

# Five year commitments for the Paris Agreement: A fundamental issue for below 2°C and 1.5°C

6 November 2015

## Technical Summary

### Background

The length of Parties' successive mitigation commitments<sup>1</sup> under the anticipated Paris agreement is emerging as a fundamental issue. This is because it can greatly impact the ability of the new agreement to achieve the goal of holding the global average temperature increase below a 2°C increase above pre-industrial levels, and returning below a 1.5°C increase above pre-industrial levels by 2100.

Recent analyses of INDCs submitted by October 1 2015 showed that the aggregate effect of INDCs for 2025 and 2030 is significantly above the levels required in this period to limit warming below 2°C<sup>2</sup>, and return to 1.5°C by 2100<sup>3</sup>. The gap between INDC emission levels and those required for 2°C and 1.5°C pathways grows rapidly between 2025 and 2030. By 2030 it may not be possible to 'catch up' and reduce emissions fast enough to limit warming below 2°C with a likely chance, and it might be impossible to limit warming below 1.5° by 2100.

If inadequate emission reductions are locked in until 2030 by the new agreement then present scientific evidence points to it becoming extremely difficult, if not impossible, to limit warming below 2°C depending upon the final emission level in 2030. A five-year period for mitigation commitments is favoured to avoid the risk of locking in a low level of ambition from Parties for an extended period of time and to encourage Parties to revisit and improve their emission reductions ambition frequently.

These briefing points aim to explain why initial and successive 5 year commitment periods (CPs)<sup>4</sup> for all Parties are a necessary element of the new agreement to help ensure that the 1.5/2°C limit is met, and how a 10-year CP would in fact fail to provide the long-term stability and certainty that Parties seek.

---

1 Presently phrased as [nationally determined mitigation commitments and/or contributions] [a nationally determined contribution with a mitigation component] with abbreviation NDMC/NDMCC in draft agreement Version of 23 October 2015@23:30hrs at <http://unfccc.int/files/bodies/application/pdf/ws1and2@2330.pdf>

2 See UNFCCC Synthesis report on the aggregate effect of the intended nationally determined contributions <http://unfccc.int/resource/docs/2015/cop21/eng/07.pdf>

3 INDCs lower projected warming to 2.7°C: significant progress but still above 2°C

<http://climateactiontracker.org/publications/briefing/223/INDCs-lower-projected-warming-to-2.7C-significant-progress-but-still-above-2C-.html>

4 The term commitment period is used loosely here recognising that the ultimate terminology used in the Paris agreement may be different.

### ***Linking commitment periods to the science***

- 5-year CPs will encourage Parties to actively respond to evolving scientific information by the IPCC (e.g. AR6 could be released in 2019) which is crucial to staying well below the 1.5/2°C limit. Mitigation commitments must be aligned to the climate science.
- It seems very unlikely that the agreement expected to be reached in Paris in December 2015 will put the world onto a mitigation pathway consistent with a below 2°C limit, let alone a 1.5°C limit. Five year CPs therefore becomes a necessary part of achieving the goal.
- Projected emission levels in 2030 lie far above 2° and 1.5°C pathways, rendering correction in the following decade extremely problematic, if not impossible. Projected emission levels in 2025 are still above 2° and 1.5° pathways, but to a lesser extent. It is plausible that efforts could be sufficiently increased in the 2025-30 period to bring emission pathways limiting warming to 1.5/2°C within reach.
- Based on current INDCs and announcements from Parties, the world is on track for a warming of around 2.7°C (90% chance above 2°C and 66% chance or likely below 3°C)<sup>3</sup> of warming. 2030 INDC emission levels appear to make it impossible to limit warming below 2° with a 66 per cent (likely) or higher probability. The first commitment period under the agreement must not lock in a 3 degrees world.
- Parties will need to make more ambitious commitments for the mid to late 2020s to have any realistic chance of achieving a 1.5/2°C limit.

### ***Regulatory and political arguments for adopting five-year commitment periods***

- An initial 5-year CP would require Parties to start their first CP in 2021 and 'lift their game' or adopt stronger efforts at the start of a new CP in 2026. However, if a 10-year CP were adopted there would be no obligation to do anything more until 2030 – fifteen years after the Paris agreement is signed.
- Given Parties communicate their commitments well in advance of when they intend to undertake them, to prepare for a CP starting in 2026, Parties need to bring forward new commitments for 2026-30 at the latest in 2019/20. The IPCC Sixth Assessment Report would need to be timed to input into this 'collective moment', when all Parties set 2030 targets.
- More regular updating of commitments on a 5-year cycle is necessary to respond to the latest science and avoid locking in inadequate levels of ambition for long periods of time.
- Under a 10-year initial cycle starting in 2021 and ending in 2030, there would be over fifteen years between making the commitment in 2015 for the first CP and commencing the second CP in 2031. Science says that Parties cannot afford to lock in an inadequate level of ambition that has little or no certainty of being improved for fifteen years.
- A commitment to 'review' targets in the middle of a 10-year CP will not lead to increased ambition. Experience under the Kyoto Protocol illustrates that attempts to extract increased mitigation ambition through reviewing commitments and providing the opportunity for parties to 'ratchet up' ambition within a CP have not worked.
- Under the Kyoto review process (1/CMP.8), concluded in 2014, which required Annex I Parties to revisit their quantified emission commitments for the second commitment period, not a single Party took up the opportunity to increase its level of ambition. The lesson learned is that leaving the door open to lengthy commitment periods is not helpful.

- More generally, the concept of ‘ratcheting up’ commitments over time tends to lock-in a cycle of always ‘promising to do better next time’. During this time, the gap between what needs to be done and what is actually being done grows wider and achieving the kind of levels of mitigation required to prevent dangerous climate change eventually becomes infeasible. This makes it critical that the Paris agreement adopts a mitigation ambition framework that places the world onto an acceptable pathway towards long-term decarbonisation.
- INDCs should add up to a minimum threshold, and reviewing and setting goals every five years will keep Parties on this pathway. The emission reductions pathway should always be the frame of reference.
- From the perspective of vulnerable countries, a 5-year CP provides an opportunity to maintain and increase pressure on other Parties to increase their ambition.
- Many significant emitters such as China and India already operationalise their domestic climate policies in five year periods, which is fully consistent with a 5-year CP. Even Parties that have 10-year planning cycles can calculate their emission trajectories for 2025 and present a contribution/commitment for a first 5-year period, increasing their ambition then for a second commitment period to run from 2026 through 2030.

***Economic rationale for adopting five-year commitment cycles***

- Adopting a 10 year CP would also make emissions reductions beyond 2030 harder, costlier, more disruptive and less likely to realistically achieve the 1.5/2°C limit. Delaying action by five years would increase the cost of transition by between \$340 billion and \$500 billion in the electricity sector alone (\$US2012).
- As the International Energy Agency (IEA) has repeatedly warned, waiting until 2030 will create larger carbon lock-ins, and hence greater regulatory and economic disruption if shifting to a more ambitious low-emissions pathway after 2030.
- Supporters of a 10-year CP often point to the need for regulatory certainty to ease the transition and increase investor confidence, but adopting a 10-year CP only provides certainty for fossil fuel incumbents by locking in their ability to invest in emissions-intensive infrastructure.
- Uncertainty will persist as long as there is a gap between Parties’ ambitions and the ultimate objective of the Convention to limit warming to 1.5/2°C. A 10-year CP prolongs this uncertainty, which will make it difficult to justify investments in new energy and other infrastructure, while a 5-year CP better facilitates the transition. A 10-year CP doesn’t promote uncertainty - it locks in uncertainty.
- A 10-year CP promotes the lock-in of carbon-intensive assets and will require significantly greater, costlier and more onerous action beyond 2030 to put the world on a 1.5/2°C pathway. This will increase the cost of finance for existing and new assets and introduce regulatory uncertainty as governments and the private sector are left to deal with stranded assets.
- A 5-year CP combined with a no back-sliding provision ensures that certainty for investors is at least as high as under a 10-year CP, while simultaneously signaling that any remaining uncertainty will only point one way: towards increasing stringency.

# Technical Background

## Introduction

This technical paper provides underlying information and data for the issues outlined in the Technical Summary above. Specifically, it steps through evidence from scientific, economic, regulatory and political perspectives to help explain why having 5-year commitment periods (CP), applicable to all Parties, is a critical element of the Paris agreement being negotiated under the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP).

The key message from the evidence is that 5-year CPs will be essential to achieving a goal of holding the global average temperature increase below 2°C above pre-industrial levels, and returning below a 1.5°C increase above pre-industrial levels by 2100 (2/1.5°C goal).

## Background

Two distinct options have emerged in the communication by Parties of Intended Nationally Determined Contributions (iNDCs) and negotiations under the ADP for defining the length of commitment periods: 5-year CPs with emissions reduction targets for the first CP to be achieved by 2025, or 10-year CPs with targets for the first CP to be achieved by 2030.

A first 5-year CP would require Parties to start their first CP in 2021 and submit new and more ambitious commitments at the beginning of the second CP in 2026. Under a 10-year CP, Parties would also be required to start their first CP in 2021, but would not be required to renew and increase the ambition of their commitments until 2031.

This means that a 10-year CP would not require Parties to revisit their 2015-stated ambition for pre-2030 action that the evidence shows to be critical for achieving the 2/1.5°C goal: If 10-year CPs are adopted under the new agreement that lock in inadequate emission reductions until 2030, present scientific evidence points to it becoming extremely difficult, if not impossible, to limit warming below 1.5/2°C – see “Scientific evidence” below for further details. 5-year CPs are therefore favoured to avoid the risk of locking in inadequate levels of ambition from Parties for an extended period of time and to require Parties to revisit and improve their emission reductions ambition more frequently.

The informal Ministerial consultation of 46 UNFCCC parties, held in Paris on 20-21 July 2015, highlighted support for a mid-term review mechanism as a way of encouraging Parties to ‘ratchet up’ their level of ambition during a 10-year CP. A non-binding summary of the consultations reflected “broad, common understanding” amongst attendees to allow both 5 and 10 year contributions, with the latter to be revisited every 5 years “with an option – but

not an obligation – to upgrade them”.<sup>5</sup> However, as is outlined below, experience with the Kyoto Protocol has shown such mechanisms to be ineffective. Increases in ambition, if they occur at all, are likely to happen at the beginning of a commitment period, not during one.

## Scientific evidence

### Unambitious iNDCs highlight the need to renew commitments in 2025

Based on iNDCs communicated by Parties up to 1 October 2015, which account for approximately 78% of global greenhouse gas (GHG) emissions, the Climate Action Tracker (CAT) calculates that the world is on track for 2.7°C of warming by 2100 (and committed to further warming beyond 2100). Put another way, while pledges are likely to keep warming below 3°C, there is a 90 per cent likelihood of exceeding 2°C.

Failure to commit to new and more ambitious mitigation commitments in 2025 threatens to lock out any hope of limiting warming to below 2°C or 1.5°C. There is a wide range of possible decarbonisation pathways in the scientific literature that lead to below 2°C and 1.5°C, but these generally reach much lower global emission levels by 2025 and 2030 than the levels implied by INDCs in aggregate. The median ambition gap in 2025, between iNDCs and the 2°C literature, is 12 Gt CO<sub>2</sub>-e, rising to 16 Gt CO<sub>2</sub>-e in 2030. For 1.5°C, the corresponding gaps are 15 Gt CO<sub>2</sub>-e in 2025 and 22 Gt CO<sub>2</sub>-e in 2030.<sup>6</sup> To put this into perspective, China’s emissions in 2010 were 11 Gt CO<sub>2</sub>-e.<sup>7</sup>

In fact, based on iNDCs as at 1 October 2015, there are no demonstrated socio-economic scenarios in the 2014 UNEP Gap Report (based on IPCC-reviewed scientific literature) that enable the world to hold warming below 2°C with a ‘likely’ chance, or to hold warming below 1.5°C by 2100, although the gap by 2025 is much smaller than by 2030. While some scenarios in the IPCC AR5 database do achieve very rapid emission reductions after 2030, these either lead to a lower probability to hold warming below 2°C, or rely on extreme high emissions of sulphur<sup>8</sup>, at a level that can best be characterized as geo-engineering, and are still coupled with high carbon emissions that lead to, for example, high levels of ocean acidification.

For a global warming limit of 2°C:<sup>9</sup>

- In 2025, iNDCs lead to emissions of 53 Gt CO<sub>2</sub>-e, while the most optimistic energy-economic modelling requires emissions in 2025 to be no more than 50 Gt CO<sub>2</sub>-e, a gap of 3 Gt CO<sub>2</sub>-e.

<sup>5</sup> France and Peru, Aide-Memoire, First informal ministerial consultations to prepare COP21, 20-21 July, 2015, <http://www.minam.gob.pe/somoscop20/wp-content/uploads/sites/81/2014/10/Aide-m%C3%A9moire-Paris-July-Informals.pdf>, accessed 17/8/15.

<sup>6</sup> Ibid, p5. Uncertainty ranges for emissions gap to 2dC: in 2025, 11-13 Gt CO<sub>2</sub>-e; in 2030, 15-17 Gt CO<sub>2</sub>-e. Uncertainty ranges for emissions gap to 1.5dC: in 2025, 14-16 Gt CO<sub>2</sub>-e; in 2030, 21-23 Gt CO<sub>2</sub>-e.

<sup>7</sup> PRIMAP4BIS emissions database, China projected emissions in 2015, <https://www.pik-potsdam.de/research/climate-impacts-and-vulnerabilities/research/rd2-flagship-projects/primap/primap>, accessed 19 October 2015.

<sup>8</sup> All IPCC AR5 scenarios with global emissions of around 55 Gt CO<sub>2</sub>-e or higher in 2030 that achieve 2°C with a ‘likely’ chance are produced by a single model (MERGE\_ETL), which assumes in its scenarios that SO<sub>x</sub> emissions do not decrease with decreasing CO<sub>2</sub> emissions from coal, currently the main (co-)emission source. These high SO<sub>x</sub> emissions have a cooling effect which results in less temperature rise by 2100. This is an unrealistic assumption for large deviations in emissions from the baseline, which is the case in 2/1.5°C consistent emissions pathways that see a phase-out of coal-fired power plans in the coming decades.

<sup>9</sup> Climate Action Tracker, Global Temperature Update October 2015, p 5. Uncertainty ranges for 2dC: iNDCs in 2025, 52-54 Gt CO<sub>2</sub>-e and in 2030, 53-55 Gt CO<sub>2</sub>-e.

- Towards 2030, the gap grows very rapidly: iNDCs lead to emissions of 54 Gt CO<sub>2</sub>-e, while the most optimistic energy-economic modelling requires emission in 2030 to be no more than 44 Gt CO<sub>2</sub>-e, a gap of 10 Gt CO<sub>2</sub>-e.

The picture is more bleak when considering the feasibility of limiting warming to 1.5°C:<sup>10</sup>

- In 2025, the most optimistic scenarios require that emissions do not exceed 48 Gt CO<sub>2</sub>-e, a gap of 5 Gt CO<sub>2</sub>-e.
- Again, the gap grows very rapidly towards 2030: emissions cannot exceed 40 Gt CO<sub>2</sub>-e, putting the gap at 14 Gt CO<sub>2</sub>-e. Put another way, this would require a reduction in emissions in 2030 equivalent to almost one-and-a-half times China's entire emissions in 2010.

This analysis shows that even if a 5-year CP is adopted, projected emission levels in 2025 are still above scientifically-demonstrated 2°C and 1.5°C pathways. However, the rate of change needed to bring the world onto a 2/1.5°C compatible pathway is much lower if Parties come back to the table before 2025, rather than 2030. As scientific literature and technology markets evolves, it is conceivable that energy-economic pathways would be developed that show the way to get back on track for 1.5 and 2°C after 2025, from the modest remaining 2025 gap between INDCs and the currently estimated edge of demonstrated feasibility. However, given the escalating gap post-2025 this is much less likely by 2030, given technological, social and economic constraints.

By implementing a 5-year CP, the chances of moving the world onto a 2/1.5°C pathway in 2025 are higher, and the potential social and economic disruption of doing so is reduced, but only if Parties avoid locking in 2030 emissions targets and commit to new and more ambitious mitigation commitments in 2025.

### **Delay hurts chances of meeting the 2°C goal**

If a 10-year CP is adopted which locks in inadequate ambition until 2030, the scientific evidence shows that it is much more difficult to stay on a 2°C pathway, than if Parties adopt a first 5-year CP that ends in 2025 and followed by significantly strengthened commitments for the 2026-2030 period. IEA reported that that very few scenarios assessed in IPCC AR5 WG3 with annual GHG emissions above 2010 levels in 2030 still had at least a 50% chance of meeting the 2 °C goal with emissions in all world regions peaking between 2010 (OECD) and 2030 (parts of Africa and Asia).<sup>11</sup>

Figure 2 shows the effect of waiting until 2030 to increase ambition on the probability of holding warming below 2°C. The probability initially rises with increasing global mitigation investments, or costs (expressed here as carbon price), but reaches a plateau at high costs, for which probability does not rise further, once technological options start to be exhausted. In other words, even if mitigation investments following a delay were to rise to extreme levels, these can never fully compensate for the higher effectiveness of earlier action.

<sup>10</sup> Based on analysis of AR5 scenario database and scenarios with the introduction of global climate policy in 2020.

<sup>11</sup> International Energy Agency, World Energy Outlook Special Report 2015, p 139, Chapter 5: Building Success in Paris and Beyond, 2015, <https://www.iea.org/publications/freepublications/publication/WEO2015SpecialReportonEnergyandClimateChange.pdf>, accessed 21/8/15; IPCC AR5, WG3 (2014), e.g. Figure 6.31 and Table 6.4.

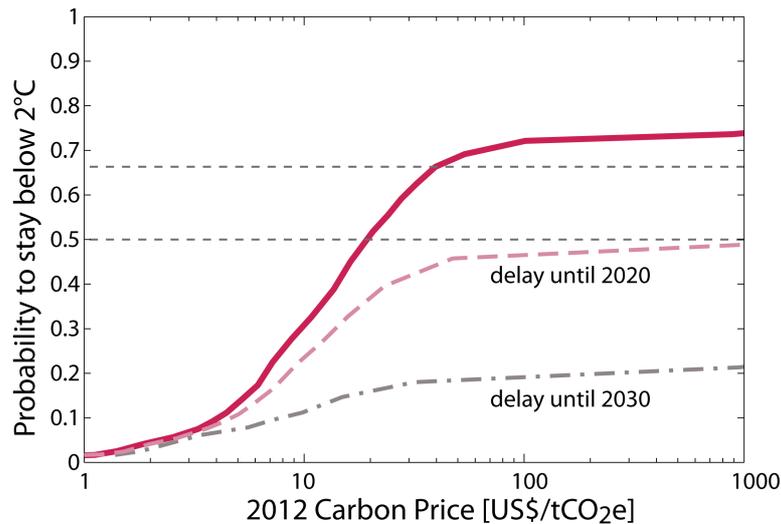


Figure 2: The implications of different delays in adopting action consistent with a 2°C pathway on holding warming to below 2°C. 2012 Carbon Price is the price at the time action starts, discounted back to 2012 with a discount rate of 5% per year. Source: Rogelj et al, Probabilistic cost estimates for climate change mitigation, Nature (2013).

Failing to move onto a 2 degree compatible emissions pathway until 2030 decreases the probability of limiting global warming to 2°C for several reasons. Firstly, for the same level of investment, the high probabilities that were still feasible when assuming immediate action can no longer be achieved. Secondly, no matter how much investment flows into low-carbon technologies, the overall probability to hold warming below 2°C is lower, because available technology options for further emission reductions get exhausted and cannot fully compensate for the early lack of action.<sup>12</sup>

### 10-year CPs would require much higher decarbonisation rates

Science from the Intergovernmental Panel on Climate Change (IPCC) tells us that delaying action today will require stronger and faster action tomorrow to avoid dangerous climate change. This is shown in the graph below from the Fifth Assessment Report of the IPCC (Figure 1).

All emission trajectories shown in the graph are in line with a roughly 50-75% chance of limiting warming to below 2°C. The light green lines show higher annual emissions increase scenarios peaking in 2030, whereas the dark green lines show lower annual increases and an earlier peak in emissions. The boxes in the right panel indicate the annual rate of change (CO<sub>2</sub> emission reductions) required in the 20 years after 2030, which depend on the course taken prior to 2030.

While early action scenarios (dark green lines) require annual reductions after 2030 of around 3% (dark green boxes), delayed action results in emission trajectories (“middle” and light green) that increase the level of reductions required after 2030 to up to around 6% per year.

<sup>12</sup> Rogelj et al (2013).

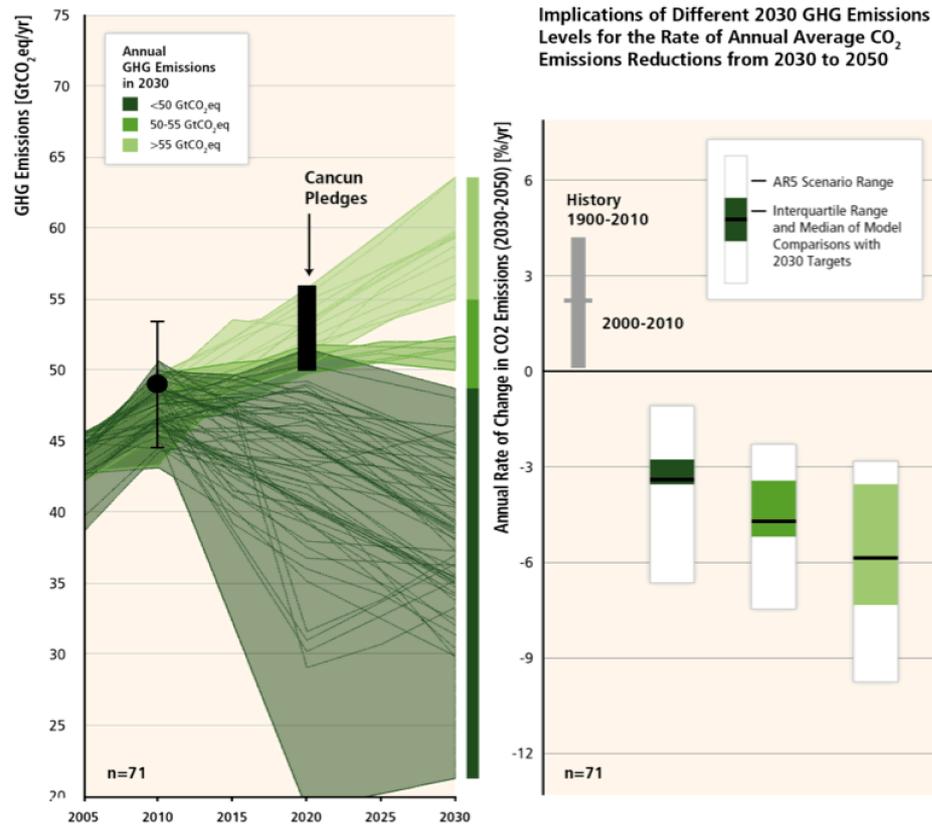


Figure 1: The implications of different 2030 GHG emissions levels (left panel) for the rate of CO<sub>2</sub> emissions reductions (middle panel) in mitigation scenarios consistent with a roughly 50-75% chance of holding warming to below 2°C. Source: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Figure TS.9, Table 6.3.

In the context of commitment periods, if 2020 emissions are at the high end of Cancun pledges (the black box in Figure 1) and are followed by a 10-year CP that locks in increasing global emissions until 2030, the global emissions pathway is consistent with the light green wedge and hence an average 6% per annum decrease in CO<sub>2</sub> emissions post-2030 to limit warming to below 2°C.

On the other hand, if 2020 emissions are at the lower end of the IPCC’s assessment of Cancun pledges, and two successive 5-year CPs over 2021-2025 and 2026-2030 result in lower emissions in 2030, it is still conceivable for global emissions to follow a dark green pathway and hence limit the required decrease in CO<sub>2</sub> emissions post-2030 to 3% per annum. This in essence means that delaying the commitment to necessary levels of ambitious action until 2030 rather than 2025 could require the world to move up to twice as fast in terms of annual CO<sub>2</sub> emission reductions after 2030, if warming is to be limited to below 2°C.

Put differently again, if a 5-year CP for 2026-2030 succeeded in raising ambition and placed the world by 2030 onto the dark green pathway in Figure 1, over the following 20 years, a 60% reduction in emissions would be required to hold warming below 2°C. However, if a 10-year first CP was adopted, and it resulted in emissions in 2030 which were instead on the light green pathway, this would require a 120% reduction in emissions over the following 20 years – significantly increasing the size of the challenge and placing more reliance on negative emissions technologies, both of which are explored further below.

### Higher decarbonisation rates will cause greater social and economic impacts

There are significant social and economic implications to such an unprecedented rapid shift to a 2°C pathway. The International Energy Agency (IEA) has repeatedly warned that fossil fuel-intensive infrastructure will continue to be built up until that point at which the world shifts to this more ambitious low-emissions pathway.<sup>13</sup> This will in turn entrench GHG emissions in existing infrastructure such as power plants, transport and industry, also known as the lock-in effect. The result will be greater regulatory and economic disruption as this infrastructure is retired before the end of its economic life, with obvious flow on effects for the workers and communities that the infrastructure supports. Stranded assets are discussed in more detail in the following section.

Pathways in which the shift to levels of ambition consistent with 2°C is delayed until 2030 are more likely to require global net negative emissions to achieve the temperature goal. This is because these pathways display more reliance on the use of carbon dioxide removal technologies later in the century such as bioenergy with carbon capture and storage (BECCS) to keep warming within a 2 (or 1.5°C) pathway. BECCS requires substantial quantities of biofuel crops and carbon capture, transport and storage, and is subject to significant technological, social and economic uncertainty.<sup>14</sup> Ambitious early action will therefore help to hedge against the possibility that BECCS will not evolve to the extent anticipated by existing scenarios.<sup>15</sup>

### Commitments should evolve with the climate science

In order to achieve the 2/1.5°C goal, mitigation commitments must be aligned with the progress in climate science and its findings. Every five to seven years the IPCC publishes an assessment report synthesising the most up-to-date climate science.<sup>16</sup> The IPCC's AR6, to be released between 2019 and 2021, is expected to increase certainty about the adverse effects of climate change and the options and costs of mitigation and adaptation. Adopting 5-year CPs will therefore better enable Parties to make commitments based on the latest scientific developments.

## Economic evidence

### Economic losses increase with 10-year CPs

The IPCC's Fifth Assessment Report shows that to have a 50-75% chance of limiting warming to 2°C, global mitigation costs – measured as a percentage of consumption lost – will likely be in the low single digit range.<sup>17</sup> Longer delays increase cost. Delaying action until 2030, instead of acting now, will increase the cost incurred in the following 20 years by 28-44%.<sup>18</sup> Conversely, any action taken before 2030 lowers the overall cost of reaching the 2°C goal.<sup>19</sup>

<sup>13</sup> IEA (2015), Figure 5.5, p 139.

<sup>14</sup> Tavoni et al., Modeling meets science and technology: an introduction to a special issue on negative emissions, Nature Climate Change (2013).

<sup>15</sup> Rogerlj et al (2013).

<sup>16</sup> Decision IPCC/XLI-4, 41st Session of the IPCC, 24-27 February 2015, [https://www.ipcc.ch/meetings/session41/p41\\_decisions.pdf](https://www.ipcc.ch/meetings/session41/p41_decisions.pdf), accessed 18/8/15.

<sup>17</sup> IPCC AR5, WG3 Figure 6.21. Level of consumption measured between 2020-2100 compared to level of consumption in a baseline scenario with little or no mitigation actions. This is a commonly used economic metric because consumption is a proxy for welfare.

<sup>18</sup> IPCC AR5, WG3, Table SPM.2.

<sup>19</sup> IPCC AR5, WG3, figure 6.25.

Using scenario projections from the IEA, we undertook a simplified analysis to calculate the cost of locking in low ambition under a 10-year CP.<sup>20</sup> We looked at the costs in the electricity sector (a significant contributor to GHG emissions) in a scenario where strong ambition starts in 2025 at the end of the first 5-year CP, compared to a world in which Parties adopt a 10-year CP, delaying strong mitigation action until beyond 2030.

Delaying action by five years would increase the cost of mitigation worldwide by **between \$340 and \$500 billion in the electricity sector alone** (\$US2012)<sup>21</sup>. The increased cost is incurred because countries must scale up investment in low-carbon electricity sector technologies to move onto a 2°C compatible pathway more rapidly than they would otherwise have done. Because of a lack of suitable modelling scenarios it is not possible to calculate the cost of moving onto a 1.5°C pathway, although it is expected that the cost would be even higher.

### **IEA calls for 5-year CPs to facilitate energy investments**

In its 2015 Special Report on Energy and Climate Change, the IEA stated that a 5-year review cycle of mitigation targets is needed to “send the necessary signals to the energy sector.”<sup>22</sup> It highlighted several contextual factors that give rise to this need, namely that “the environment in which these [mitigation] goals are being set is changing rapidly,” and “the cost and performance of many low-carbon technologies are improving rapidly.” It consequently called for:

*“a five-year cycle that creates an expectation of rising ambition [to] send a clearer message to investors of countries’ long-term commitment to progressive decarbonisation.”<sup>23</sup>*

Even the compromise proposal of a 10-year CP with a 5-year review, as described in the Background section, is unlikely to provide investors with assurance of countries’ increasing levels of ambition, given the failure of a similar mid-term review mechanism under the Kyoto Protocol (discussed in the following section). To promote certainty in energy and other capital-intensive sectors, 5-year CPs that result in stronger action from 2025 onwards give the best chance of sending a signal to stakeholders that climate legislation will continue to apply in the long-term with increasing stringency.

### **10-year CPs creates more stranded assets**

If we assume that a first 10-year CP results in a delay in moving onto a 2°C pathway, new carbon-intensive infrastructure assets (predominantly coal-fired power plants without carbon capture and storage) will be built during the 10 year period. If more ambition is generated for post-2030 under a second CP, with the aim of shifting onto a 2°C pathway,

---

20 Low ambition in this case corresponds to the IEA Current Policy Scenario and New Policy Scenario, both of which lead to a temperature increase of 3.6°C; Strong ambition corresponds to the IEA 450 Scenario which is a 2°C consistent scenario.

21 Assumptions for calculation of cost of transition:

- Scenario data from IEA’s latest World Energy Outlook (WEO (2014)) and World Energy Investments Outlook (WEIO (2014)).
- The time taken to shift investment from the low to high ambition pathway is 5 years, linearly interpolated.
- No parties make new commitments during the first commitment period (i.e. 2020-2025 for the 5-year CP, or 2020-2030 for the 10-year CP).
- For the period 2012-2015 the WEIO Current Policy Scenario is assumed to apply.
- The calculations of investments are based on a median constant (2020 level) investment costs from WEIO 2014. This is chosen as a point of time that is representative of electricity sector costs over the time period of the analysis.
- Delaying the switch towards the 450 scenario means that the probability of achieving 2 degrees will be somewhat lower than it is in the 450 scenario, although the exact amount is difficult to quantify without additional modelling.

22 IEA (2015), p 134.

23 Ibid., p 138.

some of these assets will likely have to be decommissioned before the end of their economic life. Assets that are constrained by future climate policy are not going to be able to realise their maximum value. This puts at risk capital that has already been committed, increasing the overall cost of refinancing existing power sector assets and opening up governments to the risk of private sector action seeking compensation for asset value impairment. We estimate that delaying the time taken to shift onto a 2°C pathway by five years, by adopting a 10-year rather than a 5-year CP, generates an **additional \$560-820 billion in stranded assets in the electricity sector alone** (\$US2012).<sup>24</sup>

In calling for a 5-year review cycle, the IEA also highlighted the increased risk of stranded assets arising from a longer cycle:

*“From an infrastructure perspective, delaying [by five years] to adopt a Bridge [2°C compatible] strategy significantly increases the size of the challenge of wrenching power sector emissions back onto a 2°C path thereafter. Such a high level of high-carbon infrastructure also increases the risk of assets becoming stranded if strict climate policies are adopted later.”<sup>25</sup>*

## Regulatory and geo-political context

### ‘Ratcheting up’ processes do not work

One argument raised in support of 10-year CPs is that ambition levels can be reviewed and ‘ratcheted up’ during a CP, rather than waiting for the end of a CP to adopt new, more ambitious targets. However, experience under the Kyoto Protocol illustrates that attempts to extract increased mitigation ambition through reviewing commitments and providing the opportunity for parties to “ratchet up” ambition within a commitment cycle have not worked.

In the negotiations leading up to COP 18 in Doha, the EU proposed a second commitment period under the Kyoto Protocol lasting eight years until 2020, largely to align with timelines under existing climate legislation such as the EU Emissions Trading Scheme (EU ETS)<sup>26</sup> and Renewable Energy Directive<sup>27</sup>. Other groupings of countries, including the African Group and the Alliance of Small Island States (AOSIS), supported a 5-year CP that would run until 2017.<sup>28</sup> An 8-year CP until 2020 with a mid-term review was accepted as a compromise, which required Annex I Parties to revisit their targets for the second commitment period in 2014, with a view to increasing ambition.<sup>29</sup> Despite this, under the mid-term review process that concluded in 2014, not a single Party took up the opportunity to increase its level of ambition.<sup>30</sup> The lesson learned is that processes that require mid-term reviews of ambition

<sup>24</sup> Assumptions for calculation of value of stranded assets are the same as those used to calculate the cost of transition described above.

<sup>25</sup> IEA (2015), p 139.

<sup>26</sup> Phase 3 of the EU ETS runs from 2013 to 2020.

<sup>27</sup> The Renewable Energy Directive requires the EU to fulfill at least 20% of its total energy needs with renewables by 2020.

<sup>28</sup> IISD, Earth Negotiations Bulletin, Vol. 12, No. 546, 28 May 2012, <http://www.iisd.ca/download/pdf/enb12546e.pdf>, p 8.

<sup>29</sup> IISD, Earth Negotiations Bulletin, Vol. 5, No. 567, 11 December 2012, <http://www.iisd.ca/download/pdf/enb12567e.pdf>, p 14.

<sup>30</sup> 1/CMP.8, and IISD, Earth Negotiations Bulletin, Vol. 12, No. 555, 8 September 2012, <http://www.iisd.ca/download/pdf/enb12555e.pdf>, p 8.

<sup>30</sup> FCCC/KP/CMP/2014/3, Report on the high-level ministerial round table on increased ambition of Kyoto Protocol commitments, 4 September 2015, <http://unfccc.int/resource/docs/2014/cmp10/eng/03.pdf>.

and the opportunity (but no obligation) to “ratchet up” ambition are a poor substitute for shorter CPs.

#### **5-year CPs can align with domestic legislative and policy frameworks**

Generally, Parties that adopt climate policy planning cycles or programmes that are longer than five years can equally calculate their emission trajectories for 2025 and present a commitment for 5-year, rather than 10-year, periods.

For example, the EU has consistently in the ADP negotiations supported a 10-year CP, with emissions reductions targets to be achieved by 2030.<sup>31</sup> However, adopting a 5-year CP is just as possible under the existing EU climate policy framework, and would not require changes to the underlying EU regulatory framework. For instance, the share of the EU’s abatement task to be achieved in sectors covered by the EU ETS is based upon a 1.74% per annum decrease in allowances until 2020 and a 2.1% per annum decrease until 2030. This does not hinder the EU’s ability to put forward a target for 2025 instead of 2030. Similarly, the Effort Sharing Decision that underpins the EU’s approach to reducing emissions from non-EU ETS sectors is based on annual emissions limits that follow a straight-line path between the initial year and the target year.<sup>32</sup> A 2025 target could therefore easily be translated into an annual emission allocation for each EU member State up until 2025 without changing the underlying methodology.

#### **A 5-year CP promotes political accountability**

Election cycles in representative democracies are typically less than five years. Keeping the commitments within a similar period of time for action by the governments that have proposed them is more likely to increase accountability for raising ambition, since the need to propose a more stringent commitment will arise during the term of each successive government. Conversely, 10-year CPs would take pressure off governments to commit to stronger levels of ambition, since multiple election cycles would fall within a 10-year period.

Further, the possibility for communicating commitments every 5 instead of 10 years enables parties to take account of rapidly changing national circumstances. This is a view shared by the IEA, who contends that five-year review cycles “creates an opportunity for political ambition to keep pace with external events” (the IEA’s examples include lessons learnt from policy implementation and growing public acceptance of the need to transition to a low carbon future).<sup>33</sup> Increasing awareness of the early adverse effects of climate change (e.g. extreme events), together with increasing scientific certainty of the costs they are incurring, might also increase acceptance of more ambitious mitigation policy at a domestic level.

---

31 European Commission, Conclusions (23 and 24 October 2014), 24 October 2014, [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/ec/145397.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf).

32 European Commission, Annual Emission Allocations, June 2015, [http://ec.europa.eu/clima/policies/effort/framework/index\\_en.htm](http://ec.europa.eu/clima/policies/effort/framework/index_en.htm), and European Commission, Conclusions (23 and 24 October 2014), 24 October 2014, [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/ec/145397.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf).

33 IEA (2015), p 138.