# The Mitigation Framework in the 2015 Climate Change Agreement: from Targets to Pathways

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# Forward

This paper is the fruit of many months of intensive collaboration between the authors, on the basis of the Memorandum of Understanding signed between the Institute of Sustainable Development and International Relations (IDDRI) and the National Centre for Climate Strategy and International Cooperation of China (NCSC) in December 2013.

It represents the efforts of the authors to propose a comprehensive and ambitious framework for mitigation in the new 2015 climate agreement. As with all collaborations, there has been much discussion, learning and a spirit of problem solving to achieve this text. It is a significant achievement for two groups of authors from China and Europe to have come this far. There is much that can be learnt from this process for the global negotiations.

The global negotiations are moving into a new and important phase. Parties have agreed to put forward the elements of a draft text in Lima in 2014, in order to propose a draft agreement six months before the crucial Paris conference in 2015.

Part of the challenge is to define a new framework for mitigation, among the other elements of the agreement. This framework will need to recognize the realities of different circumstances and interests in sovereign states, the international legal and institutional tools that can be mobilized, and the urgency of limiting warming to 2˚C. It will need to be equitable, ambitious, effective and dynamic.

This paper represents the authors’ attempt to meet that challenge and contribute to the global discussion on effective responses to the common challenge of climate change.

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# Highlights

**The Mitigation Framework in the New Climate Agreement**

Countries have agreed to negotiate a new climate agreement by 2015. One of the key elements of this will be a new mitigation framework and new emissions targets for all. Enhanced action is urgently needed to limit warming to 2˚C. Otherwise, development and welfare will be put at significant risk. The new agreement needs to find a way to allow the continuous strengthening of the action of sovereign states, to reflect the 2˚C objective. The agreement should also recognize the spectrum of countries and changing circumstances, as well as remaining gaps between groups.

**Climate Mitigation: Rebuilding the Machine from the Inside Out**

Mitigation is a long-term structural challenge, involving profound changes in investment, infrastructure, technology and behaviour. Uncertainties in such structural processes may be particularly high in developing or emerging countries still undergoing industrialization, demographic shift, and urbanization. Mastering them requires long-term policy horizons, cooperation, technology innovation and policy learning, focusing on the drivers of emissions reductions.

**From Targets to Pathways**

The mitigation framework should consist of a more precise translation of the 2˚C target as a key directional reference, but not as the basis for top-down allocation. It is essential to integrate the long-term perspective in national policy making, international cooperation, and private sector anticipations. Under the new agreement, countries except Least Development Countries would put forward long-term low emissions pathways to 2050. These would be submitted by 2018 and regularly updated. Countries would also submit multi-sector, multi-timeframe operational targets in 2015, under the new agreement. These should reflect the drivers of emissions reductions, allowing for the most ambitious action where countries feel they can go furthest. These would be updated every 5 years in subsequent rounds of collective action.

# Context and Introduction

Countries have agreed to negotiate a new global climate agreement by 2015, which will be applicable to all countries from 2020. According to the negotiation mandate, the 2015 agreement will cover mitigation, adaptation, finance, technology development and transfer, transparency of action and support, and capacity building.[[3]](#footnote-3) Negotiations are not starting from scratch; progress has been made since Copenhagen on each of these elements.[[4]](#footnote-4)

Currently, all major economies, with a few exceptions, have proposed voluntary mitigation targets to 2020 under the framework of the Cancún Accords. These targets are only until 2020, and are recognized to be insufficient to meet the objective of keeping global average temperature change to less than 2˚C. The IPCC notes:

“…Estimated global GHG emissions levels in 2020 based on the Cancún Pledges are not consistent with cost-effective long-term mitigation trajectories … to limit temperature change to 2˚C relative to pre-industrial levels … The Cancún Pledges are broadly consistent with cost-effective scenarios that are likely to keep temperature change below 3°C relative to preindustrial levels…”[[5]](#footnote-5)

Negotiating new, stronger mitigation targets for the period after 2020 will therefore be one of the key tasks of the negotiation process. This paper focuses mainly on the issue of defining the mitigation framework, as one key element of the new comprehensive agreement.

The 2013 climate conference agreed that Parties should define the information framework for mitigation targets[[6]](#footnote-6) by the Lima conference in 2014. This information, provided together with mitigation targets, should facilitate a better understanding, credibility and accountability of these targets. This is one of the key deliverables for the 2014 negotiations.

**This paper addresses this issue of the design of the mitigation framework: how should we structure the information that Parties put forward with their mitigation targets, in order to promote participation, equity, transparency and ambition? It also addresses broader questions of the mitigation regime: how can it promote dynamic, long-term, transformational action?**

Several issues should be made clear from the outset. Firstly, the 2013 Warsaw conference made clear that there is still some divergence of views regarding the legal form of mitigation targets. This paper leaves aside this question of legal form, and thus uses the neutral word mitigation ‘targets’. Secondly, the agreement, as mentioned above, will need to cover all the issues of the Durban Mandate. This paper mainly focuses on mitigation targets, and leaves aside this issue of other elements of the 2015 agreement. Further work should take up these issues urgently.[[7]](#footnote-7)

Thirdly, the issue of the design of mitigation targets combines both elements of “structure” and “process”.[[8]](#footnote-8) The transparency, credibility and understanding of mitigation targets can be facilitated by processes such as a reporting, verification and review, which can help Parties to understand each other’s actions. It can also be facilitated by the structure of the targets themselves, i.e. the rules and information that are used to define them. Ensuring a transparent outcome on mitigation will require optimizing both elements. This paper focuses on the issue of the “structure” of mitigation targets.

This paper is structured as follows. Section 2 outlines the key issues that the mitigation framework must address. These include the scale and rapidity of transformation, the need for long-term signals and policy coordination, and the need to address the multiple drivers of emissions trajectories. Section 3 then looks at the *ad hoc* structure that the Cancun Pledges have taken, in order to draw some lessons for the future design of the mitigation framework. Section 4 then proposes the basic pillars of the mitigation framework in the new agreement: the 2˚C target as a directional reference for global action; and a fundamental shift from a ‘logic of targets’ to a ‘logic of pathways’. Under a ‘logic of pathways’, countries would submit long-term, indicative low emissions pathways, combined with operational multi-sector, multi-timeframe target packages. Finally, section 5 concludes.

# Key Issues to be Addressed by the Mitigation Framework

## The Urgency of Climate Change and the Need for Transformation

The recent series of IPCC reports have recalled the urgency of global climate change. The IPCC confirmed that without further mitigation efforts, global average surface temperatures will rise by 3.7 to 4.8˚C over the century, with the possibility of higher temperature increases not to be excluded.[[9]](#footnote-9) This is clearly above the objective of limiting warming to 2˚C which was been set under the 2010 Cancun Agreements.[[10]](#footnote-10) Unabated climate change at this level would pose great risks to economic development, vulnerable populations, and ecosystems.

A significant change of course is therefore required in order to address climate change. According to the IPCC, emissions need to be reduced by 40-70% by 2050 in order to have a likely chance (>66%) of keeping warming below 2˚C.[[11]](#footnote-11) This would require significant transformations in energy supply, energy use, and agriculture, forestry and other land-use.[[12]](#footnote-12) The key sectoral transformations required have been characterized by the IPCC’s WGIII report. These include the significant up-scaling of low-carbon energy supply, and improvements in energy efficiency and the switch to low-carbon energy sources in buildings, transport and industry:[[13]](#footnote-13)

* *Energy supply*: the share of low carbon energy will need to triple or quadruple by 2050.[[14]](#footnote-14) Low-carbon electricity supply increases from the current share of around 30% to more than 80% by 2050.[[15]](#footnote-15)
* *Transport:* energy demand for transport would need to be reduced by 10-45% from baseline by 2050, through more efficient technology and reduction in structural transport demand through urban planning. Low-carbon energy supply in transport would need to reach around 30-45% of final energy consumption in 2050.[[16]](#footnote-16)
* *Buildings*: final energy demand will need to be reduced by about 15-35% compared to baseline by 2050 through energy efficiency, and low-carbon energy to increase to 45-60% of final energy consumption in the buildings sector by 2050.[[17]](#footnote-17)
* *Industry*: final energy demand will need to be reduced by about 18-28% by 2050 compared to baseline, through a combination of energy efficiency and structural measures such as material efficiency, recycling and reuse. Low-carbon energy supply will need to increase to about 45-55% of final energy consumption in the industry sector, largely through a switch to electricity and industrial CCS.[[18]](#footnote-18)

These references can give a sense of the direction, technologies and strategies required sector by sector.

## The Diversity of Countries and Remaining Gaps between Groups

According to the Durban Mandate, the new agreement should be “under the Convention [and] applicable to all Parties”.[[19]](#footnote-19) It is widely expected that all major countries should take on new mitigation targets in the context of this new agreement, with Least Developed Countries doing so probably at their discretion. This creates the important challenge of finding a mitigation framework that can take into account the wide diversity of countries, while providing transparency.

Figure 1 provides one indicator of this diversity between countries, showing GDP per capita in purchasing power terms. As can been seen, there is a very wide spectrum of countries, based on this indicator. To provide another point of comparison, Figure 2 shows CO2 emissions per capita for the same group of countries. Clearly, any framework to include mitigation targets from such a diverse range of countries will need to be flexible, in order to accommodate the spectrum of national circumstances, and the diversities of policies and levers which are available for reducing emissions in each country.

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| Figure 1: GDP per capita at purchasing power parity, 2012, annex 1 in red, non-annex 1 in blue | Figure 2: CO2[[20]](#footnote-20) per capita, 2010, annex 1 in red, non-annex 1 in blue |
|  |  |
| *Source: World Bank data* | *Source: World Bank data* |

At the same time as acknowledging the broad spectrum of circumstances, it is important to acknowledge the continued relevance of distinctions between groups of countries. It is also important to consider future economic trajectories, as the agreement is intended to be a durable long-term instrument regulating the period after 2020. The instrument thus needs to be able to take into account the depth of change expected, uncertainties, and future capacities.

In order to give a sense of the evolution of broad groups of countries overtime, we present GDP/capita (since 1990) and CO2/capita (since 1992) in Figure 3 and Figure 4 below for five groups of countries.[[21]](#footnote-21)

**It should be noted clearly that the groups represented are purely illustrative. The Warsaw decision stated that mitigation targets would be nationally-determined.[[22]](#footnote-22) In addition, any groupings are of course subject to discussion, given the imperfect overlap between different internationally used classifications, negotiation groups, and different objective criteria like GDP per capita or overall economic size. Furthermore, it is difficult to capture the mitigation and development opportunities and challenges faced by countries only using one or two indicators. In this sense the figures below are intended to give merely an illustration of how conditions have changed in broad groupings since 1990. This can help give an insight into the different kinds of mitigation challenges that the members of the different groups tend to face.**

The five groups of countries represented are as follows:

1. *Annex 1 countries*. All countries represented in Annex 1 of the Convention. It should be noted that even this group contains significant diversity, e.g. between Ukraine and the US.
2. *Major oil and gas exporters non-Annex 1*. These are the members of the Major Petroleum and Gas Exporters classification of the United Nations Conference on Trade and Development (UNCTAD), with GDP per capita at PPP above USD 15 000 in 2012 and members of non-Annex 1. These countries have a particular challenge of economic diversification and the management of large resource rents, as well as high emissions and GDP per capita.[[23]](#footnote-23)
3. *Higher GDP, non-Annex 1 countries*. These countries are non-Annex 1 countries with a GDP per capita above USD 15 000 in 2012, who do not fall into group 2 above. These countries include newly industrialized countries, which have largely gone through important processes of demographic shift, urbanization and industrialization.[[24]](#footnote-24)
4. *Emerging non-Annex 1 countries*. This group includes all countries with a GDP/capita between USD 7 000 and 15 000. Of course this cut-off is subject to discussion, although the largest countries weigh most on the outcome here and adjusting the cut-off is unlikely to significantly impact the group weighted average. Clearly, the group contains some small countries which would not normally be ranked among the ‘emerging countries’ due to smaller market size. However, to be consistent they have been placed in this group based on the quantitative criteria of GDP/capita. **The only exception to this quantitative criteria is India, which has been placed in this group due to its large size, traditional place in international classifications of emerging countries, and role within the BASIC group in the climate negotiations. On GDP/capita alone, it would not be part of this group.** Countries in this group often face similar challenges of on-going urbanization and industrialization processes. Even though this group contains a diversity of countries, the results in Figure 3 and Figure 4 are dominated by the largest countries such as China, India, Brazil, South Africa, Thailand and Indonesia which make up 88% of GDP in this group.[[25]](#footnote-25)
5. *The rest of non-Annex 1*. All other non-Annex 1 countries which do not figure in the above four groups. It should be noted that this group contains countries which are often placed in international classifications of emerging countries, due to their market size. However, on the objective criteria of GDP/capita they are placed in this group.

It should be noted that Figure 3 and Figure 4 take the weighted average of GDP or CO2/capita among the countries within the group. That is, they sum GDP and CO2 for each group and divide by the summed population of the group. This means that larger countries are taken into account in defining the average CO2/capita or GDP/capita of the group, which would not be the case for the non-weighted average of average national GDP/capita or CO2/capita.

A number of insights can be drawn from the two figures. Firstly, it is clear that there remain significant differences between the groups as defined, with an increasing income gap in absolute terms when compared with the 1990 level. Secondly, there has been a process of relative convergence, albeit quite incomplete. Between 1990 and 2012, the gap in GDP/capita reduced by 13 percentage points between Annex 1 and emerging non-Annex 1 countries, for example, although in 2012 it was still 75% below the Annex 1 average. The gap in GDP/capita reduced by 16 percentage points between the Annex 1 group and higher GDP non-Annex 1 countries between 1990 and 2012. It reduced only slightly (0.4 percentage points) between the rest of non-Annex 1 and Annex 1. Thirdly, it is interesting to note that emerging non-Annex 1 and the rest of Annex 1 group have started to diverge since 1990.

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| Figure 3: average income per capita, PPP, 1990-2012[[26]](#footnote-26) | Figure 4: average CO2 per capita, 1992-2010 |
|  |  |
| *Source: World Bank data* | *Source: World Bank data* |

In sum: the new agreement will have to include a wide diversity of countries. Variation is particularly large within the non-Annex I group. This means that the new agreement should acknowledge the difference between fast-growing, higher capacity emerging economies and the rest of the non-Annex I group. However, the gaps between Annex I and non-Annex I group still significantly large. In this regard, **the new agreement will thus need to provide a flexible and equitable framework for mitigation targets, to reflect this large spectrum of countries and gaps in the development of different country groups.**

## Climate Change as a Long-Term Structural Challenge and the Need for Global Coordination

Climate change is often described as a “wicked problem”.GHG emissions come from all sectors and all activities within the economy. Climate policy has many interactions with other development agendas, such as growth, poverty alleviation, job creation, environmental quality, energy security and access, and poverty eradication. These interactions, including potential co-benefits to climate action, need to be understood and included in the consideration of the mitigation framework.

It is useful to distinguish between three different kinds of uncertainty regarding emissions pathways:

* *Structural uncertainty*: Climate policies aim to effect long-term change in inert systems: to alter investment flows and economic incentives, the composition of long-lived capital stock, and consumption choices. Such economic, physical and social change takes time. Long-term developments such as urbanization patterns can have very significant impacts on long-term emissions. Factors such as the rate and structure of economic growth can have a large impact on emissions. Behavioural patterns, such as demand for goods and services, are also important. In the short-term these uncertainties are often seen as ‘exogenous’ to climate policy. However, such structural factors need to be included in long-term mitigation strategies.
* *Technological uncertainty*: Reaching deep emissions reductions will require significant technology innovation to bring down costs and to demonstrate and commercialize less mature technologies, as discussed in 2.1 above. Some of the required technologies are ‘global’ in the sense that they operate in highly traded product markets (batteries, for example). Here assumptions about global innovation, demonstration and deployment are crucial. Other technologies are ‘global’ in the sense that they confer no private benefits in the absence of strong policy to solve global climate change. CCS is a case in point. Global policy cooperation and coordination will be required to reduce technology uncertainties.
* *Policy uncertainty*: Climate policies are complex, long-term interventions in production and consumption modes across all sectors and levels of society. They require significant administrative capacity. For some countries this may be a real issue in the short-term.

Some uncertainties are particularly large in fast growing developing countries, particularly relating to structural uncertainties (growth rate and structure, societal consumption patterns, urbanization). This can be seen looking back at past projections of emissions performances, compared to actual outcomes. Figure 5 compares the CO2 emissions projections of the World Energy Outlook 2000 and the World Energy Outlook 2002, for the years 2010 and 2020, with actual historical emissions in 2010. It can be seen that actual outcomes in 2010 deviated significantly from projections. The deviation amounted to an overestimation of actual 2010 emissions by 10-15% and 10-19% for the OECD North America and Europe, respectively. It amounted to an underestimation of 33-42% and 6-22% for China and India, respectively.[[27]](#footnote-27)

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| Figure 5: Comparison of past projections of emissions with historical data |
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| *Source: authors based on IEA WEO 2000 and IEA WEO2002[[28]](#footnote-28)* |

One way to address these uncertainties is to directly address the *drivers* of emissions reductions. Emissions drivers can be conceptualized by looking at the so-called Kaya identity, which describes emissions at the outcome of four parameters: population, GDP, energy intensity of GDP, and carbon intensity of energy. In order to give more detail, these can be broken down further into a “sectoral Kaya identity”, which describes sectoral emissions as the product of four parameters: sectoral activity level, sectoral structure, energy intensity, and carbon intensity of energy consumption. Table 1 gives an example of the Kaya identity at both macroeconomic and sectoral level, taking the industrial and transport sectors as the sectoral examples. The different elements of the sectoral Kaya identity can be thought of as potential mitigation levers, requiring different kinds of strategies and entailing different kinds of opportunities and uncertainties on different timelines. The table also gives an example of a mitigation strategy related to each of these ‘levers’.

Table 1: Macroeconomic and sectoral Kaya identity and example mitigation strategies

|  |  |  |  |
| --- | --- | --- | --- |
| **Kaya Identity Parameter** | **Macroeconomic level** | **Sectoral level (industry)** | **Sectoral level (transport)** |
| Population or activity level | Population   * Population size * Growth rate * Demography | Level of industrial demand  *Example mitigation strategy: demand reduction through dematerialization, recycling, reuse* | Level of transport demand, *Example mitigation strategy: demand reduction through greater urban density* |
| Activity  structure | GDP   * GDP level * GDP growth rate * GDP structure | Structure of industrial value added  *Example mitigation strategy: shift to less energy intensive industrial sectors and products* | Structure of transport services, i.e. transport mode  *Example mitigation strategy: modal shift from road to rail* |
| Energy intensity | Energy intensity of GDP   * Technology * GDP structure | Energy intensity  *Example mitigation strategy: improve the technical energy efficiency of industrial processes* | Technological fuel efficiency  *Example mitigation strategy: fuel economy standards for vehicles* |
| Carbon intensity | Carbon intensity of energy   * Energy mix | Carbon intensity of industrial energy consumption  *Example mitigation strategy: switching from coal to gas, or low-carbon electricity or biomass in industrial energy consumption* | Carbon intensity of transport energy consumption  *Example mitigation strategy: shift to electric vehicles* |

*Source: authors*

Some of these factors, such as overall transport demand or industrial structure, are mostly seen as exogenous to climate policy in the short-term. In the longer-term, however, policies need to impact on these variables, for example through enhanced urban density or dematerialized industrial production through ultra-high performance materials (reducing the use of cement or steel, for the same performance outcome, for example). Parameters such as energy intensity and carbon intensity are more directly related to climate policy as such in the short-term. Here, policy outcomes can be more certain and quantifiable in the short-term. Both kinds of strategies are needed.

Providing space for countries to identify which levers they are most actively pursuing can have several advantages. Firstly, it can allow countries to highlight forceful actions in the short-term where outcomes are more certain (for example on the deployment of low-carbon energy). This would be as a complement to economy-wide targets, which may be more affected by the broader uncertainties discussed above. Secondly, by highlighting where countries are taking action (for example, planned roll-out of electric vehicles, or low-carbon electricity), important information can be given for the coordination of innovation, deployment and market creation within and between countries, and for the private sector. This can help to overcome uncertainties about technology innovation and availability.

A number of conclusions can be drawn from this discussion. First, emissions trajectories are influenced by a number of uncertainties. Some of these, in particular the rate and structure of economic growth, urbanization patterns and societal consumption patterns are particularly relevant to emerging and developing countries, at least in the shorter-term. For this reason, secondly, the mitigation framework will need to give sufficient flexibility to allow for such uncertainty. **Here relative intensity targets, absolute growth targets, or aspirational peaking targets can have an important role.** Thirdly, policy outcomes may be more certain in the short-term in certain sectors or for certain mitigation levers. **A closer focus on emissions drivers as a complement to economy-wide targets may allow both greater transparency of action, flexibility for countries to highlight which key drivers they are addressing to the greatest extent, and more ambitious action.** In this respect, a flexible framework should be developed to allow countries to identify their key sectoral indicators, policies or targets, as a complement to economy-wide targets. Fourthly, this sectoral disaggregation can form the basis for greater cooperation, coordination and credibility, particularly by more strongly shaping the expectations of the private sector actions within each sector.

## Creating a Long-Term, Dynamic Agreement

Because of the uncertainties highlighted above, the new agreement will need to be robust to new information and dynamic over time.[[29]](#footnote-29) Countries will likely be able to reinforce their actions over time, as collective learning about policies, technologies and the science of climate change takes place. In this respect, it is important to optimize the two parameters of flexibility and predictability.[[30]](#footnote-30) Predictability renders state engagement mutually more credible, facilitates reciprocity, and sends more robust signals to the private sector. Flexibility will allow the agreement to be tightened over time, and to react to changing circumstances.

# The Example of the Cancun Targets

Before going into the proposal on how the mitigation framework can address the four challenges outlined above, we look into the structure of the Cancun targets. Figure 6 and Figure 7 represent the Cancun targets by type of target: absolute relative to a base-year, BAU targets, carbon intensity targets, and quantified and non-quantified sectoral targets.

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| --- | --- |
| Figure 6: number of countries with economy-wide targets by target type | Figure 7: number of countries with sectoral targets by sector and target type |
|  |  |
| *Source: authors based on UNFCCC, 2014[[31]](#footnote-31)* | *Source: authors based on UNFCCC, 2014[[32]](#footnote-32)* |

As can be seen, a large number of developing countries took on sectoral targets, due to the lack of capacity to formulate economy-wide targets, and uncertainty over economy-wide outcomes. A large share of these sectoral targets were also qualitative in nature. Concerning the emerging countries, it is interesting to note that a number of them took on hybrid targets, combining economy-wide relative targets and sectoral targets and actions:

* China: economy-wide carbon intensity target of 40-45% improvement by 2020; plus sectoral target to increase the share of non-fossil fuels in primary energy to 15% by 2020, and a land-use target to increase forest cover by 40 million ha and forest stock volume by 1.3 million m3 by 2020 compared to 2005.
* Brazil: economy wide BAU target of 36.1-38.9% below projected levels, plus a number of sectoral targets relating to land-use, energy efficiency, transport energy supply, electric energy supply, and industry.
* South Africa: BAU target only, of 34% below BAU in 2020 and 42% below BAU in 2025.
* India: carbon intensity target, excluding the agricultural sector.

The Cancun targets demonstrate the importance of including sector-specific actions within the mitigation framework to allow countries to express efforts that they are undertaking, either as a complement to an economy-wide target, or as a substitute for those countries unable to undertake an economy-wide target.

# The Design of Mitigation Targets – A Proposal

## The 2 Degrees Target: An Long-Term Global Goal as a Directional Reference

The long-term global goal provides a key guidance for national and private sector planning and action. While the Cancun Agreements contain the objective of limiting warming to 2˚C, this reference is imprecise and hortatory. The 2˚C target should be made more precise and operational in the new agreement.

According to the IPCC AR5 WGIII report, in order to have a greater than 66% probability of limiting warming to 2˚C, cumulative emissions need to be kept below 550–1300 Gt CO2 between 2011 and 2050. This translates to required GHG emissions reduction of 40%-70% in 2050 relative to 2010. Emissions levels will have to be near zero or below (i.e. negative) by 2100. This will require fundamental changes in all production and consumption systems.

However, the IPCC report also recognizes that uncertainties exist across the whole causal chain from socio-economic development, emissions, atmospheric concentrations, radiative forcing and temperature rise. In this regard, it is difficult to require decision-makers to make precise commitments regarding long-term emission trajectories and total emissions.

Top-down allocation schemes based on budgets also may not be the most favorable means of negotiation, as they create a zero sum bargaining mentality and do not reflect national decision-making processes and circumstances. Indeed, it has already been accepted that mitigation targets will be ‘nationally-determined’. In this context, the discussion around a global goal should no longer be seen as a basis for allocation, but rather as a directional reference against which global progress must be assessed to identify the gap to be filled to foster enhanced action. In the context of ‘nationally-determined’ targets, having this reference point is very important.

The 2°C target in the new agreement could therefore be based on the following principles:

1. It should not be intended as a framework for allocation, but rather as a directional reference to assess progress at the global level and national contributions.
2. It should recognize scientific uncertainties and be based therefore on a risk management approach recognizing the imperative to avoid risks of higher concentration, delayed action scenarios: increased climate impacts, technology failure notably for negative emissions, and greater costs and social dislocations.
3. It should include more precise directional references than the current framing under the Cancun Agreements, for example by referring to key quantified conclusions of the IPCC regarding the global 2˚C trajectory as a directional reference point.
4. Subsequent iterations of nationally determined contributions should be taken in the context of the 2˚C target.
5. Any potential ‘action gap’ between the 2˚C target and nationally determined contributions and between the best practice and nationally determined contributions should be filled through an on-going process of reinforced action. This should include sectoral policy efforts where countries feel that they may be able to put forward more than their nationally-determined contribution.

## From Targets to Pathways

### Low Emissions Pathways and Multiple Time Period Targets

As mentioned above, one of the key challenges is creating a dynamic agreement that can be adjusted and strengthened over time. Another challenge is creating a framework that can bridge the bottom-up and top-down dynamic. The long-term global target, as argued above, is needed therefore as a directional reference. A third challenge is balancing flexibility and predictability.

Discussions on the dynamic agreement are centring around so-called ‘ratchet mechanisms’, which would allow targets to be easily adjusted within commitment periods in order to take into account new information and allow for increased ambition.[[33]](#footnote-33) Having this flexibility to revisit existing targets is indeed important. However, a number of factors may prevent the use of such ratchet mechanisms within commitment periods. These include:

1. A desire not to prejudge future negotiations.
2. The difficulty of individual revision of targets in the context of a collective action challenge.
3. The inertia of domestic policy processes, which means that it is difficult to revisit decisions once made.
4. The inertia of infrastructures and technologies, which means that ratcheting up targets in the short-term may be difficult. It also means that short-term targets become increasingly irrelevant for economic decision makers, such as investors, as one moves forward in time.

For this reason, one of the main strategies for ensuring a dynamic agreement should be to **create collective, predictable expectations about future negotiation cycles, which can then align domestic policy process and international negotiations.**

One option to address both challenges may be a **rolling,** **multi-year target framework combined with a long-term deep decarbonisation pathway, i.e. an indicative long-term low emissions development strategy.** These pathways can be assessed against the collective goal. At the same time, regular updating can address the balance of certainty and flexibility.

This framework would combine the following elements. Firstly, target periods would be pre-defined. There would be an expectation that all countries would propose new targets at a predefined moment for each new period. This would help promote predictability and the alignment of domestic policy processes and the international negotiations. Secondly, countries would propose multi-period targets. Beyond the current target period, the targets proposed for future periods would be more ‘aspirational’, but would at least give an indication of the pathway being considered. These future targets would be concretized when the current period expires, and the future period is negotiated. This would promote a combination of flexibility to adjust the trajectory over time, while still giving an overall direction of travel.

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| Finally, countries would submit deep decarbonisation pathways (or scenarios), i.e. to 2050. Climate change is a long-term, collective action challenge. It is essential to start to embed this long-term aspect in national policy planning and private sector anticipations of long-term framework conditions. Evidently, given the uncertainties outlined above, it will be difficult for countries to ‘commit’ to an individual long-term pathway. A simple framework should be developed to allow countries to represent an indicative long-term low emissions pathway to 2050, which can be modified and strengthened every five years, in line with each round of strengthened collective action and the adoption of new short-term targets. This would allow the reflection of learning on policy, technology and global cooperation in each successive iteration of the low emissions pathways. The 2015 agreement could contain a commitment to submit them before the entry into force of the instrument by 2020, e.g. by 2018 for all countries except Least Developed Countries.  The low emissions pathways would not be legally binding. Their main purpose would be i) to provide a continuous reference for short-term efforts; ii) integrate long-term perspectives into policy processes and private sector perceptions and anticipations of framework conditions; iii) provide a framework for sharing information and coordinating key international policy spill-overs, particularly in terms of innovation for key low-carbon technologies.  Figure 8: deep decarbonisation pathways plus a ‘five-plus-five’ predictable target period structure |
|  |
| *Source: Authors* |

Several elements should be underscored within this framework:

1. Targets would continue to be nationally-determined.
2. There would be an expectation that countries would continue to make increased efforts over time. This would set the overall direction of travel, and help to create more predictability. In addition, the development of longer-term low emissions pathways would introduce a yardstick to assess progress towards long-term targets.
3. Countries would be free to choose the nature of the targets that they set in future periods. However, there would be a minimum expectation that each country would be required to set a hard target for the period ‘year x + 5’ to ‘year x + 10’, and an indicative target for ‘year x + 10’ to ‘year x + 15’. This may help to bridge differences between countries who would like to see 2025 as the target year for the 2015 negotiations, and those who would like to see 2030.
4. As mentioned, countries would be encouraged to be as comprehensive and long-term as possible in the submission of their indicative, long-term low emissions pathways. However, understandably capacity to do so would need to be built up over time. As a minimum, major emitters would be expected to submit the first iteration of their low emissions pathways by 2018.

**There is a need to shift out of the ‘target mentality’ and towards an understanding of climate change as the challenge of shifting long-term social, technological and infrastructural pathways. This complex, uncertain transition is difficult to summarize as single ‘number’. A combination of targets and pathways is required to capture the full range of necessary action and policy effort, and balance predictability and flexibility. The agreement should include long-term, indicative low emissions pathways, which can be updated, refined and reinforced over time. These should be complemented by multi-period targets, to create stable, predictable expectations about future cycles of collective action.**

### Target Packages: Multi-Tier, Multi-Sector Targets

In order to accommodate the diversity of countries; take into account the complexity and uncertainty of climate policy as a long-term structural challenge; and allow for predictability and flexibility, we propose a multi-tier target structure. As contributions will be nationally determined, countries will be free to select which tier they belong in. There would be an expectation that countries fill in as many tiers as they are able to. There would be an expectation that countries would not decrease the stringency of the tier in which they place themselves, and would gradually increase it over time. The tiers are as follows:

1. Tier one: absolute, economy-wide targets relative to a predefined base-year/period, including both absolute reduction or absolute growth targets (e.g. for emerging countries), or aspirational peaking targets;
2. Tier two: relative, economy-wide targets against GDP (carbon intensity) or population (per capita) or against *ex ante* defined BAU;
3. Tier three: quantitative or qualitative sectoral indicators, targets or policies.

Countries with still growing emissions could take on absolute growth targets or BAU targets or intensity targets. Provided that *ex ante* information is given about the level of BAU, targets against BAU are substantively no different from absolute growth targets.

The table below presents an example template for the three target tiers, and the information that countries would be required to fill in for each tier. This information is crucial to ensure the credibility, transparency, and accountability of targets.

Table 2: target template for the three tiers[[34]](#footnote-34)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tier 1: economy-wide absolute targets:  -absolute reduction  -absolute growth targets  -aspirational peaking targets | Target | Time period: base year and end date(s) | Coverage: gases, sectors, GWP | | Accounting: approach to the land sector and use of markets | Anticipated national emissions at end of time period | Self clarification of Equity and ambition of targets |
| Key methodologies for growth targets: population, GDP, energy intensity and emissions projections | | | | |
| Tier 2: relative targets:  -against BAU  -against GDP  -against  population, i.e. per capita | Target | Time period: base year (for CO2 intensity targets or per capita targets) and end date(s) | Coverage: gases, sectors, GWP | | Accounting (opt-in): approach to the land sector and use of markets | Anticipated emissions at end of time period in absolute terms; |
| Key methodologies and assumptions used to project population, GDP and BAU | | | | |
| Tier 3: sectoral indicators, targets, policies | Energy supply | Industry | Transportation | Buildings | | Land use |
| Quantification and/or policy description | Quantification and/or policy description | Quantification and/or policy description | Quantification and/or policy description | | Quantification and/or policy description |
| Cross sectoral policy descriptions or plans if desired | | | | | |  |

This framework can be illustrated with a couple of hypothetical examples:

* *Developed country X*: takes on an absolute, economy wide emissions reduction target (tier 1). In addition, for developed country X, the roll-out of renewable energy and electric vehicles is a key measure to implement its target, and it therefore puts forward a renewables target as a share of energy supply and a penetration rate for electric vehicles or a share of electricity in transport energy consumption (tier 3).
* *Emerging country Y*: takes on an aspirational economy-wide peaking target (tier 1), and a firm emissions intensity of GDP target (tier 2). In addition, emerging country X has much greater certainty over the control of emissions in certain large industrial sectors, and takes on a quantitative target in these sectors as well as a target for the zero carbon share in energy supply (tier 3).
* *Other developing country Z*: is not in a position to take on an economy wide target due to its more limited capacity and responsibility. However, it has important programs in renewables and the land-use sector. It therefore puts forward sectoral targets under these sectors (tier 3).

# Conclusions

Countries have agreed to negotiate a new climate agreement by 2015. One of the key elements of this will be a new mitigation framework and new emissions targets for all. Enhanced action is urgently needed to limit warming to 2˚C. Otherwise, development and welfare will be put at significant risk. The new agreement needs to find a way to allow the continuous strengthening of the action of sovereign states, to reflect the 2˚C objective. The agreement should also recognize the spectrum of countries and changing circumstances, as well as remaining gaps between groups.

Mitigation is a long-term structural challenge, involving profound changes in investment, infrastructure, technology and behaviour. Uncertainties in such structural processes may be particularly high in developing or emerging countries still undergoing industrialization, demographic shift, and urbanization. Mastering them requires long-term policy horizons, cooperation, technology innovation and policy learning, focusing on the drivers of emissions reductions.

The mitigation framework should consist of a more precise translation of the 2˚C target as a key directional reference, but not as the basis for top-down allocation. It is essential to integrate the long-term perspective in national policy making, international cooperation, and private sector anticipations. Under the new agreement, countries except Least Development Countries would put forward long-term low emissions pathways to 2050. These would be submitted by 2018 and regularly updated. Countries would also submit multi-sector, multi-timeframe operational targets in 2015, under the new agreement. These should reflect the drivers of emissions reductions, allowing for the most ambitious action where countries feel they can go furthest. These would be updated every 5 years in subsequent rounds of collective action.

1. This paper was written under the author’s own responsibility and does not necessarily reflect the views of NCSC or the People’s Republic of China [↑](#footnote-ref-1)
2. This paper was written under the author’s own responsibility and does not necessarily reflect the views of NCSC or the People’s Republic of China [↑](#footnote-ref-2)
3. 1/CP.17. [↑](#footnote-ref-3)
4. For example, work on the transparency of fast-start financing could be a basis for work on the transparency of contributions to climate financing. For adaptation, the work done on developing the framework for the National Adaptation Plans could serve as a starting point for the discussion on the framework for state contributions on adaptation. [↑](#footnote-ref-4)
5. IPCC, AR5, WGIII, Summary for Policy Makers, pp. 15. [↑](#footnote-ref-5)
6. And for other elements of nationally determined contributions; as mentioned, this paper focuses only on the mitigation aspects. [↑](#footnote-ref-6)
7. In this regard, IDDRI is working on a number of papers, which will be published through the course of 2014. These include a paper on the adaptation framework in the 2015 agreement. [↑](#footnote-ref-7)
8. We are indebted to Dan Bodansky for this distinction. [↑](#footnote-ref-8)
9. The figure of 3.7 – 4.8 ˚C equates to the median of the ‘baseline scenarios’ in the IPCC AR5 scenario database, see IPCC, AR5, WGIII, Technical Summary, notes to table TS.1 . [↑](#footnote-ref-9)
10. UNFCCC, Decision 1/CP.16 [↑](#footnote-ref-10)
11. IPCC, AR5, WGIII, Technical Summary, page 28. [↑](#footnote-ref-11)
12. Ibid, ff. 39. [↑](#footnote-ref-12)
13. Ibid, ff. 39. [↑](#footnote-ref-13)
14. IPCC, AR5, WGIII, Summary for Policy Makers, pp. 15. [↑](#footnote-ref-14)
15. Ibid, pp. 46. [↑](#footnote-ref-15)
16. IPCC, AR5, WGIII, Technical Summary, ff. 51. [↑](#footnote-ref-16)
17. Ibid, ff. 58. [↑](#footnote-ref-17)
18. Ibid, ff. 64. [↑](#footnote-ref-18)
19. 1.CP/17, 2. [↑](#footnote-ref-19)
20. CO2 here only cover CO2 emission from fossil fuel combustion [↑](#footnote-ref-20)
21. Other indicators could include cumulative CO2 emissions, relating to the debate on historical responsibility. [↑](#footnote-ref-21)
22. 1/CP.19 [↑](#footnote-ref-22)
23. Iran, Iraq, Kazakhstan, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, Venezuela [↑](#footnote-ref-23)
24. Antigua and Barbuda, Azerbaijan, Bahamas, Bahrain, Barbados, Bermuda, Brunei Darussalam, Chile, Equatorial Guinea, Gabon, Hong Kong SAR, Israel, Korea, Lebanon, Macao SAR, Malaysia, Mauritius, Mexico, Panama, Puerto Rico, Seychelles, Singapore, St. Kitts and Nevis, Suriname, Trinidad and Tobago, Uruguay [↑](#footnote-ref-24)
25. Albania, Algeria, Angola, Armenia, Belize, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, China, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Grenada, Guatemala, Indonesia, Jamaica, Jordan, Kosovo, Macedonia, Maldives, Mongolia, Montenegro, Namibia, Palau, Paraguay, Peru, Serbia, South Africa, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Thailand, Tunisia, Turkmenistan, India [↑](#footnote-ref-25)
26. It should be noted that the World Bank database contains some gaps for national GDP figures. However, as these tend to be for smaller countries, it does not have a significant impact on the weighted average of different groups. [↑](#footnote-ref-26)
27. It is interesting to note in passing that the reduction in the 2010 emissions projections for China and India between 2000 and 2002 was due to the latter set of scenarios including the impact of the Asian Financial Crisis: the economic baseline of the 2000 scenario was based on 1997 economic projections. [↑](#footnote-ref-27)
28. International Energy Agency (2000), “World Energy Outlook 2000”, Paris: IEA. International Energy Agency (2002), “World Energy Outlook 2002”, Paris: IEA. [↑](#footnote-ref-28)
29. Cf. Aldy, J. et al. (2003), “Thirteen plus one: a comparison of global climate policy architectures”, *Climate Policy,* in particular the discussion on the criteria of policy flexibility in the face of new evidence. [↑](#footnote-ref-29)
30. Cf. Brunner, S. et al (2011), “Credible Commitment in Carbon Policy”, *Climate Policy*   [↑](#footnote-ref-30)
31. UNFCCC (2014), “FCCC/SBSTA/2014/INF.6” and UNFCCC (2014), FCCC/SBI/2013/INF.12/Rev.2 [↑](#footnote-ref-31)
32. Ibid [↑](#footnote-ref-32)
33. Briner, G. et al (2014), “Built to Last: Designing a Flexible and Durable 2015 Climate Change Agreement”, draft background document prepared for the OECD CCXG forum. [↑](#footnote-ref-33)
34. Other information will also need to be provided for other aspects of nationally determined contributions, for example on finance and adaptation. [↑](#footnote-ref-34)