reach a 2°C pathway: if most other countries followed the Australian approach, global warming would exceed 3–4°C.

Australia is one of five industrialised countries rated “inadequate” by the Climate Action Tracker (the other four are Canada, Japan, New Zealand and Russia). There is no single metric, such as rate of improvement in emissions per capita or improvement of emissions intensity, that can be used to rank the country unambiguously, given different starting years, base years and history of action (or inaction) on climate policy. Based on a range of metrics, Australia's INDC is in the bottom half of the range of the industrialised countries.

Australia stands out as having the largest relative gap between current policy projections for 2030 and the INDC target. With currently implemented policy measures, **Australia's emissions are set to increase substantially to more than 27% above 2005 levels by 2030**, which is equivalent to an increase of around **61% above 1990 levels**. Australia's Direct Action Plan does not put Australia anywhere close to a track that meets its INDC 2030 target. The additional funding announced in August 2015 by the Government for post-2020, should it be re-elected in 2016, would reduce this projected increase by only 2%, to around 25% above 2005 levels (equivalent to 57% above 1990).

Of the nine industrialised countries assessed, Australia ranks eighth on its projected rate of reduction in per capita emissions, exceeded only by Russia, and eighth on projected improvement in emissions intensity for the period from 2012 to 2030, with Canada ranking worst.

In July 2014, against international trends, the Australian Government abolished its nascent Carbon Pricing system by partly repealing its Clean Energy Future Plan, which marked a negative turning point in Australia's climate policy. Before the repeal, Australia's climate policy was projected to bring Australia two thirds of the way closer to the announced INDC 2030 target.

The CAT has assessed recent policy developments in Australia, including the Emissions Reduction Fund, the scaling back of the Renewable Energy Target (RET) and, as well the most recent emissions

projections published by the Government. Contrary to government assertions (Australian Government, 2015b), the abatement task has increased considerably over the years, reflecting the negative consequences of the repeal and the Australian government's amendments of key climate policies in recent years.

The CAT estimates that before the repeal of the Clean Energy Future Package, Australia was on track to meet their 2020 target. With the repeal, policies fall short and a cumulative abatement task of at least 153 MtCO<sub>2</sub>e between 2013–2020 remains. The scaling back of the Renewable Energy Target (RET) from 41,000 GWh to 33,000 GWh by 2020 translates into an extra 97-141 MtCO<sub>2</sub>e of cumulative abatement required during the period 2012-2030. After accounting for this and the effects of the ERF, **we estimate a remaining cumulative abatement challenge between 2013 and 2030 of between 1.5–1.7 GtCO<sub>2</sub>e (equivalent to roughly three years of Australia's current national emissions).**

It is clear from our present assessment that currently planned policies are inconsistent with the INDC 2030 target and Australia needs substantially more policies to meet that target. To meet its 2030 emissions targets, Australia needs to decrease its emissions by an average annual rate of 2% until 2030; instead, with current policies, emissions are set to increase by an average rate of 1.5% a year.

**For the 2020 period** Australia has a target 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). After taking into account Kyoto protocol accounting rules (notably a modified 'gross-net' accounting approach for LULUCF activities), Australia would be allowed to increase its GHG emissions by **23–48% above 1990 levels by 2020 excluding LULUCF.**

With current policies projected to increase emissions to 35 to 40% above 1990 levels by 2020, meeting the second commitment period targets may require very little, if any, action, due to the substantial amount of LULUCF credits or allowances that Australia obtains under this agreement. Put another way, the **treatment of LULUCF under Kyoto rules allows Australia to continue increasing its emissions until 2020, yet still meet its 2020 target.**

Should Australia fail to ratify the Doha amendments for the Kyoto Protocol's second commitment period, then its 2020 Copenhagen pledge will be relevant. The CAT estimates Australia's unconditional Copenhagen pledge—to reduce emissions by 5% below 2000 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.

In its INDC for 2030, **Australia specifies that it will apply a 'net-net' accounting approach to its target.** What this means is that "net" emissions, i.e. all national emissions including removals from LULUCF, are used to define the emissions levels used in both the base year and the commitment period. Even though there is large uncertainty associated with LULUCF data (e.g. in estimating sinks and high variability due to factors such as wildfires, droughts or other weather extremes), this approach allows for comparing like with like, as opposed to the modified gross-net accounting approach applied under the Kyoto Protocol, and which would apply for the period to 2020, should Australia ratify the second commitment period of the protocol, for its 2020 target.

An important aspect of the Australian INDC is that the 2030 target remains provisional on the "rules and other underpinning arrangements of the agreement" and that Australia reserves the right to adjust its target. This adds an unusually high level of uncertainty to Australia's contribution to the 2015 global agreement at this point. Should the target be adjusted and/or any of the underlying rules altered, this assessment will have to be updated.

## Australia's 2020 pledge and post-2020 INDC

In this section, we first analyse Australia's INDC target for 2030 and then step sequentially through the analysis of the Kyoto protocol first commitment period (2008-2012), the target for the Kyoto second commitment period (2013-2020) and show the relationship with the 2020 Copenhagen pledge.

### Post-2020 INDC Target

On 11 August 2015, Australia announced a 26–28% reduction of greenhouse gas emissions by 2030 below 2005 levels including LULUCF. This translates into a range of 445–458 MtCO<sub>2</sub>e allowed emissions levels in 2030 incl. LULUCF (equivalent to a reduction of 15–18% below 1990 emissions levels incl. LULUCF). Analysis of the effect of the INDC on likely fossil fuel and industrial<sup>1</sup> GHG emissions is made difficult by the fact that the INDC target includes LULUCF emissions, which are substantial, and fluctuate significantly (Figure 2 under “Data Sources and assumptions”). We have estimated levels of emissions excl. LULUCF resulting from the INDC by subtracting projected emissions for the LULUCF sector in 2030 from the targeted level incl. LULUCF. We estimate that the INDC translates into emissions levels of 395–437 MtCO<sub>2</sub>e emissions excl. LULUCF (that is, around 5% below to 5% above 1990 emissions levels excl. LULUCF).

<b>Kyoto Protocol</b>	
Member of KP CP1 (2008-2012)	yes
Member of KP CP2 (2013-2020)	yes
KP CP1 target (below base year)	+8%
KP CP2 target (below base year)	-0.5%
[equivalent to 23-48% above 1990 levels excl. LULUCF]	
<b>Convention</b>	
Copenhagen pledge	
Unconditional	-5%
[equivalent to 26% above 1990 levels excl. LULUCF]	
Conditional	-15%/-20%
Reference for pledges	2000 emissions
Conditions (for higher pledge level)	
-15%: global agreement, which implies atmospheric stabilization at between 510 and 540ppm CO <sub>2</sub> e	
-25%: ambitious global deal capable of stabilizing levels of greenhouse gases in the atmosphere at 450 ppm CO <sub>2</sub> e or lower	
<b>INDC</b>	
Target	-26 to -28% by 2030
[equivalent to -5% to 5% of 1990 levels excl. LULUCF]	
Reference for pledge	2005 emissions

	INDC emissions levels (excl. LULUCF) (MtCO <sub>2</sub> e)	INDC emissions levels (excl. LULUCF) relative to base year (%)			CAT rating
	2030	1990	2000	2005	
<b>Australia</b>	395-437	-4.9% to 5.4%	-19% to -11%	-24.6% to -16.4%	Inadequate
<b>Canada</b>	578	-2.2%	-20%	-21%	Inadequate
<b>EU</b>	3376	-40%	-33%	-34%	Medium
<b>Japan</b>	1079	-13%	-19%	-20%	Inadequate
<b>New Zealand</b>	59-68	-3% to 13%	-17% to -3%	-25% to -13%	Inadequate
<b>Norway</b>	20-30	-61% to -40%	-63% to -44%	-64% to -44%	Medium
<b>Russia</b>	2986-3163	-11% to -6%	45% to 54%	40% to 48%	Inadequate
<b>Switzerland</b>	26	-50%	-49%	-51%	Medium
<b>USA</b>	4307-4682	-31% to -25%	-39% to -34%	-40% to -35%	Medium

Table 1: GHG Emissions levels (excl. LULUCF) in 2030 resulting from the INDC in absolute terms and expressed as reductions below 1990, 2000 and 2005 base years. Note that for the USA, 2030 levels result from the linear interpolation between the 2025 emissions levels implied by the INDC and the long-term target in 2050.

<sup>1</sup> With „industrial GHG emissions“ we mean here GHG emissions from the energy, industrial processes, solvent and other product use, agriculture and waste sectors, excluding land sector and forestry.

A comparison of GHG emissions levels (excl. LULUCF) achieved by INDCs expressed as reductions below 1990 (Table 1) shows that Australia's INDC is at the bottom of the ranking of industrialised countries together with Canada and New Zealand. This pattern holds with different choices of base year, although it becomes less prominent for more recent base years. For example, the difference in reductions below 2005 achieved by the INDC in Australia and in the EU is less strong than when compared to 1990—this is due to the fact that while emissions were increasing by roughly 26% between 1990 and 2005 in Australia, they were decreasing by 8% in the EU.

The INDC target results in emissions levels that are far above emissions levels resulting from the Climate Change Authority (CCA) recommendations for Australia's future emissions reduction target (Australian Climate Change Authority, 2015). In July 2015, the CCA recommended an emissions reduction target of 30% below 2000 levels by 2025 (incl. LULUCF). The Authority did not recommend a target for 2030, but has estimated that Australia should be aiming to reduce emissions by 40–60% below 2000 levels (incl. LULUCF) by 2030. These targets would translate into reductions of 11–19% in 2025 and 25–59% in 2030 below 1990 emissions levels excl. LULUCF and would bring Australia much closer to being in line with 2°C and placing it in the “medium” category in 2030.

An important aspect of the Australian INDC is that the 2030 target remains provisional on the “rules and other underpinning arrangements of the agreement” and that Australia reserves the right to adjust it. This adds high uncertainty to Australia's contribution of Australia to the 2015 global agreement. The conclusions of the present CAT assessment are subject to the same uncertainty and will need to be revised once any adjustments to the target and proposed LULUCF accounting approaches are made.

### Box 1: LULUCF in the INDC target

As described in detail in Box 2 below, Australia's commitments under the Kyoto Protocol's second commitment period (2013–2020) translates into an increase in the range 23–48% above 1990 levels of GHG emissions excluding LULUCF, after taking into account certain rules and provisions that apply to Australia under the Kyoto Protocol. Up until now, Australia has strongly supported and applied a ‘gross-net’ to calculate emissions allowances. Under this approach, gross emissions are used to calculate the base year emissions and targets are set with respect to these emissions. However, compliance is based on net emissions during the commitment period. This approach potentially creates important anomalies, and Australia's 2020 pledge is one of the best examples of how this approach can have important negative consequences for the environmental integrity of the Protocol.

However, Australia has clarified in its INDC that it will apply a net-net accounting approach in the post-2020 framework. “Net-net” accounting means that “net” emissions are used to define the emissions sources used in both the base year and the commitment period. Under this approach, like is compared with like, and there is no asymmetry in what is used to set the target versus what is counted as emissions for compliance with an obligation.

While the CAT recognises that the change in accounting approaches from modified “gross-net” approach under the Kyoto Protocol, to “net-net” is a step in the right direction, it is important to note that the “net-net” approach still presents a number of serious problems. Emissions and sinks in the LULUCF sector have higher uncertainties than other sectors and are difficult to project, which makes it difficult to estimate 2030 emissions from all other sectors under a net-net target. In the INDC, Australia stated that emissions from natural disturbances—wildfires, droughts, or other weather extremes—will be excluded from the target. Currently, the emissions level in 2005 excluding emissions from natural disturbances is not clear in the available data, again adding uncertainty to the absolute emissions target for 2030.

Although reducing emissions—or increasing sinks—in the LULUCF sector is important: a pathway towards 2°C requires a decarbonisation of the world energy system. The use of sinks to achieve targets may mask, for example, an increase in emissions from energy emissions that would be inconsistent with a low carbon, transformational pathway towards 2°C goal. Real, substantial reductions in emissions from all sectors need to be made by all countries to set the world on a pathway towards a decarbonised economy. This is highlighted by the World Bank in its Decarbonising Development (World Bank Group, 2015) report: all models show that achieving climate change stabilisation in a cost-effective way "requires action on four fronts: decarbonised electricity production, electrification, improved efficiency and reduced waste, and increase of carbon sinks such as forests." A gross-gross approach, in which targets are set with respect to the base year emissions excl. LULUCF and only covers those emissions in the target year, would ensure that these anomalies are resolved.

The relevance of the new net-net approach for 2030 is illustrated by the calculation of hypothetical allowances that would be granted from LULUCF if Australia were to use the formerly applied Kyoto accounting approach instead. Based on projections from the Australian Government for the different LULUCF activities (Australian Government, 2013), the CAT estimates that applying a Kyoto-type accounting system, would result in Australia getting a net debit of 345 MtCO<sub>2</sub>e from LULUCF over the period 2020–2030, which would significantly decrease Australia's allowed emissions levels in 2030. A target of 26–28% below 2005 levels would translate into a reduction of 36% below 1990 levels excl. LULUCF. Conversely, under the net-net system currently adopted under the INDC 2030 emissions levels excl. LULUCF will be in the range of 5% below to 5% above 1990. The high net debits under a Kyoto accounting system is mainly due to very high projected levels of deforestation over the period, which is of concern in itself. Our calculations suggest that a net-net approach to accounting will therefore allow a more generous emissions allowance in the post-2020 regime than a Kyoto-type accounting system would.

### Kyoto Protocol First Commitment Period Target (2008-2012)

While Australia met its first commitment period target for the Kyoto protocol, as with the case of Russia, this was less to do with policy action and more to do with specific accounting provisions, which enabled emissions in the first commitment period to exceed real emissions. As the analysis below shows, the surplus generated in emission allowances in the first commitment period significantly reduces the amount of action needed in the period to 2020. In this section we also outline in some detail the issues surrounding the different approaches to LULUCF accounting, and how this affects projected emissions of GHG excl. LULUCF (emissions from fossil fuel burning, agriculture, industry and waste).

Australia's Kyoto Protocol target for the first commitment period (CP1) (2008–2012) was to limit the increase in its GHG emissions excl. LULUCF to 8% above to 1990 levels (QELRO of 108% of base year emissions).

Under the Kyoto Protocol accounting rules (notably Kyoto Protocol Article 3.7), Australia is allowed to add deforestation emissions to its base year for calculating its commitment period emissions allowances. This leads to an increase in Australia's allowances of about 30% per year of the commitment period (further details in Box 2). Other LULUCF accounting rules applicable to Australia in the first commitment period (Article 3.3), certain land-use change and forestry activities (mainly deforestation) provided debits, which were subtracted from the allowed GHG emissions excl. LULUCF during the commitment period.

Overall, Article 3.7 and the other LULUCF provisions of the Kyoto Protocol resulted in emission allowances exceeding actual emissions by about 100 MtCO<sub>2</sub>e, despite minimal policy action for that period. Australia ended CP1 with a surplus emissions allowance of about 100MtCO<sub>2</sub>e to be

transferred to the second commitment period, principally as a consequence of Article 3.7 (which is often called the Australia clause<sup>2</sup>).

### Kyoto Protocol Second Commitment Period Target (2013-2020)

Australia has a target 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:

- i. Article 3.7—a special provision of the Kyoto Protocol that applies to Australia, allowing it to include deforestation emissions in 1990 its base year,<sup>3</sup>
- ii. surplus units resulting from the first commitment period and
- iii. the CAT assessment of likely aggregate credits due to Kyoto land use change and land-use change and forestry (LULUCF) accounting rules,

Australia's allowed GHG emissions (excluding LULUCF) could be increased in 2020 to 23-48% above 1990 levels of GHG emissions excluding LULUCF.

#### Box 2: A step-by-step guide to Australia's 2020 pledge final emissions allowances

Below we step through the key elements of the Kyoto architecture used to quantify the likely outcome of Australia's 2020 target. In Australia's case, these elements can lead to a very substantial increase in emissions allowances in 2020. The accounting approach described below has no implications for the 2030 target as the Australian INDC states it will apply a different accounting approach for the post-2030 regime (see section 'Post-2020 INDC Target'). The different elements quantified here are:

- **Article 3.7**

Article 3.7 (often referred to as "the Australia clause") allows Australia to include GHG emissions from LULUCF to the 1990 base year. This adds as much as 140 MtCO<sub>2</sub>e or 30% of 1990 national GHG emissions (excl. LULUCF) to the base year emissions, which are then used to calculate the emission allowances. With Article 3.7, the Kyoto target of reducing emissions by 0.5% compared to 1990 over the period 2013–2020 translates into about a 32% increase above 1990 levels of GHG emissions (excl. LULUCF) in 2020.

- **First commitment period surplus**

Due mainly to the application of Article 3.7, Australia's emissions allowances in the period 2008 to 2012 exceeded its actual emissions leading to a surplus of 101 MtCO<sub>2</sub>e. This adds a further 5% to allowed emissions in 2020, bringing the increase to around 37% above 1990 levels. To make its 2020 target more ambitious, Australia could instead cancel these surplus units, as has been done by other countries, e.g. the United Kingdom.

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

The CAT estimates the LULUCF accounting rules could in total either add a further 11% to allowed emissions in 2020 in LULUCF credits, or subtract 8% through LULUCF debits bringing the overall increase in 2020 to around 23–48% above 1990 GHG emissions (excl. LULUCF) levels.

In the second commitment period of the Kyoto Protocol (CP2), parties must account for afforestation, reforestation and deforestation (ARD) and for forest management activities and can opt to account for additional accounting activities, such as cropland and grazing land management (further details under the Assumptions section). The CAT estimates the cumulative ARD debits to be between 141-332 MtCO<sub>2</sub>e, and credits from forest management to be between 63–153 MtCO<sub>2</sub>e. According to Australia's National Inventory Report 2013, Australia will account for emissions and removals from cropland management and grazing land management. The inclusion of these activities will result in additional credits of between 25-223 MtCO<sub>2</sub>e.

The CAT performs the calculations of LULUCF credits and debits using our own and the Australian government's

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<sup>2</sup> [http://envirowiki.org/The\\_Australia\\_Clause](http://envirowiki.org/The_Australia_Clause)

<sup>3</sup> The review of the initial report of Australia for its second commitment period under Kyoto would permit more accurate quantification in the event of any adjustments to its reported deforestation or other emissions in the base year, as occurred in the case of the IRR for the first Kyoto commitment period (<http://unfccc.int/resource/docs/2009/irr/aus.pdf>)



projections of LULUCF activities in the period 2013–2020. This leads to a range of estimates with CAT estimates leading to the upper end of the possible range. The large differences result from discrepancies in the projection of emissions for each activity, especially from deforestation and grazing land management emissions projections.

- *Deforestation:* The CAT projects emissions for deforestation based on linear trend over the historical period (further details under Assumptions section). This results in decreasing emissions from deforestation in the forthcoming years while the Australian government projects it to increase and stabilize around 53 MtCO<sub>2</sub>e until 2030. The CAT therefore estimates a lower amount of credits from this activity. It is important to note that according to a recent report (RepuTex, 2015a), deforestation is on the rise again due to the amendments to Queensland's land clearing laws in 2012 resulting in hundreds of thousands of hectares being cleared at a rate similar to pre-2005 levels. Because there is still no official data confirming this and because the CAT estimates are more consistent with historical data, we consider those estimates to be the more likely estimates (further details in Box A1).
- *Grazing land management:* At this point, the CAT uses a proxy for emissions from grazing land management, the reported emissions under category "grazing land remaining grazing land management" in CRF 2104 and projects emissions for this activity over the second commitment period using a linear trend over the historical period. Under the CAT approach, a large number of credits (214 MtCO<sub>2</sub>e) will be generated over CP2, while the Australian government projects only very few credits to be generated (Department of the Environment, 2015, Australian Government, 2013), mainly due to much lower adjusted 1990 levels for the activity. Until the publication of Australia's initial report for Kyoto Protocol CP2 that should provide further clarity and confirmation of the 1990 levels and values for LULUCF accounting, we opt to show the full range of credits obtained by the CAT and the Australian government (further details on this discrepancy in "Data sources and assumptions").

- **Cap on emission allowances**

Article 3.7ter decided in Doha in 2012 introduces a cap on a country's emissions allowances, by automatically limiting allowances in the second commitment period to eight times the average GHG emissions of the first three years of the first commitment period to ensure the environmental integrity of the protocol. Application of 3.7ter to Australia results in the cancelling of 24 MtCO<sub>2</sub>e emissions units from the first commitment period. An Australian submission from October 2014 redefines the emissions used to calculate this cap to also include deforestation emissions as defined in Article 3.7. If Australia's proposal succeeds, those units would not be cancelled.

- **Final allowances under all rules**

We estimate that all these accounting rules would allow Australia's 2020 Annex A emissions to be between 509-603 MtCO<sub>2</sub>e in 2020 (or in cumulative terms, 4.2 to 4.6 GtCO<sub>2</sub>e over the whole second commitment period), which is 23-48% above 1990 levels of GHG emissions (excl. LULUCF). If the Australian submission re-interpreting 3.7ter is accepted and applied to Australia's initial assigned amount, the cumulative allowed emissions over this period would be increased by 24 MtCO<sub>2</sub>e.

## Copenhagen 2020 Pledge

As Australia has both a pledge under the Copenhagen Accord, and a Kyoto target for the second commitment period (2013–2020) described above, but has yet to confirm its intent to ratify the Doha Amendments, it is essential to review both in order to quantify the country's likely future emissions allowances in 2020. Should Australia ratify the Doha Amendment to the Kyoto protocol, it is the Kyoto 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.

Under the Copenhagen Accord Australia has proposed three targets for 2020 with different conditions, -5%, -15%, and -25% relative to 2000. Australia has provided absolute allowed emission levels in 2020 of 524 MtCO<sub>2</sub>e, 468 MtCO<sub>2</sub>e, and 413 MtCO<sub>2</sub>e for the -5%, -15% and -25% targets



respectively (these figures assume 5 MtCO<sub>2</sub>e from ARD in 2020). The -5% goal currently stands as their unconditional pledge.

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” (UNFCCC, 2014 and DCCEE, 2012)<sup>4</sup>. The CAT estimates the Australia’s unconditional Copenhagen pledge to reduce emissions by 5% below 2000 emissions by 2020 is equivalent to approximately 7% increase above 2000 levels which is equivalent to a 26% increase above 1990 levels of GHG emissions excluding LULUCF<sup>5</sup> 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.

Since the Copenhagen pledge is non-legally binding there are no pre-existing rules as to which rule apply to this pledge. Some countries, like New Zealand indicate that they would use the same Kyoto Protocol rules to increase their allowed GHG emissions as illustrated in the previous chapter. If we apply this approach to the Copenhagen pledge, Australia could increase its GHG emissions (excl. LULUCF) by up to 22% above 2000 levels (equivalent to 45% increase above 1990 levels) and still officially meet its 5% reduction target.<sup>6</sup>

## Fair Share

### Effort Sharing

We rate Australia’s INDC target for 2030 “inadequate.” The “inadequate” rating indicates that Australia’s commitment exceeds the acceptable emissions level for Australia in all effort-sharing proposals evaluated by the CAT. This means it is not consistent with limiting warming to below 2°C: if most other countries followed the Australia approach, global warming would exceed 3–4°C. For Australia, proposals based on capability lead to higher emissions allowances whereas approaches that focus on equal cumulative/equal per capita emission would require more stringent reductions. The 2020 Kyoto targets are also rated “inadequate”.

### Improvements in emissions per-capita and emissions intensity

A close look at intensity indicators, such as emissions intensity of GDP and emissions per capita, and their rate of improvement under the INDC and current policy projections scenarios, may reveal important trends that emissions alone cannot. Beyond the CAT effort-sharing ranges, comparing these intensity indicators trends among countries provides further insight into fairness and progress towards decarbonisation of national economies.

The Australian INDC target implies significant improvements in emissions per capita and emissions intensity (emissions per unit of GDP). The CAT assesses that to meet its 2030 target, emissions per capita would reach roughly 15 MtCO<sub>2</sub>e, which would imply an annual reduction rate in emissions per capita of 2.4–2.9% between 2012 and 2030 (and an overall reduction of 40–46%<sup>7</sup> below 2005 levels, Table 2). This is similar to efforts made by other developed countries, as for example the USA, over

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<sup>4</sup> In comparison with the Kyoto Protocol target, the Copenhagen pledge not only puts forward a different target and base year (2000 vs 1990) but also a different way to calculate base year emissions, as it includes emissions from afforestation, deforestation and reforestation instead of only deforestation as it is done under the Kyoto Protocol.

<sup>5</sup> CRF 2014 data.

<sup>6</sup> For this calculation, we did not use Party-provided ARD projections, instead obtaining the 2020 ARD value by linear trend over the period 1990-2010 for afforestation and reforestation and a linear trend over the period 1990-2012 for deforestation (see Data Sources and assumptions).

<sup>7</sup> Emissions per capita improvement numbers provided in the INDC document are of 50-52% improvement in emissions per capita below 2005 levels, so slightly lower than our estimates.

the same period, which are expected to reach emissions per capita of 13 tCO<sub>2</sub>e per capita in 2030 according to their INDCs,<sup>8</sup> with an annual reduction rate of around 2.5–3% in emissions per capita (and an overall 48% compared to 2005 levels).

	Per capita emissions GHG emissions/population (tCO2e/pers)				Annual rate of improvement in per capita emissions (%)		CAT rating
	1990	2005	2030		2012-2030		
			INDC	Current policy projections	INDC	Current policy projections	
Australia	24	26	14-15	23-24	-2.9% to -2.4%	-0.1% to 0%	Inadequate
Canada	21	23	14	20	-1.9%	-0.1%	Inadequate
EU	12	10	6.4	7-8	-1.8%	-1.3% to -0.4%	Medium
Japan	10	11	9.1	10-11	-0.8%	-0.5% to 0.1%	Inadequate
New Zealand	18	19	11-13	17	-2.3% to -1.4%	-0.2%	Inadequate
Norway	12	12	3-5	9	-6.3% to -4%	-1.1%	Medium
Russia	23	15	22-24	21-21	1.9% to 2.2%	1.6% to 1.6%	Inadequate
Switzerland	8	7	3	3-4	-4.1%	-3.5% to -2%	Medium
USA	24	24	12-13	16-16	-3% to -2.5%	-0.5% to -0.4%	Medium

Table 2: Emissions per capita in 1990, 2005 and 2030 and annual rate of improvement in per capita emissions (%) between 2012–2030 for industrialised countries under INDC and Current Policy scenarios. Note that for the USA, 2030 levels result from the linear interpolation between the 2025 emissions levels implied by the INDC and the long-term target in 2050.

However, the picture is very different if current policy projections are considered instead of the INDC target. While current policies in the USA bring them to an emissions per capita level of 16 tCO<sub>2</sub>e, current policy projections in Australia do not imply any improvement in emissions per capita from today's level (Table 2). It is important to note that since 1990, Australia's emissions per capita have been decreasing at a very slow pace (decrease of only 2% between 1990 and 2012). Whether Australia will be able to achieve these reductions remains doubtful given the country's recent emissions trend and climate policy developments.

	Emissions Intensity GHG emissions/GDP (tCO2e/million USD2012)				Annual rate of improvement in emissions Intensity (%)		CAT rating
	1990	2005	2030		2012-2030		
			INDC	Current policy projections	INDC	Current policy projections	
Australia	851	661	252-279	426-427	-4.4% to -3.8%	-1.5% to -1.5%	Inadequate
Canada	668	554	228	314	-2.8%	-1.1%	Inadequate
EU	469	314	150	163-192	-3.0%	-2.6% to -1.7%	Medium
Japan	281	259	163	173-192	-2.3%	-2% to -1.4%	Inadequate
New Zealand	767	603	288-337	420	-3.7% to -2.9%	-1.7%	Inadequate
Norway	233	157	40-62	106	-7.4% to -5.2%	-2.3%	Medium
Russia	3495	2449	805-853	760-771	-1.9% to -1.5%	-2.2% to -2.1%	Inadequate
Switzerland	138	117	39	44-58	-4.6%	-4% to -2.5%	Medium
USA	662	484	171-186	224-223	-4.6% to -4.2%	-2.2% to -2.1%	Medium

Table 3: Emissions intensity in 2030 and annual rate of improvement in emissions intensity (%) between 2012-2030 for industrialised countries under INDC and Current Policy scenarios. Note that for the USA, 2030 levels result from the linear interpolation between the 2025 emissions levels implied by the INDC and the long-term target in 2050.

In terms of emissions intensity per GDP, currently implemented policies in Australia would lead to levels of 426 tCO<sub>2</sub>e/million USD2012 in 2030 (Table 3), which represents a reduction of around 35% compared to 2005 levels. Intended levels with the INDC are of 252–279 tCO<sub>2</sub>e/million USD2012,

<sup>8</sup> For the USA, the levels in 2030 result from a linear interpolation between emissions levels implied by the INDC in 2025 and long-term target.

which represents an overall 58–62% reduction below 2005 levels<sup>9</sup>, and far below what currently implemented policies can achieve.

## Current Policy Projections

Australia's current policies fall far short of the emissions reductions required to meet the 2030 target put forward in the INDC. Under current policies in place in Australia, total national GHG emissions excl. LULUCF are projected to rise to about 575 MtCO<sub>2</sub>e by 2020 and 670 MtCO<sub>2</sub>e by 2030, equivalent to an increase in emissions from 2005 levels (excl. LULUCF) of 19% and 27% by 2020 and 2030 respectively (when compared to 1990 levels (excl. LULUCF) this results in an increase of 39% and 61% respectively). To meet its 2030 emissions targets, Australian emissions should *decrease* by an average rate of 2% per cent until 2030; instead, with current policies, they are set to *increase* by an average rate of 1.5% per year.

The Australian Government's published [INDC's Fact Sheet](#) states that Australia's target is achievable with its Direct Action Plan. It presents several indicative emissions reductions sources and its abatement potential: the Emissions Reduction Fund and its Safeguard Mechanism are said to generate around 360MtCO<sub>2</sub>e abatement, the National Energy Productivity Plan in total 248MtCO<sub>2</sub>e (155MtCO<sub>2</sub>e through energy efficiency and 93 through vehicle efficiency), Ozone and HFC measures are expected to generate 82MtCO<sub>2</sub>e and lastly technology improvements and other sources of abatement are said to contribute another 207 MtCO<sub>2</sub>e of abatement potential (Australian Government, 2015a).<sup>10</sup>

While the Government plans to use Direct Action approaches to reduce Australia's emissions to meet its 2020 and 2030 targets, many of the listed policies in its fact sheet are not yet maturely developed, and it remains highly uncertain whether they will deliver the necessary emissions abatement to meet the targets. Is it clear that all of these listed policies do not come close to the emissions reductions that would have been achieved under the core instruments of the national climate policy and legislation in the previous Government's Clean Energy Future package, such as the Carbon Pricing Mechanism and the Large Scale Renewable Energy Target (Parliament of Australia, n.d.), all of which the current Government has repealed or amended. According to the CAT the Clean Energy Future Package would have brought Australia roughly halfway closer to its target when compared to currently implemented policies.

Current policy projections (with all implemented, not planned policies) are expected to lead to an emissions level of 578MtCO<sub>2</sub>e excluding LULUCF by 2020, that is, 39% above 1990 levels of GHG emissions (excl. LULUCF) by 2020. This is in line with the effective emissions allowances estimated by the CAT for 2020 (further details in Box 2), which are increased through the usage of various accounting rules and thus ultimately allow Australia's emissions to be 23–48% above 1990 levels. In other words, Australia may not need to do anything in terms of policies between now and 2020 to meet its Kyoto obligations, a situation that also prevailed for the first commitment period (2008 to 2012). Note again, this is merely due to a mechanical uplifting of allowed GHG emissions and not due to effective climate policies that actually decrease GHG emissions.

Our current policy projections are based on Australia's Emissions Projections 2014–15 published by the Department of Environment on March 2015, which include existing policies and measures with the exception of the Emissions Reduction Fund (ERF). Additionally, the CAT incorporates the Renewable Energy Amendment Act 2015, passed by the Australian Government on June 25, which reduces Australia's large-scale renewable energy target from 41,000 GWh to 33,000 GWh in 2020, as

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<sup>9</sup> Intensity improvement numbers provided in the INDC document are of 64-65% and roughly in line with our estimates.

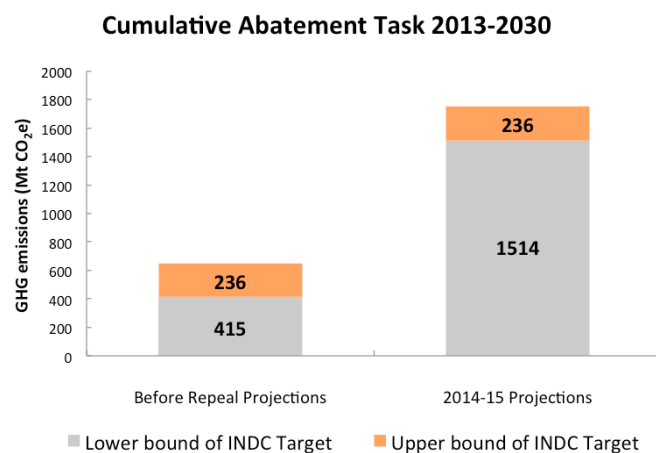
<sup>10</sup> Numbers read from Figure 5 in Environmental Ministry [Summary of Australia's 2030 emissions reduction target](#)

well as the potential abatement from the ERF until 2020, based on the results of the first auction, which took place in April 2015.

As the Energy Productivity Plan, presented in the Energy White Paper in April 2015 (Australian Government, 2015d), is still under development and not backed by any legal framework or policies, we do not include it in our assessment. Similarly, we abstained from any quantification of “technology improvements” at this point, as they would be highly speculative.

Contrary to what the government finds in their assessment (Australian Government, 2015b), the CAT finds the cumulative abatement task between has actually increased considerably over the years, reflecting the negative consequences of the repeal and amendments of key climate policies in recent years (Figure 1). Before the repeal, we assessed that Australia was on track to meet their target. This is no longer the case after the repeal: the CAT estimates that a cumulative abatement challenge of 153 MtCO<sub>2</sub>e between 2013 and 2020 remains. With the first commitment period surplus, and the credits from forestry in the second commitment period, we estimate Australia will hold over 157 MtCO<sub>2</sub>e of emission allowances for the period 2013-2020. This exceeds the abatement task, and indicates that under the Kyoto protocol, little, if any, further by action is needed to meet the 2020 target. The lack of action in the period to 2020 however creates a larger abatement task in the decade following.

For the whole period of 2013 and 2030, the CAT estimates an overall remaining cumulative task of 1514–1750 MtCO<sub>2</sub>e (excluding LULUCF) under currently implemented policies. Before the repeal the abatement task was of 415–651 MtCO<sub>2</sub>e (excluding LULUCF), that is, policies brought Australia two thirds of the way closer to its INDC target.



**Figure 1: Comparison of the cumulative abatement task for Australia pre and post-repeal up to 2030 (excl. LULUCF).**

It is clear from our present assessment that Australia is currently unlikely to meet its target without substantially more policies. Currently planned policies are inconsistent with the INDC target. The continued path of Australian climate policy development cements in a clear shift away from the previous government’s targeted national climate policy that was designed to meet concrete goals in line with international climate policy targets, and the required emission reductions identified by the climate science community.

### Emission Reduction Fund

At the heart of Australia’s Direct Action Plan is the Emissions Reduction Fund (ERF), which functions as a reverse auction mechanism with an objective to “reduce emissions at lowest cost over the period to 2020” (Australian Government, 2014, p. 68). The ERF - the so-called “centrepiece” of the Australian

Government's policy suite to reduce emissions - does not set Australia on a path that would meet its targets.

Alongside the reverse auction, the ERF consists of a safeguard mechanism, which will begin operations in July 2016, and its stated intention is to limit significant emissions increases from large industrial sources. While the policy details are currently being designed and are not yet finalised, the Consultation Paper published in March this year gives an indication about the effectiveness of this mechanism. According to this paper, "Emissions baselines will be set using the highest level of reported emissions for a facility over the historical period 2009-10 to 2013-14, with a minimum baseline of 100,000 tonnes CO<sub>2</sub>e for all facilities," (Australian Government, 2015g) which effectively means that the safeguard mechanisms will not curb many emissions. In addition, according to Reputex ("UPDATE: ERF Safeguards – Toothless Tiger or Hidden Dragon? | Reputex," n.d.) the scheme currently only covers 30 companies (it includes none of the top 20 emitting facilities), which further highlights its ineffectiveness. Because of its estimated insignificant impact, the CAT has not included this in our quantification of the ERF.

Based on the first auction that took place in April of this year, the CAT developed two scenarios to analyse the impact of the fund: one scenario assuming a constant price of AUD\$13.95 per tonnes of abatement, which was the average price of the first auction; the second scenario assumes an increasing price per tonnes of abatement, increasing by AUD\$1 per auction. We assume one more auction in 2015, followed by quarterly auctions in 2016. In the CAT current policy projections, the total budget of AUD\$2.5 bn are thus distributed among six auctions and the fund is expected to run out of money after that. Based on these scenarios the CAT estimates the total abatement of the fund to be between 159–199 Mt CO<sub>2</sub>e out of which 106–121 MtCO<sub>2</sub>e would be realised before 2020 (further detail on these calculations under Assumptions).

In August 2015, the Coalition announced that if Tony Abbott wins next year's federal elections, the ERF would continue to get about AUD\$200m a year between 2020 and 2030. Given the political uncertainty around that additional funding, the CAT evaluated how much that would bring in emissions abatement, but did not include this abatement in the our current policy projections which considers currently implemented policies only and not announced policies. With the additional funding, we estimate a further cumulative abatement of 82-107MtCO<sub>2</sub>e, to be realised in the decade 2020-2030, which is equivalent to approximately 5-7% of the present abatement task of 1514–1750 MtCO<sub>2</sub>e<sup>11</sup>. The additional funding would reduce our current policy projections by only 2%, to around 25% above 2005 levels (equivalent to 57% above 1990) compared to our current estimate of 27% above 2005. We conclude that the additional funds would still not set Australia on a path that would meet its 2030 target.

### Renewable Energy Target

The Renewable Energy Target is a policy designed in 2010 aimed at creating additional generation of electricity from renewable sources. Producers create renewable energy certificates for every megawatt hour of electricity they generate and wholesale purchasers of electricity buy these certificates to meet their renewable energy obligations. They then surrender these certificates to the Clean Energy Regulator, which regulates both the supply and demand of certificates to ensure scheme integrity, and provides an online registry to enable the market to operate.

The Clean Energy Regulator administers the Renewable Energy Target's two schemes: the Large-scale Renewable Energy Target (LRET), which aims to achieve a target (originally 41,000 gigawatt-hour) of

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<sup>11</sup> For the post-2030 we estimate a remaining abatement resulting from the additional funds in the 2020-2030 decade of 34-50 MtCO<sub>2</sub>e until 2037.

additional renewable electricity generation by 2020, and the Small-scale Renewable Energy Scheme, which supports small-scale installations like household solar panels and solar hot water systems.

On June 25 2015, the Renewable Energy (Electricity) Amendment Bill 2015 (RET) was approved by both houses of the Australian Parliament, thus reducing the national large-scale renewable energy target from 41,000 GWh to 33,000 GWh in 2020. Other Amendments included the removal of the requirement for the Climate Change Authority to undertake biennial reviews on the operation of the Renewable Energy (Electricity) Act 2000 and subordinate regulations and to reinstate native forest wood waste as an eligible source of renewable energy.

Our current assessment of the amendment to the LRET shows that even if the impact on emissions for 2015–2020 is very small, in the long term, this new target represents approximately between 97-140 MtCO<sub>2</sub>e of additional emissions for the period 2020–2030. This amendment thus further increases the current emissions pathway, which was already significantly affected by the abolition of the Carbon Pricing Mechanism (further detail on these calculations under ‘Data sources and assumptions’).

## Data sources and assumptions

### New 2015 reporting guidelines

Up until 2014, aggregate GHG emissions data submitted (in the Common Reporting Format) by Governments to the UNFCCC and numbers provided in national reports (such as the National Inventory Reports or National Communications) have used Second Assessment Report (SAR) Global Warming Potentials (GWPs) for calculating emissions levels in CO<sub>2</sub>-equivalent units and been provided according to IPCC guidelines published in 1996. Beginning in 2015, mandatory reporting has transitioned to using GWPs from the Fourth Assessment Report (AR4) and according to the more up-to-date 2006 IPCC guidelines. Here we describe the impact of these changes on the CAT analysis.

- **Global Warming Potentials: IPCC Second Assessment Report (SAR) vs. IPCC Fourth Assessment Report (AR4)**

All CAT assessments to date have consistently employed SAR GWPs. A central part of the CAT analysis is to aggregate countries' emissions trajectories to the global level to estimate associated resulting temperature increase: the same set of GWPs needs to be considered for all countries. Many developing countries assessed by the CAT have only provided aggregate emissions data using SAR GWPs (very often, data on per-gas basis is also not provided which would allow us to convert CO<sub>2</sub>-equivalent from SAR to AR4 GWPs). The fact that the data in AR4 GWPs has only been provided for very few countries, the CAT has opted, for this update, to continue using SAR GWPs.

On a side note, Australia's emissions projections 2014–15 states to be “using the 20-year global warming potentials contained in the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report.” However, upon a closer look one can reveal that at least the historical emissions are reported by the source (Quarterly Update of Australia's GHG National Inventory) using the 100-year global warming potentials. We assume that the stated 20-year GWP constitutes an inconsistency and assume that the projections also use the 100-year GWPs, since the historic data and projections smoothly touch in 2015.

- **1996 vs. 2006 IPCC guidelines**

The most recent CRF data submitted by Australia reports data in 2006 IPCC guidelines (and not 1996 IPCC guidelines). Due to mainly a timeline issue—the first new CRF tables have only been submitted very recently—the CAT team is still in the process to adapt its read-in routines for the latest data-reporting format and therefor uses mainly CRF 2014 data for this update. Once the latest CRF data is read in, and if important differences arise between data reported in 2015 compared to data reported in 2014 (e.g. concerning the base year emissions), we will publish an update to this assessment.

For this update, two important data issues remain unresolved: (1) extracting natural disturbances from most recent CRF data, which at this point is not possible but needed to verify the 2005 base year emissions for INDC calculation; and (2) understanding how methodology (including changes in both emissions factors and categorisation), combined with changes in GWP, impact the difference between 2014 and 2015 reported aggregate GHG emission values in National Inventory Reports.

### Copenhagen Pledge

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

We applied LULUCF accounting to Australia's pledge, following special criteria in line with the definition of their pledges. In defining its targets for 2020, Australia considered these targets refer to its net emissions from categories included in Annex A to the Kyoto Protocol and from afforestation, reforestation and deforestation activities (ARD) for both the base year (2000) and the target year (2020). To obtain GHG emissions levels in 2020 excl. LULUCF, we have subtracted emissions from ARD



from the end year. For our calculations we did not use Party-provided ARD projections, instead obtaining the 2020 ARD value by linear trend over the period 1990-2010 for afforestation and reforestation and a linear trend over the period 1990–2012 for deforestation.

Since the Copenhagen pledge is non-legally binding there are no pre-existing rules as to which rule applies to this pledge. Some countries, like New Zealand, indicate they would use the same Kyoto Protocol rules to increase their allowed GHG emissions. We apply this approach to the Copenhagen pledge (further details under “Calculation of Australia’s Accounting Credits and Debits from Kyoto Protocol Article 3.3 and Article 3.4 LULUCF activities”).

### Post 2020 target

Australia states in its INDC that it will apply a net-net approach to accounting for LULUCF, meaning it includes all GHG emissions and removals from LULUCF in its base and target year. The announcement of the Australian target by the Department of Environment (Australian Government, 2015c) indicates a 612 MtCO<sub>2</sub>e base year emissions levels in 2005. Those emissions levels can be reconciled with the 2005 emissions levels reported in the last Quarterly update of Australia’s National Greenhouse Gas Inventory from September 2014 report submitted by Australia (Australian Government, 2015f), which states to provide all numbers in AR4 GWP levels. We conclude therefore that the 612 MtCO<sub>2</sub>e number was calculated using AR4 GWP values and do not use this number further in our calculations. This 612 MtCO<sub>2</sub>e value is also slightly higher than emissions including LULUCF reported in the latest CRF data (601 MtCO<sub>2</sub>e, Australian Government, 2015f), so it is not clear whether it is based on this latest reporting or if it includes or excludes natural disturbances and therefore may also be subject to change.

- **CAT calculation of base year emissions in SAR GWPs**

The emissions data provided in CRF 2014 includes emissions from natural disturbances, and notably wildfires, which should be excluded from the base year, as Australia explicitly states it will apply IPCC guidance for treatment of natural disturbances and variation. CAT’s approach to obtaining emissions excluding wildfires was to construct a LULUCF proxy trajectory, using CRF for all the activities (except for forest management, which in CRF includes wildfires) and add forest management excl. wildfire as reported by the Quarterly Update. This results in 618 MtCO<sub>2</sub>e base year emissions, which we use to calculate the commitment.

It is important to note that we would expect the change from AR4 to SAR GWPs to lead to slightly lower emissions in CO<sub>2</sub>e in SAR GWPs, contrary to what we find (618 MtCO<sub>2</sub>e is higher than 612 MtCO<sub>2</sub>e). More clarity on what is behind the 612 MtCO<sub>2</sub>e base year emissions levels is needed for the CAT to be able to reconcile these differences.

- **Potential reason to revise current estimate of base year emissions**

A preliminary comparison between emissions data submitted in 2014 and in 2015 performed by the CAT reveals a high increase in emissions from LULUCF for the year of 2005: in 2014, GHG emissions for the whole LULUCF was of 25 MtCO<sub>2</sub>e, while the more recent submission reports a LULUCF emissions level of 69 MtCO<sub>2</sub>e. As indicated above, wildfire-related emissions are included in that estimate, which prevents us from using those numbers directly, and the treatment of wildfires in the aggregate data has been revised between reporting years.

It is important to note that both CRF2014 and 2015 contain a category under which emissions related to wildfires are reported. However, the CAT was unable to reconcile those levels with the levels provided in national reports that provide numbers for wildfire-related emissions, such as the Quarterly Update report (Australian Government, 2015f), which indicates those emissions are also reported under other categories and not explicitly in CRF data. A better understanding of the actual

sources in the reported increase in 2005 LULUCF emissions reported in 2015 is needed and not possible at this point with the data provided thus far by Australia. As natural disturbance emissions can drastically change base year emissions, Australia needs to present estimates for those emissions more transparently.

### Current policy projections

For the current trend analysis we used the scenario provided by the Australian Department of Environment in their latest emissions projections report (Australian Government, 2015b). Alternative scenarios presented here use information from the results of the first ERF auction and the Electricity Sector Modelling report of ACIL Allen Consulting (ACIL ALLEN Consulting, 2013).

The minimum and maximum extremes of the current implemented policy projections are calculated using the base scenario provided by the last official emissions projections of the Australian government and adjusting the Renewable Energy Target (from 26,00 GWh to 33,000 GWh by 2020). This is then extended, by adding the potential effects of the Emissions Reduction Fund (under two possible scenarios based on the results of the first auction).

For calculating the impact on future emission of the Emissions Reductions Fund (ERF), we take as a base the results from the first auction, which took place in April this year, where the government purchased 47.3 million tonnes of carbon dioxide at a price of AUD\$660 million. The contract range ranged from 3 to 10 years. In the future, a safeguard mechanism for the ERF is expected to commence in July 2016 in order to ensure that the reductions purchased are net reductions. However, based on the expected characteristics of this mechanism, we expect it will not have any significant impact on the auction results and therefore decided to leave it out of our quantification.

With the first auction as a base we calculate two scenarios; both of them take into account the criticism and concern that the fund will soon run out of money (RepuTex, 2015b). We reside with this opinion and regard the budget of the fund as finite and do not assume a continuation of the fund at this point in time, based on the highly speculative nature of future scenarios, as these depend on election outcomes and other unpredictable future factors. Additionally, we assume for both scenarios that the duration of the contracts is eight years, which was around the average duration of the projects of the first auction and, further, that the Government will run auctions on a quarterly basis - as stated in their White Paper— from 2016 onwards. However, for the year 2015, we only assume one further auction, which is expected to take place November 4–5 2015 (Clean Energy Regulator, 2015)

The first scenario is conservative and assumes that the carbon price will remain the same as in the first auction: AUD\$13.95. The second scenario assumes a carbon price that increases gradually from one year to the next. This assumption is based on the fact that bigger corporations are said to behave more strategically in their bidding behaviour, driving the prices upwards and that the cheaper options were partially exhausted in the first auction ("MARKET OUTLOOK: Industry to capitalise on 'likely' ERF delay | RepuTex," n.d.).

Finally, for calculating the impact on future emission of the amendment of the LRET (Large Scale Renewable Energy Target) to 33,000 GWh in 2020, we take as a base the Electricity Sector Modelling report of ACIL Allen Consulting (ACIL ALLEN Consulting, 2013). Firstly we calculate the additional GWh that it would be necessary to produce to cover the projected generation for each year, with no renewables sources given a less ambitious LRET, and distribute them among the fossil fuels according to their expected shares of generation. Next, we apply the underlying emissions factors of the report for each year in order to translate the additional GWh to MtCO<sub>2</sub>e. We consider two scenarios to estimate a maximal and minimal impact of the adjusted LRET: the first assumes a constant generation from LRET until 2030 (as stated in the law), and the other assumes a growth rate for the generation

up to 2030 coming from the projected growth of generation of renewable energy assumed in the ACIL Allen Report.

The main assumptions for the calculation of the amended LRET are that the shares of renewable energy produced by projects that are not included in the LRET remain constant during the projections period, and that the share of generation by fuel (for fossil fuels) remains the same as that was projected by ACIL.

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

In the case of Australia, an understanding of likely credits and debits from Article 3.3 and 3.4 is fundamental to determining allowed emissions of GHG emissions (excl. LULUCF) for the second commitment period.

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. The Climate Action Tracker has 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. In our detailed assessment of Australian LULUCF emissions projections, we have found a number of inconsistencies, summarised in Box A1.

#### Box A1: Inconsistencies found in the LULUCF emissions data for Australia

This analysis has carefully considered the following reports: Australia's emissions projections 2014–15 (Department of Environment 2015); Quarterly Update of Australia's National Greenhouse Gas Inventory (Department of Environment 2014) and Australian Land Use, Land Use Change and Forestry Emissions Projections to 2030 (Australian Government 2013). Some data inconsistencies regarding the LULUCF sector have been found in those reports, creating transparency problems that increase the uncertainty related to the emissions of the LULUCF data. These data inconsistencies are briefly illustrated below, without any intended purpose but to create transparency about associated uncertainties regarding the data used in this analysis:

- **LULUCF emissions for 1990:**

Due to the use of Article 3.7, Australia included in its Kyoto Protocol base year (1990) the emissions from deforestation activity. The emissions projections 2014–2015 report seem to be using total LULUCF emissions and deforestation emissions interchangeably for the year of 1990: it reports the whole LULUCF emissions for 1990 to be 135.7Mt CO<sub>2</sub>e (corresponding only to the deforestation category) instead of the real net LULUCF emission for this year (117.6 Mt CO<sub>2</sub>e). This only occurs in the first year of the time series for the time series makes it inconsistent and can create transparency problems.

- **NET LULUCF emissions:**

Net emissions from the LULUCF sector used in the latest Government emissions projections come (at least from 1991 onwards) from the Quarterly Update of Australia's National Greenhouse Gas Inventory from September 2014. This report also entails a breakdown by LULUCF categories. However, the aggregation of the individual sectors does not match (by any linear combination possible) the net emissions provided in the same report and the difference between the totals is on average -50%. While part of the difference may be explained by the exclusion of Harvested Wood Product in the sectoral numbers, it remains unclear how the net LULUCF emissions were obtained.

- **Differences between LULUCF projections:**

The LULUCF data from the Quarterly Update from September 2014 does not match the one reported in

Australia's LULUCF emissions projections to 2030. While part of the difference may be explained by the different mandatory reporting categories of the commitment periods, as well as methodology adjustments that occurred in the last two years, large differences remain.

## CAT Approach

By selecting the best sources from available datasets, a single historic pathway for each country and each LULUCF KP activity is generated. 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.

We then project these historical pathways from the last historical year (2012) up to 2020, by either taking the long-term trend<sup>12</sup> or the historical mean. Projections are performed using the mean when the historic data has high variability, but have no clearly defined trend. ,

Here we describe the underlying data and assumptions made in order to calculate projected CP2 credits and debits for each activity, and the uncertainty due to currently available data.

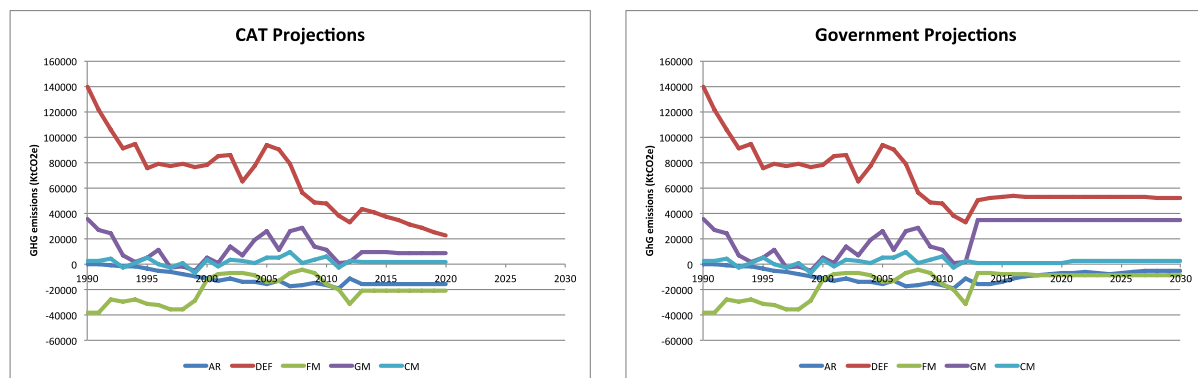


Figure 2: Historic trends and CAT (left panel) and Australian Government's (right panel) projections of Kyoto Protocol LULUCF activities in Australia (AR: Afforestation/Reforestation, DEF: Deforestation, FM: Forest Management, excl. wildfires, GM: Grazing Land Management, CM: Cropland Management). CAT projections only project until 2020 due to the high data uncertainty beyond that point.

- **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 using a trend over total estimation approach. The cumulative emissions over this period are therefore projected to be 264 MtCO<sub>2</sub>e, or an average of 33 MtCO<sub>2</sub>e per year.

<sup>12</sup> Some limits are also placed on the possibilities for trend projections, for example deforestation emissions are not allowed to drop below zero

Analysis by the Australian Climate Change Authority released in September 2013 estimates that deforestation rates will increase from recent levels & stabilise in the coming years at 53 MtCO<sub>2</sub>e 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 of the differences in projections for credits accounting are 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<sub>2</sub>e/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.

- **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 123 MtCO<sub>2</sub>e of credits, or an average of 15 MtCO<sub>2</sub>e 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 90 MtCO<sub>2</sub>e, or 11 MtCO<sub>2</sub>e/year, during CP2.

- **Kyoto Protocol Article 3.3 ARD**

The net effect of these considerations is that the CAT estimated Article 3.3 ARD debits averaged over CP2 of 18 MtCO<sub>2</sub>e are less than half those of the Government at 41.4 MtCO<sub>2</sub>e. We are 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)**

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. Forest management activities are calculated with respect to a reference level that was submitted to the AWG-KP during 2009–2011 (Government of Australia, 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<sub>2</sub>e. (UNFCCC, 2011) The most recently published reference level of 1.1 MtCO<sub>2</sub>e (2015 NIR) follows a technical correction. However, the final value will not be determined until Australia submits its Kyoto Protocol Initial Report for the second commitment period. Further, the credits available under forest management activities are limited to 3.5% of the Parties' submitted base year emissions. In Australia's case, this amounts to 19.2 MtCO<sub>2</sub>e /year, equivalent to about 4.6% of 1990 GHG emissions (excl. LULUCF).

Based on these rules, we calculate that the cap only results in a minor restriction on available credits for Australia. With our (CAT) forest management emissions projections, Australia will gain 153 MtCO<sub>2</sub>e credits cumulatively (19.2 MtCO<sub>2</sub>e / year) equivalent to 4.6% of 1990 GHG emissions excl. LULUCF. 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 GHG emissions excl. LULUCF (referenced to 1990).

Some uncertainty in the credits available from forest management remains until the forest management reference level is finalised. The treatment and assumptions related to force majeure can also significantly impact the projected emissions from this activity. National estimates of credits from this activity for 2013 were 21.3 MtCO<sub>2</sub>e (Australian Government, 2015e) before application of a cap. The 2013 estimate is consistent with CAT projections for this activity.

- **Cropland Management**

Debits and credits for cropland management and grazing land management 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<sub>2</sub>e / year (0.1% of 1990 emissions) of debits. Initial government estimates for 2013 are comparable at 1.9 MtCO<sub>2</sub>e of credits (Australian Government, 2015e).

- **Grazing Land Management**

According to the CAT, 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.

The CAT uses as a proxy for emissions from grazing land management the reported emissions under category “grazing land remaining grazing land management” in CRF 2104 and projects emissions for this activity over the second commitment period using a linear trend over the historical period.

Under the CAT approach, Australia’s 1990 base year level for grazing land management is 35 MtCO<sub>2</sub>e / year. As emissions from this activity have dropped significantly since then, we estimate that an average of 24 MtCO<sub>2</sub>e 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 GHG emissions excl. LULUCF (referenced to 1990).

According to projections from the Australian government (Australian Government, 2013), only very few credits will be generated under this activity. Recent updates to the national inventory (Department of the Environment, 2015) and first publication of a 1990 reference level for this activity indicate that credits available from this activity may be lower than the CAT estimate. The 2015 NIR reports 1990 reference year (1990) emissions for grassland management of -0.2 MtCO<sub>2</sub>e. The change in base year emission is attributed to ‘adjustments reported under Forest Conversion in the UNFCCC inventory in 1990 and recorded in the report used to calculate the assigned amount, in order to avoid double counting’ (2015 NIR, Page 59, Table 11.31). Using the revised base year emissions, debits of 5 MtCO<sub>2</sub>e are estimated for this category in 2013 (Australian Government, 2015e). As with other categories, the publication of Australia’s initial report for Kyoto Protocol CP2 should provide further clarity and confirmation of reference levels and values for LULUCF accounting. The CAT will update its estimates for CP2 credits accordingly.

#### **Aggregate Accounting under Kyoto Protocol Article 3.3 and Article 3.4**

On aggregate, we calculate that LULUCF accounting could generate up to 29 MtCO<sub>2</sub>e/year credits equivalent to 7.1% of 1990 emissions, over CP2, increasing by about 7.1% to the allowed 2020 emissions of GHG emissions excl. LULUCF (referenced to 1990).

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