

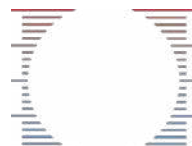
Beyond the targets: assessing the political credibility of pledges for the Paris Agreement

Alina Averchenkova and Samuela Bassi

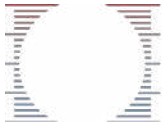
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Executive summary

Credibility and ambition will be critical for the success of the Paris Agreement, which was adopted in December 2015 at the 21st session of the Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change. This global climate agreement by 195 countries will rely on a robust transparency and accounting system, along with a periodic international review, to drive efforts on climate change. Countries will implement the Paris Agreement through “nationally determined contributions” (NDCs), including pledges to limit or reduce annual emissions of greenhouse gases. More than 180 developed and developing countries put forward *intended* nationally determined contributions (INDCs) ahead of COP21.

Much of the debate on INDCs to date has focused on *what* was pledged and how the level of pledged emissions reductions compares with scenarios for limiting the increase of mean global temperature. Recent analysis suggests that the present level of ambition will not be sufficient to keep average temperature rise to no more than 2°C. The Paris Agreement commits countries to “holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels”. Recognising that the INDCs collectively were not consistent with the warming limit, countries have agreed to increase the ambition of their emissions pledges over time.

But the ambition of the pledges is not the only consideration. Credibility – defined as the likelihood that policymakers will keep promises to implement their pledges – will be equally important for long-term success. Unlike other international treaties, such as the Kyoto Protocol, the Paris Agreement will not impose penalties or sanctions for non-compliance. Therefore, without *credible* policy implementation, the collective trust needed to support the Paris Agreement’s system of reporting and review will not be built.

Specifically, the credibility of countries’ pledges will prove vital for two key reasons. First, it will enable positive dynamics in future international climate negotiations. NDCs that are perceived as reliable and achievable (i.e. credible) will promote greater trust among countries and stimulate an upward drive in the collective level of ambition. Successful implementation would then be crucial for the willingness of all countries to further tighten their targets in the revised pledges they must submit every five years under the Paris Agreement. This will in turn affect the ability of the international community to continue negotiating greater collective levels of ambition in future review cycles. Second, credible NDCs are more likely to attract private and international public investment, particularly where more ambitious pledges are conditional on finance.

The key determinants of credibility

Despite its importance, the credibility of the countries’ pledges has not been analysed to a great extent. This policy brief develops a framework to assess the credibility of INDC pledges that were submitted ahead of COP21 and tests it on the G20 countries, sketching out a first assessment of the determinants that support the credibility of their INDCs.

The credibility of policy commitments is usually defined as the likelihood that policymakers will implement pledges or policies they announce. The analysis in this policy brief identifies four broad national-level elements that affect credibility: rules and procedures; players and organisations; norms and public opinion; and past performance in implementing international commitments and domestic policies. These are broken down further into eight key determinants of credibility:

Rules and procedures

- a coherent and comprehensive legislative and policy basis (referred to as *Legislation and policy*)
- a transparent, inclusive and effective decision-making process with sufficient political constraints to limit policy reversal (*Process*)

Players and organisations

- dedicated public bodies supported by a consultative mechanisms (*Public bodies*)
- supportive private bodies (*Private bodies*)

Norms and public opinion

- a history of active international engagement on environmental issues (*International engagement*)
- climate-aware public opinion (*Public opinion*)

Past performance (in implementing international commitments and domestic policies)

- a track record of delivering on past climate change commitments (*Past UNFCCC performance*)
- no history of policy abolition (*Past policy reversal*)

The framework set out in this policy brief enables each determinant to be scored on whether it is 'fully supportive', 'largely supportive', 'moderately supportive', 'slightly supportive' or 'not supportive' in terms of the overall credibility of the INDC.

It should be noted that the factors affecting political credibility are broader than those assessed in this analysis. Other factors, such as the role of leadership by key individuals (e.g. prime ministers) and political consensus, tend to be dynamic and can change very quickly. As a result, they are difficult to measure and have not been included within the scope of this analysis. However, these factors would be important to consider in more detailed analysis of individual countries.

Key findings on the credibility of the G20's INDCs

The INDCs put forward by the G20 countries as a group appear to score moderately well across all the determinants of credibility. There are some notable variations between industrialised countries and countries with developing/emerging economies, with the latter on average scoring lower on effective decision-making processes, public and private bodies supportive to climate action, and public awareness of climate change.

This affirms the case for continued attention to capacity-building in countries with developing and emerging economies, in order to strengthen public and private institutions that deal with climate change, as well as to raise the overall level of public awareness. This will not only support their domestic policy-making in general, but will also help strengthen the credibility of their international pledges.

No INDC from a G20 country is found to have 'no credible basis' across all the determinants explored in this analysis. **However, there are significant differences in the level of and balance among the determinants of credibility for the individual G20 members.**

For many G20 members, most determinants appear to be ‘largely supportive’ in terms of credibility. These include the European Union and its individual G20 members (France, Germany, Italy and the UK), as well as South Korea.

Several G20 members have determinants that are at least ‘moderately supportive’ in terms of credibility, but display a significant weakness in one determinant; this includes Australia, Brazil, Japan, Mexico, Russia, Turkey, South Africa and the United States.

A number of G20 countries have scope for significantly increasing credibility across most determinants. These are Argentina, Canada, China, India, Indonesia and Saudi Arabia.

This analysis of the policy credibility of individual countries is extended to take into account the size of the emissions reduction limit or pledge embedded in each G20 INDC. This brings together credibility and ambition, albeit in a relatively simple and illustrative way. The aim is to provide a sense of how much of the collective emissions reductions put forward ahead of COP21 have credible underpinning.

To achieve this, the emissions pledges are scored only against the determinants of credibility under the direct control of government, namely:

- Coherent and comprehensive legislative and policy basis (*Legislation and policy*)
- Transparent, inclusive and effective decision-making process with sufficient political constraints to limit policy reversal (*Process*)
- Dedicated public bodies supported by a consultative mechanism (*Public bodies*).

Almost all the emission reductions pledged by G20 countries appear to be underpinned by policy and legislation that is at least ‘moderately supportive’ in terms of credibility. However, G20 countries’ emissions targets were found to score lower on the transparency, inclusiveness and effectiveness of their decision-making processes and the level of political constraints to limit policy reversal, and on the existence of dedicated and independent public bodies on climate change.

Governments have the opportunity to actively improve the credibility of their current and future commitments in their NDCs, especially by strengthening: their policies and legislation; the transparency, effectiveness and inclusiveness of their decision-making process, and their climate change public bodies. This can be done, for example, by: adopting framework legislation and/or implementing carbon pricing mechanisms; assigning clear responsibility for climate change policy and establishing independent consultative bodies; creating inclusive processes for consulting and involving stakeholders; increasing the frequency of preparing greenhouse gas inventories; and improving public awareness about climate change.

The analysis presented in this policy brief provides insights on where the G20 countries could focus action to boost the credibility of their NDCs. Yet, this analysis can also be useful for other developed and developing countries, most of which, while having unique national circumstances, will need to strengthen the credibility of their NDCs to a greater or lesser extent along the main determinants identified in this policy brief.

Furthermore, the perception of credibility can be strengthened by improving the information available about best practices. Many of the INDCs submitted ahead of COP21 go a long way towards providing information on national planning processes that back them up, as well as on the planned implementation priorities and activities. Further improving the level of detail and transparency of this type of information will help enhance the understanding and mutual perception of credibility among countries and stakeholders.

1. International climate action: ambition, feasibility and credibility of efforts

1.1 International climate change negotiations ahead of Paris

International cooperation on climate change is at a critical juncture. The 21st Conference of the Parties (COP21) to the UN Framework Convention on Climate Change (UNFCCC) held in Paris reached an historic agreement on international action to tackle climate change. Ahead of the conference, countries put forward their pledges, known as 'intended nationally determined contributions' (INDCs), for action on climate mitigation and, in some cases, adaptation they will undertake by 2030.

Overall, 156 INDCs were submitted, covering 184 Parties to the Convention (12 are still pending) and representing over 98 per cent of global terrestrial GHG emissions (Carbon Brief, 2015). In the Paris Agreement, these are now referred to as Nationally Determined Contributions (NDCs).

The majority of these pledges contain quantified national emissions targets. Some INDCs are unconditional, while others contain both unconditional and enhanced conditional emissions reduction pledges. Furthermore, several INDCs from developing countries are fully conditional on international support, including technology, finance or capacity building. Most countries also indicated in their INDCs why they consider their intended contribution to be fair and ambitious in the global context, as well as what planning efforts have been already undertaken.

Much of the debate on INDCs has focused on how the pledged emissions reductions compare with scenarios for limiting the increase of mean global temperature to 2°C above pre-industrial levels (e.g. IPCC, 2014). Recent analyses suggest that their collective ambition is not sufficient to remain below the 2°C threshold (e.g. UNEP, 2015; Boyd et al., 2015; IEA, 2015; UNFCCC, 2015a). However, while emissions targets are important for evaluating the ambition of INDCs, alone they say little about countries' ability for credible policy implementation.

The perception around the political credibility of the INDC pledges and the ability of countries' to implement them through domestic policies is an important consideration for several reasons. First, from the international perspective, the credibility of pledges is a key factor for enabling positive dynamics in the international climate negotiations, where perception of pledges as reliable and likely to be achieved promotes greater trust among countries and stimulates an upward drive in the collective level of ambition over time. Successful implementation of the pledged emission reductions will be crucial for the ability and willingness of countries to tighten their targets in their future NDCs, which the Paris Agreement obligates them to submit every five years (article 4.3 and 4.9) (UNFCCC, 2015). This in turn will affect the ability of the international community to negotiate greater collective levels of ambition in the future review cycles.

Second, countries with policies that are perceived as more credible and stable are deemed as less risky business opportunities, attracting higher levels of private investments (North, 1993).

Yet the credibility of international pledges has not been analysed to a great extent. This policy brief presents an analytical framework for assessing the credibility of the INDCs and applies it to the G20 countries.

1.2 Importance of national credibility

This policy brief is focused on the credibility of INDC mitigation pledges, yet many points are also applicable to assessing the credibility of *adaptation* pledges.

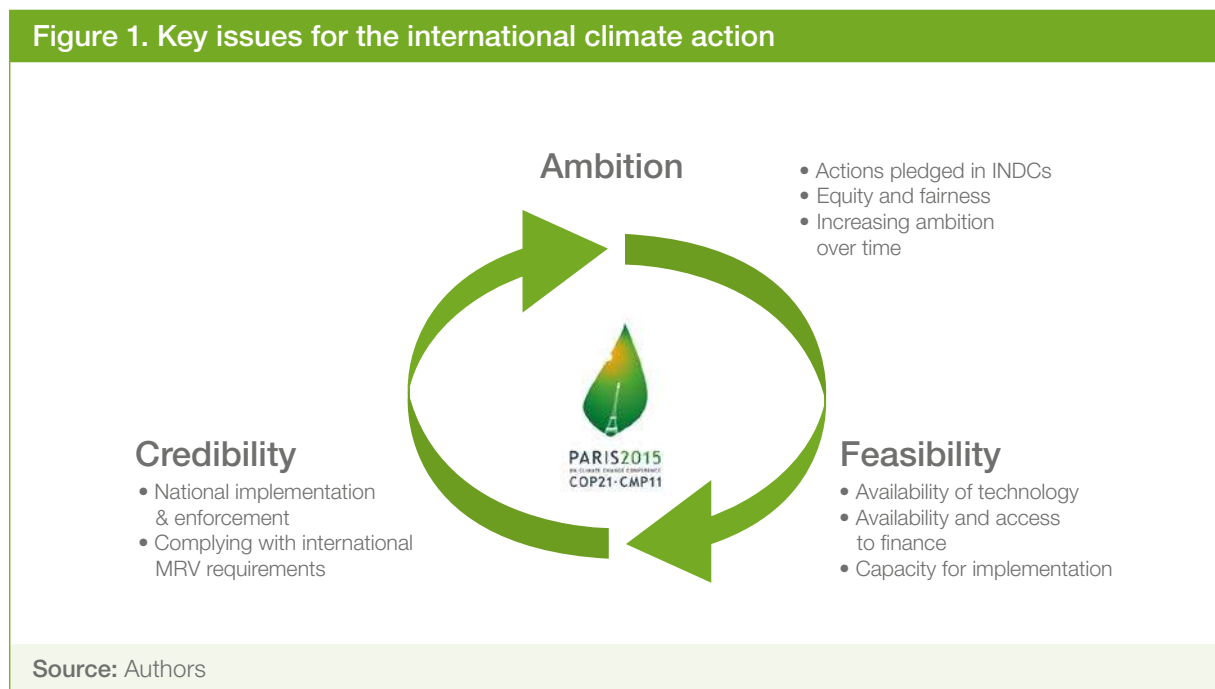
The core of the debate around mitigation pledges involves the triangulation between ambition, feasibility and credibility of action (see Figure 1), all of which are interlinked.

Ambition, as noted earlier, is usually linked to the level of expected emissions reductions being pledged through an INDC (or, in the future, through new NDCs). While there is no clear definition or formal benchmark for what should be considered as an ambitious mitigation effort, INDCs were meant to represent ‘a progression beyond the current undertaking’ (UNFCCC, 2014a).

There are several ways to measure ambition. Some countries have expressed their intended emissions reductions relative to a base year (such as their emissions in 1990 or 2005) or in terms of the GHG intensity of their GDP in 2030. Other countries have related their ambition to the reduction of emissions below business-as-usual (BAU) levels, which refers to the projected level of emissions that would occur if no additional effort were undertaken.

Another way of measuring ambition is the relation between pledges and emissions pathways that are consistent with the global objective of limiting the increase of mean global temperature to 2oC above pre-industrial levels. This has often been used in independent analyses of the INDCs.

For instance, according to the World Energy Outlook special briefing for COP21 (IEA, 2015), if the pledges are fully implemented, the energy-related emissions in the countries currently accounting for more than half of global economic activity will either plateau or decline by 2030. The pledges would also lead, by 2030, to a significant improvement in global energy intensity and to 70 per cent of additional electricity generation in the power sector being low-carbon.



Overall, however, it estimates that the path set by the pledges would fall short of the agreed goal to keep the global average temperature rise below 2°C.

Further analysis by the Grantham Research Institute (Boyd et al., 2015) suggests that the most optimistic estimate of global emissions in 2030 resulting from the submitted INDCs (up to October 2015) is about halfway between a hypothetical BAU pathway and a pathway that is consistent with the 2°C threshold.

The UNEP Gap Report (UNEP, 2015) also concludes that, while the INDCs do present a real increase in the ambition level compared to a projection of current policies, the submitted contributions by 1 October 2015 'are far from enough and the emissions gap (from 2°C) in both 2025 and 2030 will be very significant'.

Overall it appears that the level of ambition expressed in the INDCs increases the chances of keeping global average temperatures below the 2°C degree threshold, but they are likely to miss the target unless their ambition can be increased over time. Moderate or weak ambition from some countries may be partially due to their failure to recognise early economic opportunities that come from reducing GHG emissions, and the preference for 'playing it safe' and under-promising rather than putting forward 'stretch' targets that could set them up to fail. Excessive emphasis on burden sharing, the 'right to emit' and costs, associated with the language of shared sacrifice, may have reduced national incentives to propose ambitious action and take advantage of low-carbon finance and technologies (Averchenkova et al., 2014). Yet, as countries advance with the implementation of their INDCs and gain more experience and better understanding of the opportunities, raising the levels of ambition in future pledges may become more feasible.

Feasibility, in terms of the ability to meet the costs of action and the availability of capacity and skills, technology and finance for successful implementation, is closely linked to ambition. Feasibility in fact determines the maximum level of mitigation effort at a given cost. It is also linked to whether the finance required for implementation is likely to be raised, and whether there will be access to low-carbon technology and skills. Feasibility also impacts credibility, as it reflects the technical ability of a country to meet its target. For example, the World Energy Outlook estimates that the full implementation of the INDCs will require \$13.5 trillion of investment in energy efficiency and low-carbon technologies in the period 2015 to 2030 (IEA, 2015).

Credibility is a reflection of expectations that countries will be able to implement their INDC pledges, i.e. that countries will do what they say they will. This has several aspects. First, to keep to its promise a country would need to honour its INDC and operationalise it domestically, for example by putting in place policy and legislative frameworks and other arrangements. Second, a country would then need to ensure effective implementation of these arrangements. This is where the feasibility of achieving the target plays a key role. Finally, credibility also involves an assessment of the likelihood that the country will not repeal its commitment before they are implemented in full.

The relationship between credibility, feasibility and ambition is complex and multi-directional. For example, the lower the ambition, the greater the technical feasibility and therefore the higher probability that the target will be met. Hence the pledges with the lowest level of ambition may be considered the most credible. This demonstrates that an analysis of the efforts that countries are undertaking for the Paris Agreement should consider all three aspects – ambition, feasibility and credibility.

Given that a number of other analyses (e.g. Boyd et al., 2015; UNEP, 2015; BNEF, 2015; Climate Action Tracker, 2015; Carbon Brief, 2015) have focused on assessing the collective and/or individual levels of ambition, this policy brief focuses specifically on the credibility of INDCs and refrains from drawing conclusions on the combination of credibility and ambition. It would, however, be important to bring ambition, feasibility and credibility of the pledges together in future assessments.

1.3 Methodology of the study

1.3.1 Defining credibility

There is no single definition in the existing literature for the credibility of countries' policies or pledges made in the context of international negotiations, but similarities can be found with other theoretical analyses. Most definitions tend to focus on the consistency between announced commitments and actual implementation. A simple definition is that countries and governments "have credibility if others believe that they will do what they commit to" (Brunner et al., 2011). Credibility is also described as "the extent to which beliefs about the current and future course of... policy are consistent with the program originally announced by policymakers" (Blackburn and Christensen, 1989). Or, more simply, that credibility is "the expectation that an announced policy will be carried out" (Drazen and Masson, 1993).

In the context of the INDCs, the credibility of the pledges is reflected by the expectation that credible and effective national policies will be put in place to translate the pledges into domestic policy. Given that we are still in the early stage of the implementation process and most INDCs have not yet been translated into new mitigation policies, the credibility of the INDCs hinges mostly on the perceived credibility of current national mitigation actions and the past performance of countries on climate action.

1.3.2 Approach to the analysis

Given the lack of empirical studies explicitly evaluating the impact of the credibility on actual policy performance, this analysis draws on the collection of various theoretical and empirical studies, in order to develop an overall framework for the assessment of the credibility of INDCs.

Policy credibility is multifaceted. It can be driven by multiple factors (or determinants), like the setting of consistent legislation, the existence of suitable institutions or influential pressure groups. These factors often interact and mutually reinforce each other. For instance, Germany's commitment to increase its share of renewable energy has been supported by factors like high levels of environmental awareness among the population, public policies setting stable technology-specific prices, and support by a wide coalition, including government departments (like the Environment Ministry), the Green Party and several municipalities (Lockwood, 2015).

In order to identify and disentangle the multiple dimensions of credibility, this analysis first scopes the relevant literature to outline the main features that appear to increase the credibility of a country's announced commitment, focusing on features that best apply to climate change mitigation.

Second, it classifies these features into four main elements of credibility, namely rules and procedures, players and organisations, norms and public opinion, and past performance. Each of these elements can be further described through more specific determinants of credibility. This analysis identifies eight of them, two for each element:

Rules and procedures

- a coherent and comprehensive legislative and policy basis (referred to as *Legislation and policy*)
- a transparent, inclusive and effective decision-making process with sufficient political constraints to limit policy reversal (*Process*)

Players and organisations

- dedicated public bodies supported by a consultative mechanisms (*Public bodies*)
- supportive private bodies (*Private bodies*)

Norms and public opinion

- a history of active international engagement on environmental issues (*International engagement*)
- climate-aware public opinion (*Public opinion*)

Past performance (in meeting international commitments and domestic policies)

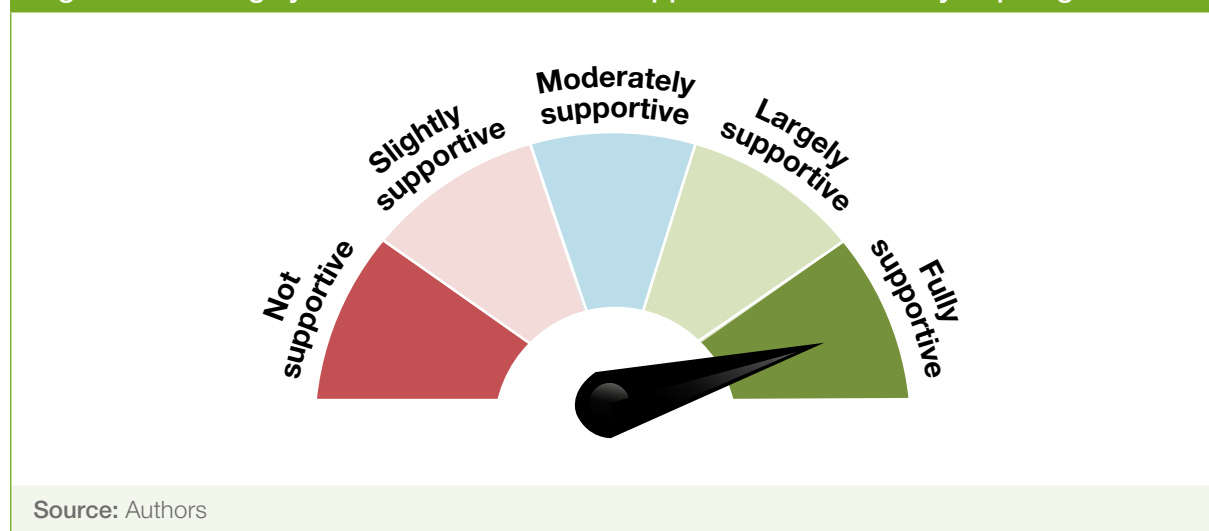
- a track record of delivering on past climate change commitments (*Past UNFCCC performance*)
- no history of policy abolition (*Past policy reversal*).

These are discussed in more detail in chapter 2.

Third, the analysis identifies a simplified set of qualitative and quantitative information and indicators that can be used as a proxy for the evaluation of each determinant, and the extent to which it supports the credibility of a country's INDC. This makes it possible to rank each country's determinants on a scale from 'not supportive' to 'fully supportive' to the credibility of their INDC (see Figure 2 and Annex 1 for more details on the scoring system).

Finally, this framework is tested on the G20 countries in order to provide a first assessment of the determinants supporting the credibility of their INDCs. This helps to identify overall trends and the priority areas for action to increase political credibility of the pledges put forward and seeks to increase certainty around their implementation. It also provides important policy lessons for countries that have only recently started to give serious contemplation to their climate change policy.

Figure 2. Scoring system for determinant's support to the credibility of pledges



Much of the underlying information for each determinant comes from the Global Climate Legislation Study (Nachmany et al., 2015), countries' respective INDC submissions (UNFCCC, 2015f) and several other reputable databases, including the World Bank (2015), UNFCCC (2015b, 2015c, 2015d), Gallup Poll (Pelham, 2009), IEA (2014), IUCN (2015), PRS (2014). These sets of indicators are not exhaustive, but aim to provide a first illustrative assessment of the credibility of the INDCs of the G20 countries. The framework for the assessment is discussed in chapter 2. The methodology applied for the assignment of scores for each indicator, determinant and element is presented in Annex 1.

The determinants of credibility and the indicators chosen to describe them are mostly qualitative in nature and strongly influenced by complex features of the country they are applied to. The information collected under each indicator is intentionally simple and easily replicable. The resulting scoring system is a relatively crude approximation of the strength of each determinant of credibility in each country. Given the lack of empirical studies on the relative importance of the four elements of credibility, the elements of credibility have not been weighed against each other to create an overall quantitative indicator of credibility. Rather, the focus of this analysis is on the insights that can be drawn from individual determinants within each element.

This study therefore does not intend to be a detailed assessment and ranking of credibility of the given countries; indeed a quantified assessment of a concept like credibility would be impossible and potentially misleading. The aim here is to provide a simplified framework to identify key trends, areas of strength and weaknesses and opportunities for improvement of countries' political credibility vis-à-vis their international climate change commitments.

Our results for the G20 countries are meant to be illustrative rather than prescriptive. They do provide, however, a first broad brush assessment of how strongly climate change pledges are supported by the political, institutional and socio-economic features already in place in a given country, and a methodology to carry out more detailed assessments.

2. Framework for assessing the credibility of INDCs

The credibility of policy commitments is usually defined as the likelihood that policymakers will keep their promises to implement the pledges or policies they announce.

Overall, an analysis of previous theoretical and empirical studies indicates that the credibility of a policy pledge is greater when policymakers have few incentives and less ability to deviate from commitments (see Box 1). The reputation of a government for being credible (in terms of keeping to its promises on policy) is strengthened by its history of compliance with past promises. Furthermore, commitment devices can help keep governments from deviating from their pledges and improve their track record on credibility. Such devices include instruments like legislation and policy, contractual agreements and delegation to dedicated public bodies.

Based on a number of theoretical and empirical studies on policy adoption and effectiveness, it is possible to group the factors that increase the credibility of a policy commitment or pledge around four main elements:

1. rules and procedures
2. players and organisations
3. norms and public opinion
4. past performance.

Each of these elements is influenced by a number of determinants, as elaborated below. In turn, each determinant can be further assessed through selected indicators, which help to measure how much each determinant supports the credibility of a pledge.

Box 1: The theory around credibility

A key concept associated with the credibility of policy is ‘the time inconsistency of optimal policies’, which was first described by Kydland and Prescott (1977) in the context of monetary policy. It highlights that policymakers are often driven by self-interest and seek short-run gains, which causes them to renege on previously announced policies (Blackburn and Christensen, 1989). Hence, the credibility of a policy pledge is greater when the ability of and the incentives for policymakers to deviate from previously announced policy is lower.

The more the gains from compliance outweigh the gains from deviation, the greater the credibility of a claim. Governments can develop a reputation of being credible through a history of consistent compliance with their promises (Brunner et al., 2012). Such positive reputation may in itself create an incentive for refraining from policy reversal (Dixit, 1996).

Climate change is a relatively new area of policy, hence strong incentives to maintain past reputation on climate change policy are largely lacking in most countries. For this reason, ‘commitment devices’, that ‘place political transaction costs in the path of policy change in order to mitigate the risks of opportunism’ and ‘create or support... constituencies interested in the continuation of the policy’ (Brunner et al., 2012) are particularly important.

Such commitment devices may include legislation or executive regulation; delegation, for instance through the establishment of independent bodies tasked with implementation of policy; and the allocation of private property rights and contracts (defined as ‘securitisation’ by Brunner et al., 2012), such as emission allowances. Essentially, increasing the credibility of a policy commitment involves the introduction of additional formal and informal veto players in the political system (Tsebelis, 2002).

Table 1 summarises the set of elements, determinants and indicators used for this analysis. Additional information on the scoring systems is provided in Annex 1.

Table 1. Elements, determinants and indicators of policy credibility

Key elements	Determinants	Indicators	Information used for assessment
Rules and procedures	Coherent and comprehensive legislative and policy basis (<i>Legislation and policy</i>)	High-level vision	– Mitigation framework legislation
		Economy-wide emission reduction targets	– Scope of targets – Targets legislative strength – Time horizon
		Carbon pricing policies	– Economy-wide carbon pricing policies – Sectoral policies – Barriers: fossil fuel subsidies
	Transparent, inclusive and effective decision-making process with sufficient political constraints to limit policy reversal (<i>Process</i>)	Mechanism for building buy-in from stakeholders	– INDC consultation – Voice and accountability index
		Stable/consistent-not easily reversible law and policy-making process	– Political constraints index
		Transparent, consistent and effective administrative and enforcement mechanisms	- Number of national communications or inventories - Quality of Bureaucracy index - Corruption Perception index - Law and Order index - International Property Rights index
Players and organisations	Dedicated public bodies supported by a consultative mechanisms (<i>Public bodies</i>)	Public bodies	- Dedicated climate change bodies - Consultative bodies
	Supportive private bodies (<i>Private bodies</i>)	Private bodies	- Carbon lobby - Environment lobby
Norms and public opinion	History of active international engagement on environmental issues (<i>International engagement</i>)	Commitment to UNFCCC initiatives	- Number of UNFCCC agreements or accords signed/committed to - Number withdrawn
		Participation in Multilateral Environmental Agreements (MEAs)	- Number of MEAs ratified - Number of MEAs withdrawn
	Climate-aware public opinion (<i>Public opinion</i>)	Public opinion	- Awareness of climate change - Seriousness of climate change - Caused by human activity
Past performance	Track record of delivering on past climate change commitments (<i>Past UNFCCC performance</i>)	Achievement of UNFCCC mitigation requirements	- Ratification of Kyoto - Performance: meeting of targets (if Annex B) or submission of National Communications (NC) and Biennial Update Reports (BURs)
	No history of policy abolition (<i>Past policy reversal</i>)	Abolishment of climate change legislation	Abolition of key climate change legislation
Note: The shorthand for each determinant used in charts and tables in this policy brief is indicated in brackets in the determinants column.			

Importantly, only some of these determinants can be directly influenced and improved by governments themselves. These are: legislation and policy, decision-making processes, and public bodies. The other determinants are more of an expression of societal attitudes and behaviour, as reflected by the actions of private bodies (environmental and carbon lobbies), public opinion, the general attitude towards international engagement and past performance.

Both aspects – those under government control and those that are not – are important for determining a country's credibility. However, governments can and should prioritise the former in order to improve their credibility in the short term.

Arguably, improvement of determinants under government control can, in the long run, also have a positive effect on the response of society, and improve countries' track record on achieving international mitigation targets and limiting policy reversal.

Notably, private bodies (pressure groups) and public opinion can be indirectly influenced by policymakers, in particular if governments strive to increase awareness on climate change issues and show strong leadership.

2.1 Rules and procedures

A number of studies have shown that rule-based rather than discretion-based policy making minimises opportunities and incentives for policymakers to renege on previously made promises. Kydland and Prescott (1977) emphasise that credible policy relies on institutional arrangements that 'make it a difficult and time-consuming process to change the policy rules in all but emergency situations'.

There are two broad determinants in relation to rules and procedures which have been shown to strengthen the credibility of policy: strong legislative and policy basis, and transparent, inclusive and effective processes. These are discussed below.

2.1.1 Strong legislative and policy basis

Legislation can be a powerful instrument to prevent policymakers from backtracking from policy commitments (see, e.g. Egebo and Englander, 1992). Recent research has shown that overarching **framework laws and policies**¹ that formalise a country's overall vision on climate change are particularly important for driving ambitious climate policy (Fankhauser et al., 2015). Hence the existence of framework legislation in a country generally suggests a high degree of government buy-in for action on climate change and reinforces the credibility of a country's pledge regarding future action.

Furthermore, in the context of climate change, legislation or policy that includes **quantifiable emissions reduction targets** indicates commitment and forward planning. Emissions targets differ in their geographical scope: they can be economy wide or sectoral; bound by different time constraints (e.g. short-term to 2020 or longer terms to 2050); and have differing levels of formality (legislated or informal) (see Box 2). The OECD (2006) notes that targets that are set in law, as opposed to being set informally (for example in governmental speeches or white papers), are more difficult to change procedurally and politically.

Overall, the presence of both short- and long-term economy-wide emissions reduction targets, set in formal legislation, can more strongly support the credibility of international pledges.

1 According to the Global Climate Legislation Study (Nachmany et al., 2015), 'framework legislation' consists of laws or regulations with equivalent status, which serve as a comprehensive, unifying basis for climate change policy, and address multiple aspect or areas of climate change mitigation in a holistic, overarching manner.

Box 2: Strength of emissions targets

Domestic and international emissions targets can be expressed in different ways. Most developed countries have set them relative to past emissions levels in a given year. Other countries set emissions reductions targets relative to future GDP or future BAU scenarios that refer to the level of emissions expected in the case of inaction.

The time horizon of targets varies from country to country, with some having short-term targets for 2020 or earlier and others having medium- or long-term targets, for example to 2030 or 2050. A country that has both short- and medium- or long-term targets has set both an intermediate milestone to monitor progress, as well as a longer-term vision for emissions reductions. This analysis assumes that repealing or watering down climate change policy would be more difficult in such a case, compared with a case where a country has only either short- or long-term targets (or none).

The legislative strengths of targets varies between 'formal', i.e. those targets that are formally anchored in laws passed by parliaments or executive regulation enacted by governments, and 'informal', i.e. targets that are only included in non-mandatory documents (e.g. white or green papers), in government announcements (e.g. a speech by a head of state) or recoded in voluntary international agreements, but not enshrined in national legislation. Formal targets can strengthen policy credibility because they are mandated by law and therefore, in principle, are more difficult to breach or revise.

Finally, it is assumed that international pledges are more credible when a country's framework legislation and targets are complemented by low-carbon policies at the economy-wide level as well as at sector level, such as emissions reduction initiatives in the energy and transport sectors. Similar to the emissions targets discussed above, low-carbon policies can vary significantly across countries and have different degrees of stringency and coverage. This analysis attempts to capture some of the qualitative features of these policies, on the basis of the information available in the 2015 Global Climate Legislation Study (Nachmany et al., 2015).

The contribution of policies to credibility depends on their coverage and the type of instruments applied (see Box 3). For the purpose of this analysis, carbon or energy taxes and emissions trading systems are attributed a stronger impact on credibility than other policies that do not apply a price on emissions, such as carbon funds or credits. Pricing instruments have the potential to apply (or tend towards) a uniform carbon price across all economic sectors, which could act as a pervasive encouragement for business and consumers to reduce their spending on high-carbon products (Bowen, 2011).

If a country does not have economy-wide targets or policies, the presence of sector-specific policies would suggest that there is at least a bottom-up attempt to ensure that some sectors reduce their emissions. This analysis considers sector specific policies in four broad areas: low carbon energy, energy efficiency, transport and agriculture (including land use, land-use change and forestry, known as LULUCF).

The role of cities and other sub-national entities in setting their own local targets and policies is also an important bottom-up approach that can support the credibility of a country commitment (see, e.g., Stern and Zenghelis, 2011). For instance, New York aims to cut GHG emissions by 30 per cent over the period 2007 to 2030; Los Angeles plans 35 per cent cuts between 1990 and 2030; Seoul plans 40 per cent cuts between 1990 and 2030; Hong Kong plans between a 50 and 60 per cent cut over the period 2005-2020 (Zenghelis and Stern, 2015).

However, the diffuse effects of local action are difficult to capture analytically, and the absence of a comprehensive and comparable database of local initiatives means this aspect could not be fully covered by this study. Whenever possible, however, large sub-national carbon pricing initiatives (such as the regional trading schemes in China) have been taken into account. As data on cities' and regions' climate change actions become more available, this area of credibility would deserve further investigation.

Box 3: Characteristics of carbon pricing instruments considered in the assessment

Carbon pricing is an essential element of climate change mitigation policy. The most widespread carbon pricing policies investigated by the 2015 Global Legislation Study (Nachmany et al., 2015) include carbon taxes and emissions trading systems, energy taxes, and carbon funds or credits.

Carbon taxes and emissions trading are expressly designed to reflect the carbon dioxide emissions of different emissions sources. They therefore apply an explicit carbon price. Low price/tax rates and widespread exemptions, however, can limit their impact (OECD, 2015) therefore their effectiveness can vary significantly from country to country.

Energy taxes are usually levied on the amount of energy used. Their rates can be influenced both by climate and non-climate policy objectives, like energy saving and air pollution. They can be seen as a form of implicit carbon pricing. However, their application can be incoherent, with low rates on some of the most carbon intensive fuels, or different rates on fuels used of similar purposes (OECD, 2015).

For the purpose of this study, carbon taxes, emissions trading and energy taxes are valued equally in terms of how they support credibility, without regard to their level of ambition. Any attempt to apply an explicit or implicit carbon price with at least some level of differentiation across carbon content of fuels receives a higher score compared to other policies.

Carbon funds and carbon credits generally target a discrete number of projects and are less suitable to be translated into an explicit or implicit carbon pricing across the economy, therefore they get a lower score on this scale of credibility support.

Also, national economy-wide carbon pricing policies score more highly than sub-national initiatives, since the former ensure broader coverage, likely resulting in stronger credibility.

However, there are policies and laws that can conflict with a country's climate change objectives, for example those which support carbon intensive activities. An important example is fossil fuel subsidies. These can discourage investments in energy efficiency, renewables and energy infrastructure (Coady et al., 2015a).² For the purpose of this study, the level of fossil fuel subsidies over GDP is used as a proxy for such barriers. A relatively high level of subsidies for fossil fuels is assumed to be at odds with emissions reduction objectives and therefore undermines the credibility of international pledges.

² As a benchmark, the world average percentage of fossil fuel subsidies over GDP in 2015 is used, which is about 6 per cent according to the International Monetary Fund.

2.1.2 Transparent, inclusive and effective processes

Rule-based policy making, as described above, needs to be underpinned by effective processes and procedures to ensure effectiveness and credibility. In this context, three major aspects are considered important in this study: ensuring policy legitimacy through mechanisms for building buy-in from stakeholders; overall stability and non-reversibility of the policy-making process, to a large extent depending on a number of veto points in the system; and effectiveness and transparency of administration and enforcement mechanisms for the legislation or policy.

Mechanisms for building and maintaining buy-in from stakeholders, such as stakeholder engagement, shape the legitimacy of public policies and the governments that promote them (Park, 2015; Lockwood, 2015). For the purpose of this analysis, it is assumed that the stronger the ability of citizens to participate in the policy-making process, the stronger the credibility of a country's pledge, providing stakeholders have been consulted before the pledge is committed to. The 'choice and accountability' indicator developed by the World Bank (2014) aims to capture 'perceptions'³ of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media (Kaufmann et al., 2010). This indicator is used here as a proxy for the mechanisms for building stakeholders' buy-in, as it allows for comparability of data across countries. This is complemented with information on stakeholder consultations on the INDCs prior to their submission, as communicated in some INDCs under 'planning processes'.

Arguably stakeholders' buy-in could be seen as being less relevant in countries with autocratic political systems. Yet, while autocracies may have an easier time introducing policies in a top-down manner, the stability of such policies over time is dependent on the leader or ruling party staying in power. This may add uncertainty to the long-term consistency of domestic policy. Nevertheless, where public opinion strongly supports action on climate change as a political goal – or action on associated close-to-home issues, such as air pollution – this may minimise the risk that leadership change will bring concurrent change in climate change policy. This is particularly the case in China, where there is growing public dissatisfaction with the levels of air pollution in cities. Hence, for the purpose of this analysis, a scoring for the 'voice and accountability' indicator has been applied regardless of whether a country is autocratic or not. It may be worth considering an additional indicator on the features of political systems along the democracy-autocracy spectrum in future analysis.

Furthermore, a government's structure and the characteristics of the political system can give an indication of **how easy or difficult it can be for a country to withdraw or reverse a policy or legislation** once adopted. This can be explored using an index of 'political constraints' (Henisz, 2002), which estimates the feasibility of policy change. The index assesses the extent to which a change in the preferences of any one actor – the most obvious example being a change in government following an election – may lead to a change in policy.⁴ To do so, it uses data on the number of independent branches of administrative government with veto power and assumes that a higher number of veto points makes it more difficult to reverse an existing policy (e.g. repealing an emissions trading scheme or a low-carbon subsidy in place).

3 The indicator relies on perception-based data sources. These include surveys (such as the Gallup Poll), views of country analyst at major multilateral development agencies (such as the European Bank for Reconstruction and Development), and data provided by non-governmental organisations (such as Reporters Without Borders) and commercial business information providers (like the Economist Intelligence Unit). It ranges from -2.5 (weak) to +2.5 (strong) performance.

4 The index ranks from 0 (most hazardous – no checks and balances) to 1 (most constrained – extensive checks and balances). It measures the constraints faced by politicians desiring to change a status quo policy in a country in a given year.

It also takes into account the level of alignment across branches of government over policy change, i.e. the extent to which the governing party (or parties) speaks with one voice or is fragmented into factions with different opinions. The more they are aligned, the more feasible a policy change would be. A higher level of political constraint is likely to mean that policy pledges are more credible, assuming they are supported by policies and legislation already in place or they have been through the formal approval in the governance system, as is the case for the INDCs. However, where no policy is yet in place, adoption of a new policy may be easier for countries having fewer institutional constraints on policy change (i.e. fewer veto points) (Fiorino, 2011). This latter implication could not be explored in this study.

Transparent, consistent and effective administrative and enforcement mechanisms lead to better governance (Fiorino, 2011) and hence support the credibility of policy pledges. In order to assess this determinant, this study focused on the following indicators: monitoring of emissions (national communications and GHG inventories submitted under the UNFCCC); overall quality of bureaucracy based on the International Country Risk Guide (ICRG), developed by PRS (2014); level of corruption based on the Corruption Perception Index developed by Transparency International (2014); overall assessment of the strength and impartiality of the legal system based on the Law and Order Index from the ICRG (PRS, 2014); and the International Property Right Index developed by the Property Right Alliance (2015). The higher a country scores against these indicators, the more its administrative and enforcement mechanisms are likely to support the credibility of policy pledges.

Future analysis should also take into account the degree of political consensus on climate action across key political parties. This is particularly relevant in those countries where elections are due soon, and where the position of the government and opposition on climate change are strongly polarised (see section 2.5). However this requires detailed research into each country's party composition and was beyond the scope of this analysis.

2.2 Players and organisations

Delegation of policy making and implementation powers to institutions with adequate capacity and expertise allows for commitment to a longer-term strategy (see, e.g. Majone, 2006; Helm et al., 2003). Empirical evidence (Gilardi, 2002) indeed suggests that governments delegate powers in order to enhance the credibility of their policies. Hence, the existence of dedicated public bodies focusing on climate change, as well as of independent consultative bodies, is an important determinant of credibility for policy pledges such as the INDCs.

At the same time, governments are influenced by lobbying from private bodies. Here private bodies are defined as non-public organisations, such as non-governmental organisations (NGOs), businesses and charities. Some are supportive of climate policies (e.g. environmental NGOs or low-carbon industries), while others may oppose them (e.g. energy intensive businesses or fossil fuel extractors and refiners).

The balance of power between private bodies with opposite interests can influence the willingness of governments to stick to promises and implement climate policy. Hence, they also have an important role in the credibility of pledges.

2.2.1 Public bodies

The relevant public bodies that oversee action on climate change are those dedicated organisations and institutions, such as climate change ministries or departments, responsible for making decisions, initiating policies and legislation, and monitoring their implementation.

Consultative bodies, such as the Committee on Climate Change in the UK, provide advice to decision makers. Importantly, they can support climate change policies across changing governments with different short-term priorities and/or divergent attitudes towards climate change action, especially when they are independent from governments.

Ideally a country would have both a dedicated climate change decision-making organisation, as well as an independent advisory body. This would help ensure that appropriate action is taken to implement national and international commitments, and therefore strengthen the credibility of a country's pledge.

This study assesses the contribution of public bodies to the credibility of a pledge on the basis of whether a dedicated climate change decision-making organisation exists, and whether it is supported by a consultative body. Higher value is placed on independent consultative bodies, as opposed to bodies controlled by the government (for example inter-parliamentary groups), as the former are more likely to provide non-partisan, science-based advice.

A more detailed country-specific analysis should also be able to assess the quality, and not only the existence, of such institutions. Politically independent expert agencies, for instance, may not always be fully accountable (or listened to), and their advice may not be as independent and science-based as one would hope for. Majone (1996) notes that such agencies can be monitored and kept politically accountable only by a combination of control instruments, namely: clear and narrowly defined objectives; strict procedural requirements; judicial review; professionalism and peer review; transparency; and public participation. These qualitative aspects warrant further investigation when assessing the link between public bodies and credibility.

Another important consideration is the level of cross-agency coordination in developing and implementing climate policy. The greater the level of coordination, the greater the chance of gaining buy-in from key sectoral agencies. This is likely to lead to more successful policy implementation. For example, a target put forward by an environment ministry in a country with weak cross-agency coordination may have a low likelihood of being comprehensively implemented, especially if policy levers sit elsewhere, for example with the treasury or energy ministry. However, given the lack of comparable data for the G20 countries, this particular aspect was not assessed in this study. It may be considered as an area for future analysis.

2.2.2 Private bodies

As noted above, private bodies can have a strong influence on government decisions, either in favour or against ambitious climate change policy.

The pressure exerted on policymakers by **environmental think tanks and pressure groups** can have a positive effect on the credibility of climate pledges. Bernauer and Gampfer (2013), for instance, find that where civil society is more involved in public decision making, public support for domestic and international climate policy may be stronger.

To provide a sense of the size of the environmental lobby in a given country, this analysis uses, as a proxy, the number of organisations and institutions that are members of the International Union for Conservation of Nature (IUCN). In order to account for country size, this indicator is measured in terms of the number of IUCN organisation per ten million inhabitants.

It is important to emphasise, however, that IUCN membership clearly does not account for all of the environmental organisations that may have an influence on government policy, nor does it reflect the strength of their lobbying activity and the size of their membership. Future, more detailed assessments should also take into account additional elements, such as the number of members to individual organisations, if data allow.

Carbon intensive and/or fossil fuel industries on the other hand, can hamper climate action, especially when these sectors are perceived as being of strategic economic importance. Analysis of OECD countries (Ward & Cao, 2012), for instance, provides evidence that powerful energy lobbies tend to constrain the level of green taxation.

In the context of international commitments, pressures from carbon lobbies could weaken the appetite of policymakers to sign up and/or comply with internationally agreed climate objectives. The power of carbon lobbies to influence government decisions is strengthened if companies act collectively, by pulling together resources and pursuing shared strategies (Meckling, 2011). Crowley (2007) and Harrison (2007), for example, question whether the past lukewarm attitude of Australian and US policymakers towards climate change commitments was partly a result of lobbying from powerful business interests.

This analysis measures the size of the carbon intensive and fossil fuel lobby in a given country as the share of value added generated by carbon intensive industries⁵ and the mining sector⁶ over GDP, based on data from the United Nations Statistical Division (2015b; 2015c).⁷

Another point worth noting is that, while carbon intensive sectors may tend to oppose climate regulation, other sectors support it. For example, renewable energy technology manufactures and low-carbon electricity generators tend to view government action on climate change as a business opportunity. As a result, conflict between business sectors with opposing climate interests has the potential to weaken the original anti-regulatory stance of the fossil fuel industry and open up political space for local and subnational governments and NGOs to push for stricter international measures (Falkner, 2008).

However, it has not been possible to capture the power of these business coalitions in this analysis due to the lack of a single definition for low-carbon sectors and insufficient granularity in the United Nation's data on the value added of these businesses. Therefore, for simplicity, this analysis considers that private bodies are more supportive of credibility the higher the share of green (IUCN) organisations per ten million inhabitants, and the lower the value added of carbon-intensive and mining companies per GDP.

5 Analysis Includes: Manufacture of textile; Manufacture of wood and of products of wood; Manufacture of paper and paper products; Manufacture of coke and refined petroleum products; Manufacture of chemicals and chemical products; Manufacture of rubber and plastic products; Manufacture of other non-metallic mineral products; and Manufacture of basic metals.

6 According to the International Standard Industrial Classification ISIC rev.3, the mining and quarrying sector includes: Mining of coal and lignite, extraction of peat; Extraction of crude petroleum and natural gas, service activities incidental to oil and gas extraction excluding surveying; Mining of uranium and thorium ores; Mining of metal ores; and Other mining and quarrying (United Nations Statistical Division, 2015a).

7 Comparable data are available only up to 2007. While these are slightly outdated, it is assumed that in most of the countries analysed the relative share of these sectors has not changed radically.

2.3 Norms and public opinion

Social norms are the customary rules that govern behaviour in groups and societies. Rather than generated by human design and planning, norms are the unplanned, unexpected result of individuals' interactions. Overall, a system of norms specifies what is acceptable and what is not in a society or group (Bicchieri and Muldoon, 2014).

Norms can therefore have an indirect effect on the choices of citizens and policy makers for what concerns climate change action. Capturing the whole range of social norms would be challenging, therefore this study focuses only on two specific aspects: the attitude of a country towards international cooperation on environmental issues, and public opinion on climate change.

This study assumes that countries which place greater normative importance to international cooperation on environment, and on climate change specifically, are likely to take commitments and pledges made in international fora more seriously.

A public opinion largely aware of climate change impacts and supportive of government action is also considered an important driver of credibility.

2.3.1 International engagement

Consistent engagement in the UN intergovernmental process on climate change and other environmental issues can be taken as a proxy for a country's general appetite for international cooperation and how seriously it takes its stated objectives.

For simplicity, this analysis broadly defines international engagement as the signing to and withdrawing from initiatives under the UNFCCC and from multilateral environmental agreements (MEAs).

Under the former, engagement in the Kyoto Protocol, the Doha Amendment, the Cancun Agreement and the submission of an INDC before COP 21 are all considered. As for engagement in the multilateral environmental agreements (MEAs), this analysis focuses on those introduced in the past 30 years, from 1985 to 2015, based on data from the International Environmental Agreements (IEA, 2015) (see Box 4).

Box 4: Participation of G20 countries in multilateral environmental agreements

In the period between 1985 and 2015 a total of about 800 multilateral agreements, amendments and protocols have been proposed on a range of environmental issues. It is, however, unrealistic to assume that a single country would have ratified all of them.

For instance, out of the G20 countries analysed here, the highest number of agreements and modifications ratified by a single country (France) was 130. The G20 countries ratified on average 63 agreements, amendments and protocols. The number of withdrawals is also relatively small compared to the agreements and modifications ratified. The average number of withdrawals, excluding those agreements and modifications that have been re-joined, among G20 countries is four. Among the countries analysed, the highest number of full withdrawals is 33 (Canada).

2.3.2 Public opinion

Public opinion is a key component of the socio-political context within which policymakers operate, and can compel or constrain political, economic and social action (Leiserowitz, 2007). National differences in climate change risk perceptions therefore may help to explain the differing levels of political support across countries for climate action (Lee et al., 2015) and are therefore important for the assessment of credibility.

To get comparable data on the perception of climate change across the world, this analysis uses data from the Gallup World Poll in 2007 and 2008, which are the latest publicly available survey results.⁸ Future analyses should strive to take into account more up to date surveys when they become available.

First, the percentage of respondents who claimed to be aware of climate change is considered; that is, those who responded that they know 'something' or a 'great deal' about it.

Being aware of climate change, however, does not tell whether respondents are sufficiently concerned about it to exert pressure on their government. For instance, a country could have a large number of citizens aware of the issues, but most of them could be sceptics.

Social science research suggests that risk perceptions are also critical components of public and social responses to hazards like climate change (Leiserowitz, 2007). The number of 'aware' respondents who also claim that climate change is 'caused by human activity'⁹ and is perceived as a 'serious personal threat' is therefore considered.

2.4 Past performance

Countries' past performance on meeting international mitigation targets is important to determine the credibility of their INDCs. In particular, this analysis focuses on countries' performance in meeting past international mitigation targets (like emissions reduction targets and emissions reporting), and commitment to their own domestic climate change policies.

2.4.1 Performance meeting international mitigation targets

The only international emissions target for which compliance can be observed to date is the Kyoto Protocol. The lack of signature or withdrawal from the Protocol is considered as a sign of weak credibility on international commitments on climate change.

For those countries which signed and did not withdraw, the analysis distinguishes between the achievements of Annex B and non-Annex B countries, i.e. between countries which had mandatory targets and those who did not. For the former, meeting the targets is considered an indicator of good performance and provides greater credibility for INDC pledges.

The performance of non-Annex B countries, which are generally developing and emerging economies, is evaluated based on their submission of National Communications and Biennial Update Reports (BURs). This is the most challenging commitment they have faced under the UNFCCC process to date. Countries were requested to submit their national communications every four years. Therefore, to be fully compliant, countries should have submitted emission data at least up to 2010 (UNFCCC, 2014b). In addition, the first BUR report was required to be submitted by December 2014 (UNFCCC, 2012).

8 Top line results can be found here: https://en.wikipedia.org/wiki/Climate_change_opinion_by_country.

9 That is, whether respondents replied 'yes' to the questions 'Temperature rise is part of global warming or climate change. Do you think rising temperatures are... a result of human activities?'. Other options were: 'a result of natural causes', 'both', and 'no opinion'. People voting 'both' were not included among positive respondents.

2.4.2 Abolition of domestic climate change legislation

A country's track record of weakening or removing domestic climate change legislation or policy undermines the credibility of its national and international commitments. It is also an indication that the risk of policy reversal, captured by the indicator of 'political constraints' (see chapter 2.1.2), is real and has already materialised in practice.

It would be complex to track the complete history of modifications to climate change policies across all the countries examined. This study therefore focuses only on the most important cases of policy reversal. The most significant examples are Australia's U-turn on its emissions trading scheme and Canada's repeal of its 2002 Kyoto Protocol Implementation Act.

2.5 Other dynamic determinants of credibility

The determinants above provide a basis for assessing the credibility of INDCs based on the legal and institutional characteristics of a given country, its social context and its past performance. These determinants have some inertia (i.e. are more 'static', as they take time to change) and hence can be assessed on the basis of centrally collected comparable data. Yet there are other elements, related to the attitude and influence of key individuals and political parties, which can also have a significant impact of a country's ability to act upon and hold on to its climate change commitments. These elements are rather dynamic and time-bound and can change very rapidly. They encompasses three key aspects:

- **Political consensus** on climate change across the main parties' positions, i.e. whether there is bipartisan agreement on climate change issues or positions that are strongly polarized
- **Leadership on climate change**, i.e. the stance on climate change of key political figures (e.g. prime ministers or presidents)
- The expected **duration of current governments** and the timing of upcoming elections.

Political consensus tends to change over time, based on the prevailing economic, social and political situation in a given moment. A lack of political consensus on climate change between the main parties may jeopardize the ability to maintain political commitment and lead to policy reversal, in particular when a country faces elections that result in the change of the ruling party or of the leader in charge. A well-known example is the strongly polarised opinions on climate change in the US Democratic and Republican parties. While the Democratic Party, in particular through the leadership of President Obama, has shown strong support for action on climate change, the Republican Party voices strong opposition to climate action.

Strong leadership on climate change from an individual in power may help overcome inertia on climate policy in the political system and give a strong positive push to national climate policy. Strong leadership, for example, may overcome barriers inherent in the lack of political consensus. One of the notable recent examples is President's Obama's leadership in introducing the Clean Power Plan in the US. Given the lack of sufficient support for regulating GHG emissions through legislation in the Congress, the President enacted executive regulation based on the existing Clean Air Act and the decision of the Supreme Court recognising GHGs as 'pollutants' that need to be regulated. A second example where strong leadership overcame inertia in the political system occurred in Canada in the late 1990s/early 2000. Then Prime Minister Jean Chrétien personally made the call to ratify the Kyoto Protocol despite strong opposition from the business community (Harrison and Sundstrom, 2010). He was successful; however, action on climate change was not a priority for his successor and Canada's emissions continued to grow. Canada eventually withdrew from the Protocol in 2011.

Strong leaders opposed to climate action are likely to lower the credibility of a climate pledge because they may have it in their power to weaken policies, despite a reasonable and inclusive process having been followed for policy development at the outset. Such circumstances would be more likely to occur in countries with authoritarian political systems and in democracies lacking political consensus on climate change.

Finally, in countries with low political consensus and/or strong leaders supporting or opposing climate change, national elections can lead to fundamental changes to climate action and commitments. Notably, the forthcoming presidential elections in the US bring with them the unsettling question of whether a new President-elect will be supportive of the recent domestic legislation (notably the Clean Power Plan) or will try to abolish it. The US case study will be investigated in more detail in a forthcoming paper by the Grantham Research Institute.¹⁰

The elements described above are difficult to capture in analysis, as they require an in-depth understanding of the political circumstances in a given country and are time-bound and dynamic in nature. They are also difficult to measure in a way that is meaningful and comparable with other countries, and have therefore been left outside the scope of this analysis.

However, it is important to recognise that these elements can have an influence on the credibility of a country pledge. A full understanding of the credibility of the INDCs by the G20 countries would therefore need to factor in the orientations of the strong leaders, the timings of the upcoming elections, as well as the status of the political consensus on climate change, which could potentially present risk to the implementation of the INDCs.

3. Application of the framework to the G20 countries: key trends in credibility of national actions

The G20 countries not only represent the world's major economies, they are also responsible for about three quarters of global greenhouse gas (GHG) emissions. All the G20 countries have submitted INDCs in the course of 2015. Their announced commitments to reduce domestic emissions and the credibility of their pledges is therefore of particular importance. This chapter presents the results of the illustrative application of the framework described in chapter 2 to the G20 countries.

As noted earlier, this analysis is not aiming to produce a 'credibility ranking' of countries. Rather, it provides an initial comparative insight into the key determinants of credibility for climate policy and emissions reduction pledges, and their variance among countries. This chapter: highlights broad trends in the credibility of the G20's INDCs; identifies how individual countries perform against the key determinants of policy credibility; and signposts potential areas for improvement and priorities for implementation.

To put this analysis in the context of the discussions around the international level of ambition of INDCs and their implementation, the emissions reductions which each country has pledged to achieve by 2030 are scored against the individual determinants of credibility that are under direct control of governments. These include: legislation and policy; transparent, inclusive

¹⁰ Forthcoming. *What shapes climate policy in the United States, China and the European Union*. Policy brief by ESRC Centre for Climate Change Economics and Policy and the Grantham Research Institute on Climate Change and the Environment, in collaboration with Columbia University, Bruegel and Tsinghua University.

effective processes with sufficient political constraints to support policy continuity; and dedicated public bodies. The chapter also outlines a ‘barometer’ measuring the aggregate level of emission reductions pledged by the G20 in terms of each of the four elements of credibility (which combine several determinants, as noted in chapter 2): rules and procedures; players and organisations; norms and public opinion; and past performance.

This is a first broad-brush assessment, whose core purpose is to test the framework and to inform the discussion on the actions necessary to improve the credibility and ambition of the INDCs overtime, and how they can be effectively implemented. For many countries, particularly some of the emerging or developing countries, the formulation of INDCs marks the first time they have had to contemplate their national climate change policy. Insights from this study are likely to be particularly relevant to these countries as they begin to underpin their pledges with *credible* policies and institutions.

3.1 Assessment of the determinants of credibility for INDCs of the G20 countries

This section provides insights into the extent to which pledged emissions reductions are supported by determinants that make them credible.

Figures 3 to 7 illustrate the results of the assessment of the determinants supportive to credibility for the G20 and by groups of countries. Determinants are colour-coded according to which of the four key elements they are associated with (see also Table 1 for a full description).

Table 2. Colour-coding by determinant	
Key elements	Determinants
Rules and procedures	Coherent and comprehensive legislative and policy basis (<i>Legislation and policy</i>)
	Transparent, inclusive and effective decision-making process with sufficient political constraints to limit policy reversal (<i>Process</i>)
Players and organisations	Dedicated public bodies supported by a consultative mechanisms (<i>Public bodies</i>)
	Supportive private bodies (<i>Private bodies</i>)
Norms and public opinion	History of active international engagement on environmental issues (<i>International engagement</i>)
	Climate-aware public opinion (<i>Public opinion</i>)
Past performance	Track record of delivering on past climate change commitments (<i>Past UNFCCC performance</i>)
	No history of policy abolition (<i>Past policy reversal</i>)
<p>Note: The shorthand for each determinant used in charts and tables in this policy brief is indicated in brackets in the determinants column.</p>	

The G20 countries, as a group, appear to score moderately well across all the determinants of credibility, with all the determinants on average being moderately to largely supportive of credibility (see Figure 3).

There are some noticeable differences among the industrialised economies (the so-called Annex I countries under the UNFCCC) and the developing or emerging economies (non-Annex I countries) that are members of the G20 (see Figure 4). The former, as a group, have generally higher average scores among all the determinants of credibility, with most of them approaching a level ‘largely supportive’ to credibility.

Developing and emerging economies display larger variation across the determinants. Notably, they tend to score better than industrialised economies in terms of past policy reversal. This may be due to the fact that the body of policies and legislation in these countries is still under development (and indeed they score lower on the ‘policy and legislation’ determinant, compared to industrialised countries). Therefore they may have less and/or younger policies from which no reversal has yet been made.

Lower scores are found in developing and emerging economies in terms of supportive public and private bodies, processes and also climate-aware public opinion, in comparison with industrialised G20 members. **This affirms the case for continued attention to capacity building in developing and emerging countries, in order to strengthen public and private institutions that deal with climate change, as well as to raise the overall level of awareness to climate change.**

Figure 3. Average score of the determinants supporting the credibility of pledges for the G20 countries as a group

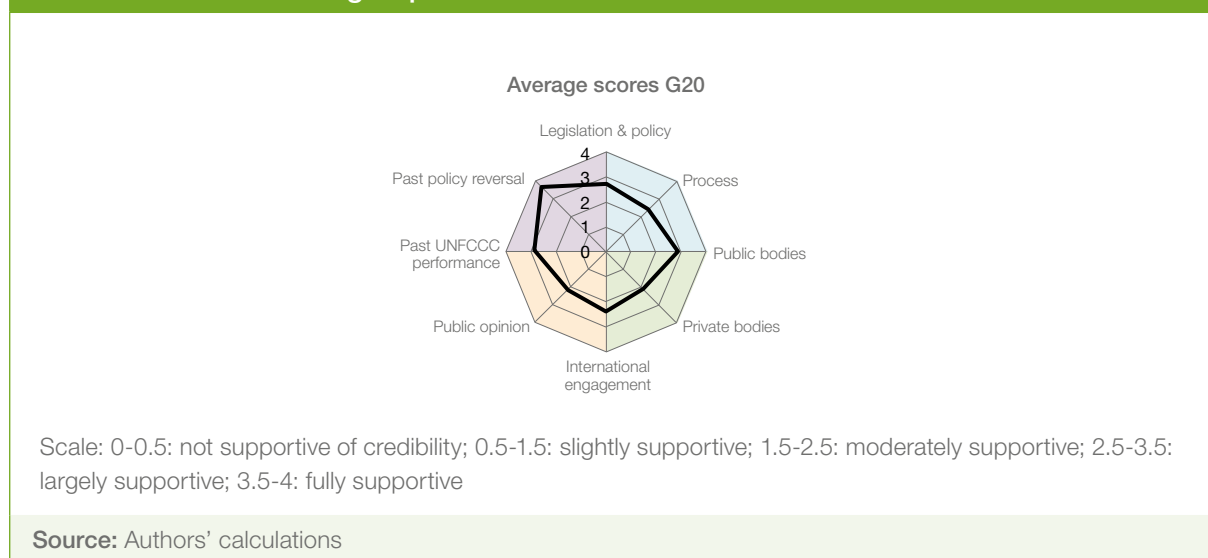
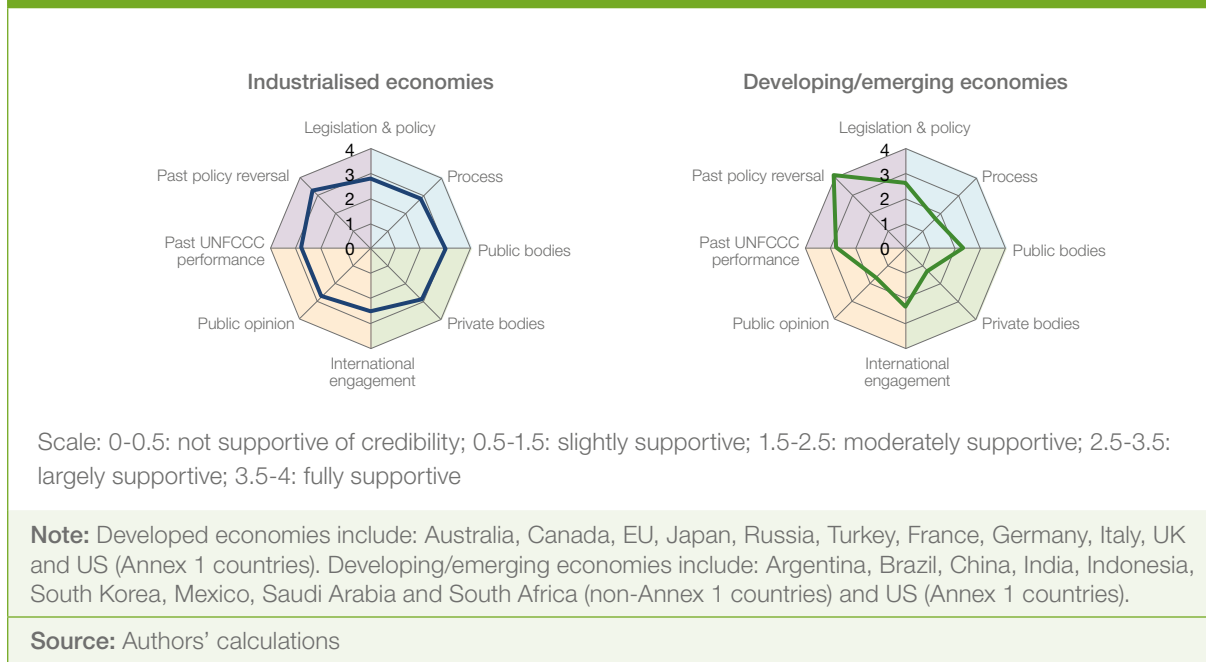


Figure 4. Average score of the determinants supporting the credibility of pledges for industrialised and developing or emerging economies



No G20 country shows a complete lack of support to their pledges' credibility through all determinants explored in this analysis. However, **there is significant difference in the score of the determinants of credibility** for the individual countries.

There is a group of countries that have most determinants at a level 'largely supportive' to credibility, and 'moderately supportive' for one or two. This includes the EU as a group and its individual G20 members (France, Germany, Italy and the UK) as well as South Korea (see Figure 5). They all score close to the top level for legislation and policy, past UNFCCC performance and lack of policy reversal. Furthermore, none of them displays significant weakness in the determinants of credibility of their INDC (i.e. none of the determinants are below the level 'moderately supportive' to credibility).

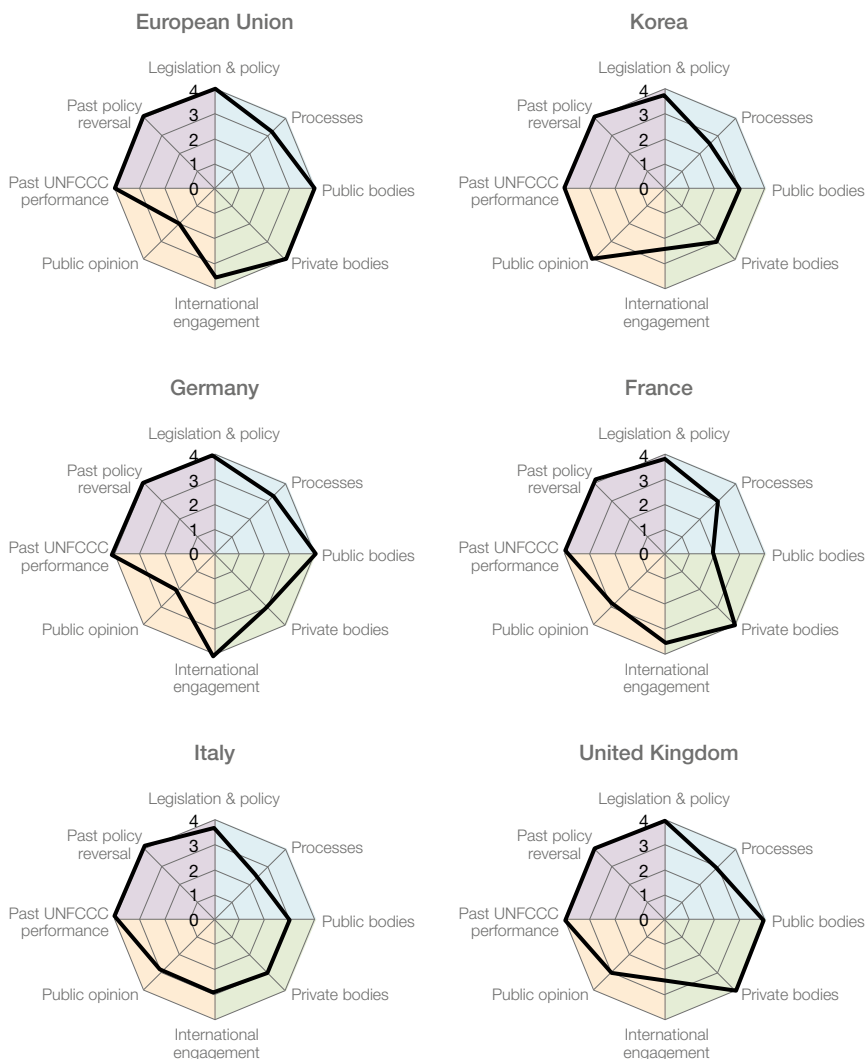
However, improvement is possible, in particular in the area of public opinion in all the European countries. The perception that climate change is caused by human activity and its perceived level of seriousness is above the world average in these countries, but below that of the top performers (10th percentile¹¹).

Further progress could be made to strengthen decision-making process in all these countries, for instance by improving the performance of the public administration (e.g. in Italy) and the frequency of GHG reporting (e.g. in South Korea). In countries like South Korea, France and Italy, credibility could also be strengthened by improving the public bodies responsible for climate change policy, in particular by introducing independent consultative bodies.

For most countries, there is also scope to improve international engagement, especially participation in and/or withdrawal from multilateral environmental agreements (MEAs). While nothing can be done about their past record, the involvement in upcoming MEAs could strengthen the perceived credibility of their pledges.

11 The 10th percentile is the score above which 10 per cent of the observations may be found.

Figure 5. Countries with most determinants ‘largely supportive’ to the credibility of climate change mitigation pledges



Scale: 0-0.5: not supportive of credibility; 0.5-1.5: slightly supportive; 1.5-2.5: moderately supportive; 2.5-3.5: largely supportive; 3.5-4: fully supportive

Note: top performers are countries with six or more of the eight determinants being ‘fully supportive’ or ‘largely supportive’ to credibility, and with no significant weakness (no determinant being slightly or not supportive)

Source: Authors’ calculations

A number of countries perform within or above average on most of the determinants of credibility, but display a significant weakness in one determinant (see Figure 6). These are the areas where improvement should be particularly sought.

Notably, Australia's past policy reversal on emissions trading undermines the credibility of its INDC. Similarly, the credibility of the US and Japan's INDCs is somewhat reduced by their past UNFCCC performance (the US did not ratify the Kyoto Protocol and Japan failed to meet its target via domestic emissions reduction). Private bodies in Mexico, Brazil and Russia are only 'slightly supportive' to credibility of their INDCs, given the significant share of carbon intensive and mining companies in their economies, and the relatively low number of environmental lobby organisations. Brazil's processes are only slightly supportive to credibility, mostly because of relatively low veto points in the political system and some inefficient aspects of its administrative structure. In South Africa, public opinion (based on the latest data available) is 'not supportive' of the credibility of its INDC due mainly to a particularly low level of awareness on climate change. Turkey does not have one distinct area of weakness, but most of its determinants are only 'moderately supportive' to credibility.

To increase the credibility of their INDCs, all countries could prioritise action on the determinants of credibility that are under the direct influence of their governments (i.e. policy and legislation, decision-making processes, and public bodies). Other determinants, like public opinion and private bodies, are harder to tackle in the short term, but some government action could foster improvement in the long run, for example increasing citizens' awareness and stimulating the creation of environmental organisations. Determinants related to past performance cannot be altered in the short run, but could become stronger in the future as countries' track record improves.

Figure 6. Countries with most determinants ‘moderately supportive’ to credibility



Scale: 0-0.5: not supportive of credibility; 0.5-1.5: slightly supportive; 1.5-2.5: moderately supportive; 2.5-3.5: largely supportive; 3.5-4: fully supportive

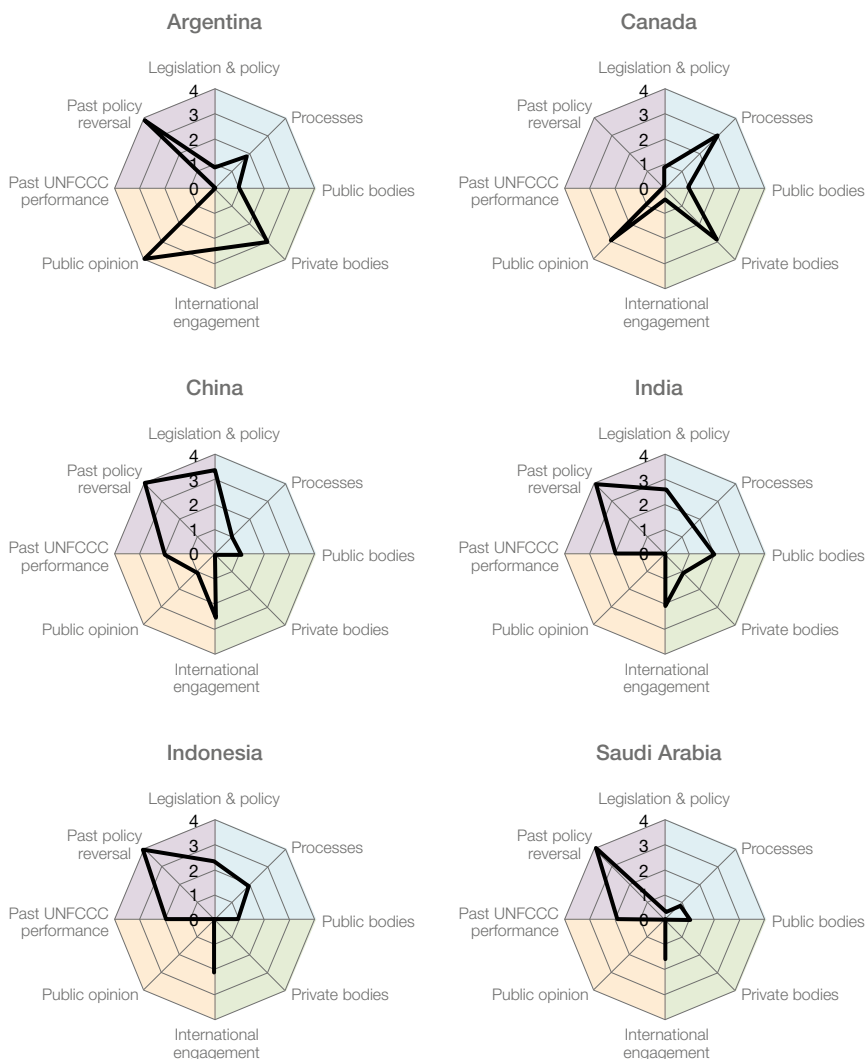
Source: Authors' calculations

Finally, a number of countries have two or more determinants that are only 'slightly supportive' or 'not supportive' to credibility and have scope for increasing support to credibility across most determinants (Figure 7). For example, Argentina, Canada and Saudi Arabia could enhance credibility by strengthening their legislation and policy, which at the moment are only 'slightly supportive' of their credibility on climate change mitigation. Private bodies, reflected by the private sector carbon lobby and environmental NGOs, and public opinion are 'not supportive' or only 'slightly supportive' to the credibility of climate policy/pledges in Indonesia, India, China and Saudi Arabia. Credibility here could be strengthened by, amongst other things, raising awareness of climate change and of business opportunities around mitigation and through creating a supportive environment for the NGOs.

Yet several countries in this group show better performance in those determinants that are under the direct control of policymakers. In China and India, for instance, the determinant for legislation and policy appears 'largely supportive' to the credibility of their pledges. Canada's decision-making process is 'largely supportive' to credibility, while public bodies are at least 'moderately supportive' to credibility in all countries in this group, with the exception of Argentina.

However, there are clearly several areas in which these countries could act upon to improve their level of credibility. In general, most will benefit from strengthening their climate change-related public bodies and processes and adoption and implementation of climate policy. Raising public awareness and support for climate change action is also an important issue.

Figure 7. Countries with potential for increasing support to credibility across most of the determinants



Scale: 0-0.5: not supportive of credibility; 0.5-1.5: slightly supportive; 1.5-2.5: moderately supportive; 2.5-3.5: largely supportive; 3.5-4: fully supportive

Source: Authors' calculations

3.2 Assessing the credibility of emissions reductions pledges

Assessing the policy credibility of individual countries is only part of the story. This chapter links the credibility analysis to the size of the emissions reduction embedded in each G20 INDC. This allows credibility and ambition to be brought together, albeit in a relatively simple and illustrative way. The aim of doing so is to give a sense of how much of the emissions reductions announced in Paris have credible underpinning.

For this analysis the emissions reduction pledge of each G20 country is scored against the three determinants of credibility that are within direct control of government, namely:

- Coherent and comprehensive legislative and policy basis (*Legislation and policy*)
- Transparent, inclusive and effective decision-making process with sufficient political constraints to limit policy reversal (*Process*)
- Dedicated public bodies supported by consultative mechanisms (*Public bodies*).

However, not all emissions reduction targets are expressed in the same way. For example, some are expressed as absolute targets, some as intensity. The first step in this analysis is therefore to understand and bring into comparable format the expected level of the emissions reductions reflected in the targets.

The expected level of emissions reductions is calculated as the difference between the pledged targets and possible ‘business as usual’ (BAU) scenarios in 2030 for each G20 country. BAU is an indication of the level of future emissions if no mitigation action is taken. These are based on countries’ own assumptions whenever possible, or on analysis by Boyd et al (2015) otherwise. Annex 2 provides more technical detail on the method used.

It should also be noted that BAUs are an analytical construct, and significant uncertainties are involved in their assessment, due to the different ways countries have expressed their targets and lack of underlying information in certain cases. Therefore, our estimated emissions reductions should be treated as illustrative, rather than an exact forecast.

Furthermore, due to the lack of information on some of the assumptions used in the INDCs for India and Saudi Arabia, it was not possible to provide even a rough estimate of the potential emissions reductions for these countries.

Therefore, while in Figures 8 to 10 the width of the bars is proportional to each country’s expected emission reduction, for India and Saudi Arabia this is not the case, and the width of their bars is only illustrative. For this reason, India and Saudi Arabia are shown at the far right of the chart, separated from other countries.

Individual EU Member States which are part of the G20 (France, Germany, Italy and the UK) are not included in the chart, since the INDC applies to the EU as a whole and no specific national targets have yet been agreed.

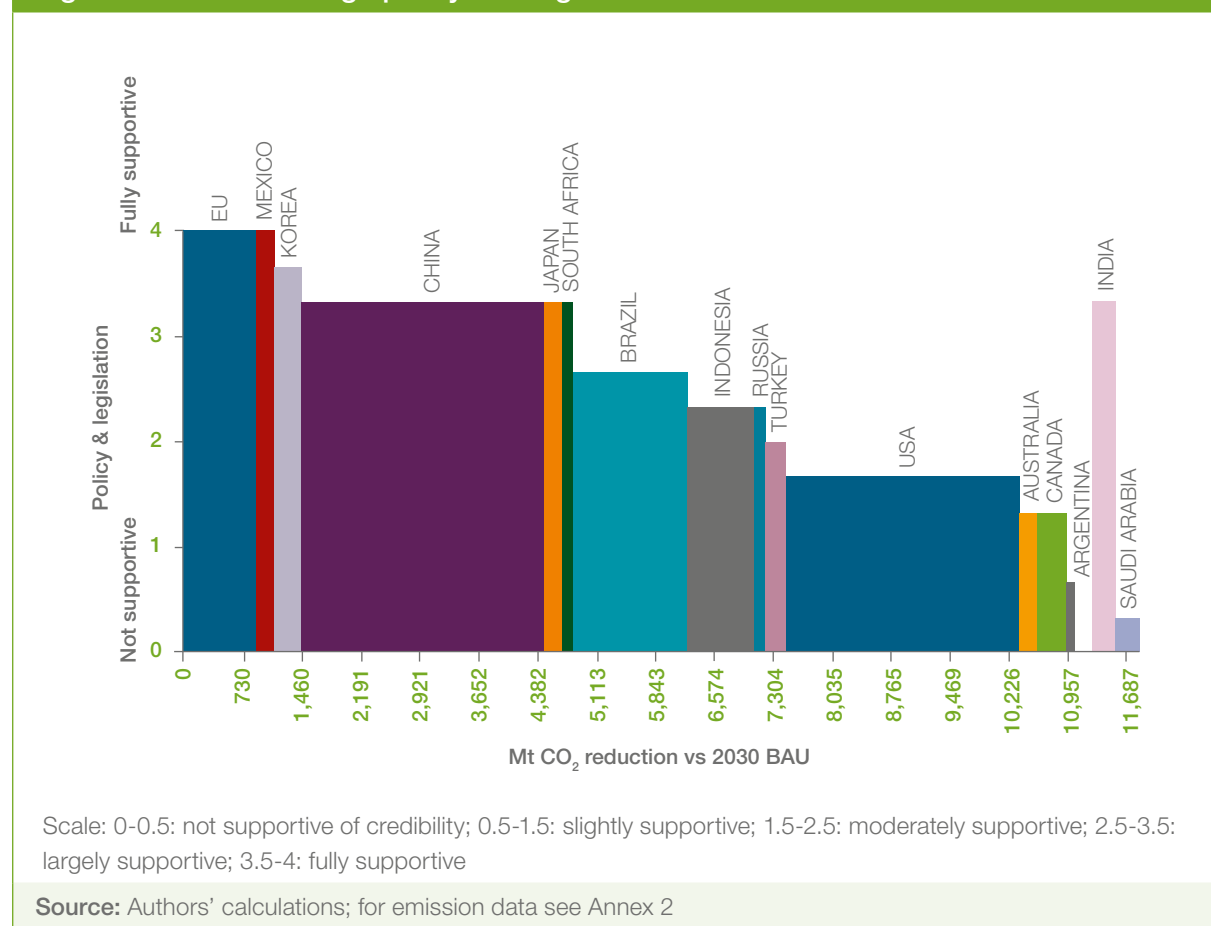
In the area of **policy and legislation**, the analysis builds on the indicators discussed section 2.1.1 and Table 1. These are: high-level vision (in terms of whether countries have mitigation framework legislation); economy-wide emissions reduction targets; and carbon pricing policies (such as carbon and energy taxes).

Almost all the pledged emissions reductions appear to be backed by policies and legislation that on average are at least ‘moderately supportive’ to credibility (see Figure 8). Notably, about half of the G20 emissions reductions are backed by policy and legislation that is either ‘largely supportive’ or ‘fully supportive’ of credibility.

The countries with the highest credibility based on policy and legislation are the EU, South Korea and Mexico which, together, account for almost 15 per cent of the G20 emissions reductions. These countries have framework legislation in place and relatively strong low-carbon policies: they all have enforced a form of carbon taxation or carbon trading, and their share of fossil fuel subsidies over GDP is below the world average (about 1.3 per cent). There are differences in the time horizon of emissions targets in these countries, however. Only the EU and Mexico have both long term and short term overall targets formalised in legislation. South Korea has formalised targets only for 2020.

Some countries display lower scores on this determinant, revealing different areas in need of improvement. Argentina, Australia, Canada, Saudi Arabia, and the US could prioritise introducing framework legislation on climate change to consolidate their long-term vision. Others, especially Argentina, Canada, Saudi Arabia and Turkey, could improve their domestic mitigation targets by developing and setting into legislation both short- and long-term emissions reduction objectives. There is also scope for strengthening climate change legislation, especially in Russia and Saudi Arabia, followed by Argentina, Brazil, Canada, Indonesia and Turkey, for example by introducing carbon pricing measures. Some countries could also increase the credibility of their efforts by reducing their fossil fuel subsidies that, as noted earlier, present a barrier to implementation of effective climate policies. This is particularly true for Argentina, Russia and Saudi Arabia, whose share of subsidies as a percentage of GDP is above the world average.

Figure 8. Climate change policy and legislation



The level of credibility is generally lower for the **processes** determinant across all the G20 countries (see Figure 9). This is affected by how countries perform on a number of indicators, namely presence of mechanisms for building buy-in from stakeholders (like public consultations); robustness of law and policy-making process (measured in terms of the 'Political Constraint Index'); and presence of administrative and enforcement mechanisms (like monitoring and reporting, level of corruption, etc. See Table 1 in chapter 2, and section 2.1.2).

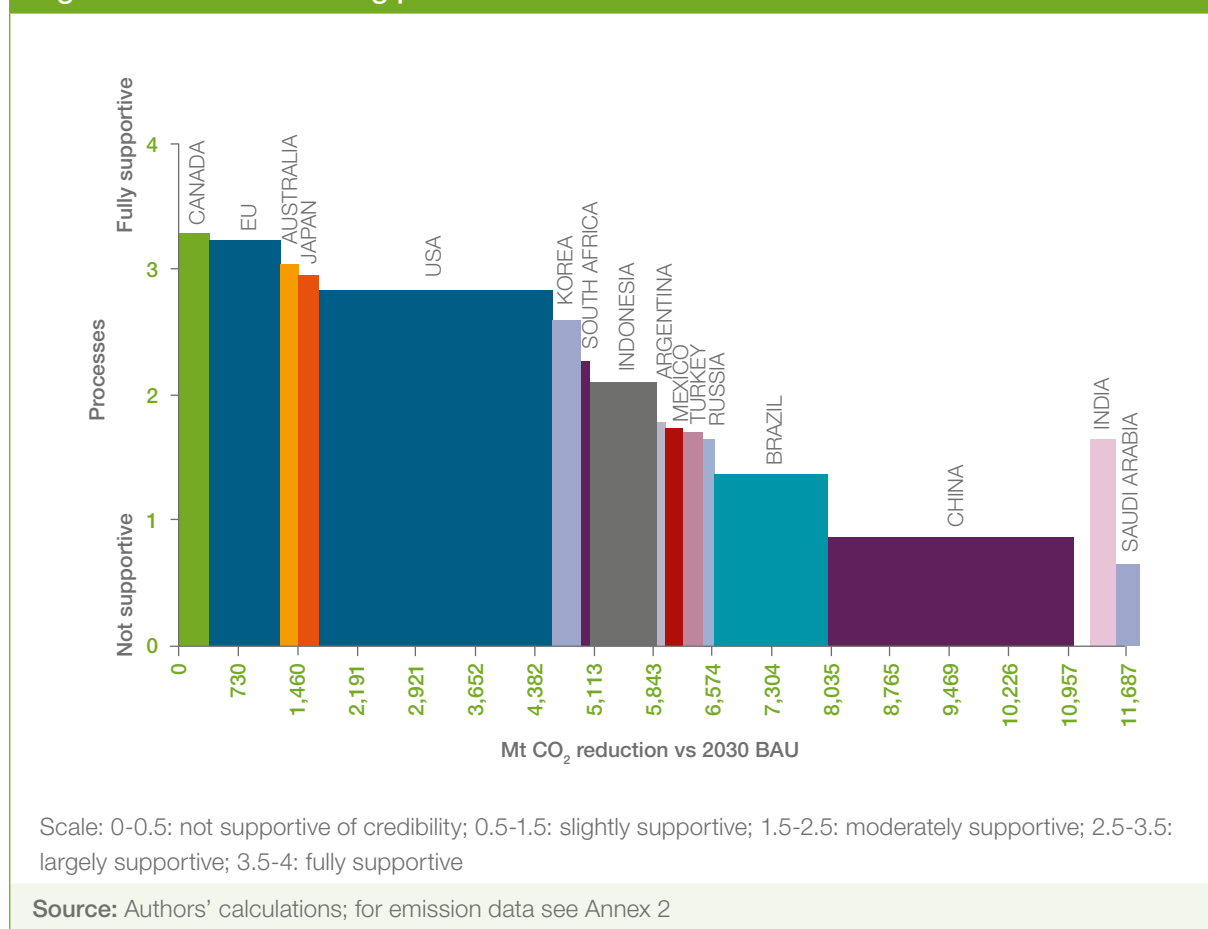
No country has processes that are fully supportive of credibility. However, about 60 per cent of the pledged emissions reductions are underpinned by processes that are at least 'moderately supportive' to credibility. Among these, some countries perform better than others.

For instance Canada, the EU, Australia, Japan, South Korea and the US all have processes in place that are 'largely supportive' to credibility. Together they represent about 45 per cent of total emissions reductions. Overall they show adequate mechanisms for building stakeholders' consensus, as well as transparent, consistent and effective administrative and enforcement mechanisms. The credibility of some countries is reduced, however, by the relative ease with which laws and policies can be removed or weakened (especially Australia, followed by the US and Japan). This suggests a possible lack of continuity in their commitments.

Based on the indicators analysed, several G20 countries can improve the processes that underpin their emissions reduction targets. In particular, some could improve the inclusiveness of their decision-making processes via deeper engagement with stakeholders (i.e. Saudi Arabia, China, Russia and Turkey). A number of other countries could limit the potential reversibility of climate change law and policies, for example through a greater level of delegation of climate policy to the independent decision-making and consultative bodies and the introduction of additional veto points in the system (i.e. China, Brazil and Saudi Arabia, followed by Argentina, Australia, India, Mexico and Turkey).

All countries, on average, show administrative and enforcement mechanisms that are at least 'moderately supportive' to credibility. While this is encouraging, no country has administrative and enforcement mechanisms that are 'fully supportive' to credibility, and some improvement certainly seems possible.

Figure 9. Decision-making processes



Finally, only a third of the pledged emissions seem to be backed by climate change-related **public bodies** that are at least 'largely supportive' to credibility (see Figure 10). The assessment is based on whether countries have dedicated climate change organisations and other advisory bodies (see section 2.2.1).

The best performing G20 members are the EU and Australia, whose public bodies are deemed 'fully supportive' to credibility, followed by Mexico, Brazil, South Korea, Turkey, Japan, Russia and South Africa with public bodies that are 'largely-supportive' to credibility.

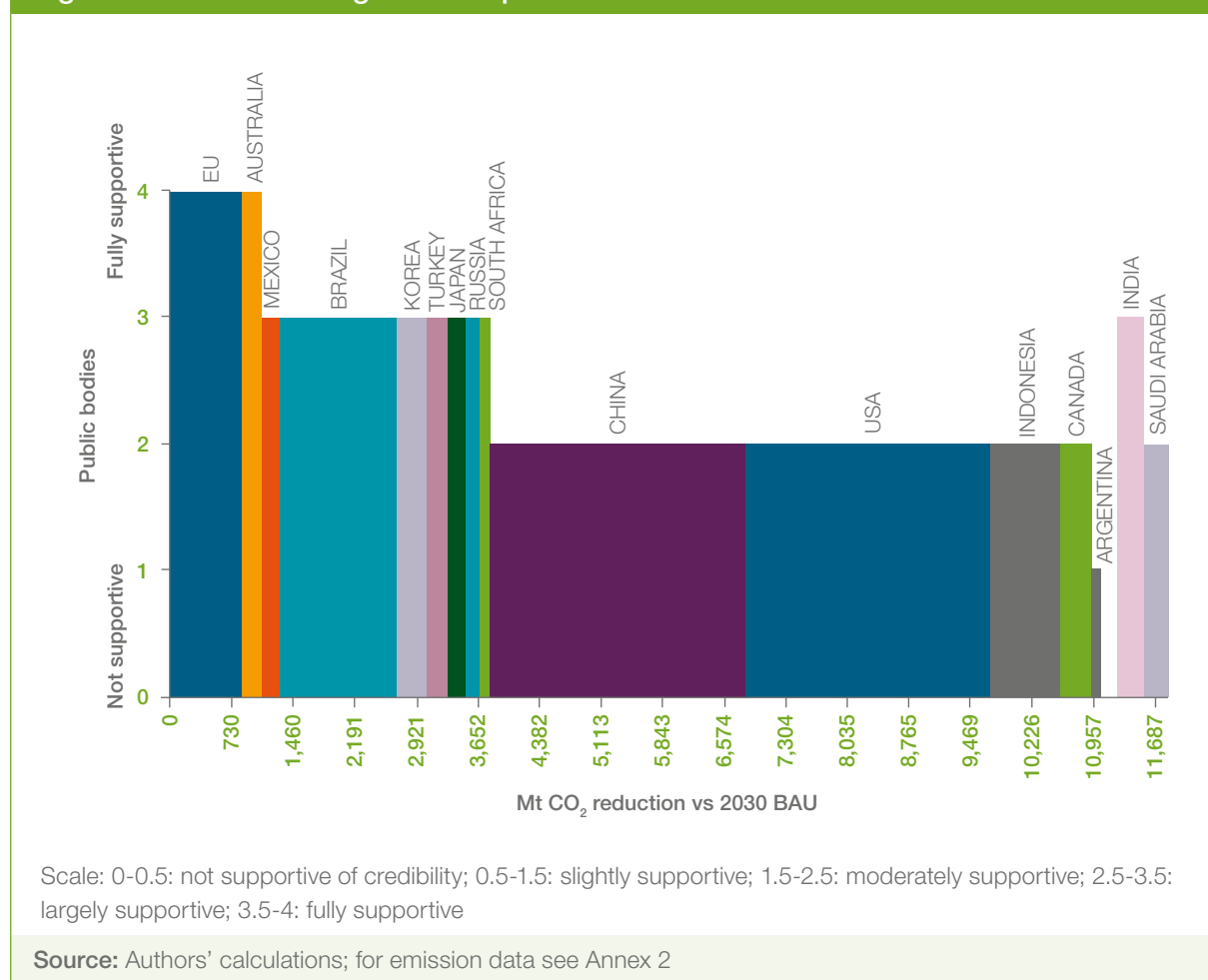
Encouragingly, climate change is included in all the G20's public administrative bodies. However, only the EU¹² appears to have a public body fully dedicated to climate change policy (the European Commission's Directorate-General for Climate Action), while in all the other G20 countries climate policy is dealt with by departments within other ministries (most commonly the Ministry of the Environment). It is assumed that both fully dedicated bodies and departments within other ministries offer the same level of support to credibility. However, it is clear that some may be better equipped to design and enforce appropriate policy than others. Encouraging countries to develop their own climate change ministries and/or strengthening their climate change departments would help ensure that sufficient capacity is dedicated to climate change (and related energy) policy making. Yet, as noted earlier, it is also important that such agencies are able to ensure effective inter-agency coordination.

12 Within the EU, the UK also has an autonomous institution, Department of Energy and Climate Change (DECC).

Furthermore, government bodies should ideally be supported by independent advisory bodies. Currently only the EU and Australia¹³ have fully independent climate change advisory bodies. Five of the G20 countries have no advisory body for climate change (notably Canada, China, Indonesia, Saudi Arabia and the US), while nine have some form of advisory institution, although not operationally independent from parliaments (they are often in the form of inter-ministerial committees).

Weak institutions could present potential risk for the ability of countries to effectively delegate and carry out implementation of their INDCs. As noted earlier, strengthening public institutions responsible for climate change policy is one of the priority areas for government action.

Figure 10. Climate change-related public bodies



13 For the EU, this is the European Environment Agency; in Australia it is the Climate Commission. Although European Member States are not covered in this chapter, it is worth noting that one of them also has its own independent advisory body: the Climate Change Commission in the UK.

Finally, the broad trends in credibility of the expected emission reductions pledged by the G20 countries are assessed across the broader four elements of credibility. These elements, as discussed above, aggregate the scores of the eight determinants into: rules and procedures (as an average of the scores for legislation and policy and for decision-making processes); players and organisations (an average of public bodies and private bodies); norms and public opinion (an average of international engagement and public opinion); and past performance (an average of performance towards international mitigation targets and abolition of climate change legislation).

Four simple ‘barometers’ are obtained, which are shown in Figure 5. These suggest that:

- Almost all the emissions reductions pledges by the G20 are backed up by rules and procedures that on average are at least ‘moderately supportive’ to credibility; however, only about 15 per cent of emission reductions are backed-up by rules and procedures that are ‘largely supportive’ to ‘fully supportive’ of credibility.
- About 60 per cent of the pledged emission reductions on average are underpinned by players and organisations that are at least ‘moderately supportive’ to credibility and more than 20 per cent have players and organisations that are ‘largely supportive’ to ‘fully supportive’ of credibility.
- About 90 per cent of the pledged emission reductions are backed up by norms and public opinion that are at least a ‘moderately supportive’ to credibility, while a third are backed up by norms and public opinion that are ‘largely supportive’ to credibility.
- Finally, almost all the pledged emission reductions appears to be based on past performance that is ‘moderately supportive’ or ‘largely supportive’ to credibility, although about 5 per cent of pledged emissions reductions are based on past performance that is ‘not supportive’ to credibility.

Figure 11. Emission reduction ‘barometers’ for each of the four key areas of credibility



Individual country case studies would be required to gain a full understanding of all the drivers of policy credibility and the interplay among them. Such analyses should take into account more dynamic factors, including the views of country leaders on climate change, political consensus and upcoming elections, which fell outside the scope of this study (see section 2.5). Such studies should also ideally consider credibility in the context of ambition and feasibility of implementation, as discussed in Chapter 1. A forthcoming policy paper by the Grantham Research Institute on China, the EU and the US will provide some of these additional details for these three jurisdictions.

4. Conclusions

Much of the debate around INDCs has focused on the ambition of pledged emissions cuts. But, equally important is the political credibility of these pledges and the feasibility of implementing them through domestic policies and processes between now and 2030.

Credibility is vital for building trust among negotiating parties, as this will help to increase the ambition of pledges over time. Furthermore, countries with policies that are perceived as more credible and stable are more likely to attract the private investment and international climate finance that will be essential for their successful implementation. This is particularly important for those INDC commitments that are conditional upon financial support.

Assessing the credibility of INDCs is challenging because it has many dimensions. **Credibility can be driven by multiple factors that often interact and mutually reinforce each other.**

This analysis considered the following to be the key determinants of credibility:

- a coherent and comprehensive *legislative and policy basis*
- a transparent, inclusive and effective *decision-making process*
- capable *public bodies*
- supportive *private bodies*
- a history of effective *international engagement*
- a climate-aware *public opinion*
- a track record of delivering on *past climate change commitments and no history of policy reversal*.

These determinants are particularly meaningful for analysts because they are measurable. However, the credibility of climate change pledges can also be determined by other dynamic factors, such as strong leadership in the face of political inertia (as seen with President Obama in the US), the lack of political consensus on climate change across party lines, and the timing of upcoming elections. These elements are time-bound and can change very rapidly, making them difficult to measure. It was therefore not possible to capture them in this analysis. They should, however, be taken into account when assessing countries' credibility in more detail.

Considering the G20 countries as a group, they appear to score moderately well across all the determinants of credibility. There are some notable variations between industrialised and developing/emerging economies, with the latter on average scoring lower on effective decision-making processes, public bodies and private bodies supportive to climate action, and having lower public awareness of climate change.

This affirms the case for continued attention to capacity building in developing and emerging countries, in order to strengthen public and private institutions that deal with climate change, as well as to raise the overall level of public awareness. This will not only support their domestic policy making in general, but will also help strengthen the credibility of their international pledges.

No G20 country is found to have ‘no credible basis’ for their INDC across the determinants explored in this analysis. **However, there are significant differences in the level of and balance among the determinants of credibility for the individual countries.** Notably, three broad groups of countries can be identified:

- Countries with most of the determinants at a level ‘largely supportive’ to credibility; this includes the EU and its individual G20 members (France, Germany, Italy and the UK), as well as South Korea;
- Countries with most of the determinants at least ‘moderately supportive’ to credibility, but displaying significant weakness in one of the determinants; this includes Australia, Brazil, Japan, Mexico, Russia, Turkey, South Africa and the US;
- Countries that have scope to significantly increase their credibility across most determinants. These are Argentina, Canada, China, India, Indonesia and Saudi Arabia.

Furthermore, the analysis of the policy credibility of individual countries is extended to take into account the size of the emissions reduction embedded in each G20 INDC. This allows credibility and ambition to be brought together, albeit in a relatively simple and illustrative way. The aim is to provide a sense of how much of the emissions reductions pledged in INDCs have credible underpinning.

This analysis showed the following:

Almost all the emissions reductions pledges by the G20 are underpinned by rules and procedures that on average are at least ‘moderately supportive’ to credibility; however, only 15 per cent of emission reductions are backed up by ‘largely supportive’ or ‘fully supportive’ rules and procedures.

About 60 per cent of the pledged emission reductions are on average are backed up by players and organisations that are at least ‘moderately supportive’ to credibility; more than 20 per cent have players and organisations that are ‘largely supportive’ to ‘fully supportive’ to credibility.

About 90 per cent of the pledged emission reductions are underpinned by norms and public opinion that are at least a ‘moderately supportive’ to credibility, while a third are backed by norms and public opinion that are ‘largely supportive’ to credibility.

Finally, almost all the pledged emissions reductions appear to be based on past performance that is ‘moderately supportive’ or ‘largely supportive’ to credibility, although about 5 per cent of pledged emissions reductions are based on past performance that is ‘not supportive’ at all.

Now that agreement has been reached in Paris, countries have a window of opportunity to improve the credibility of their pledges. In particular, **policymakers have direct influence on some determinants of credibility, especially policy and legislation, decision-making processes and public bodies.** These should be the focus of governments’ attention as part of the implementation of the INDCs.

In the long run, this could also help to boost those determinants outside of direct government control, like public opinion and private bodies, as well as improve their track record on climate change policies. This will not only increase the credibility of their international commitments and their capability to deliver, but also enable them to raise the ambition of future commitments.

Furthermore, the perception of credibility can be strengthened by improving the information available on best practice for determinants of credibility, such as policy and legislation, transparent and inclusive decision-making processes, and effective public bodies. Many of the INDCs submitted ahead of Paris go a long way in providing information on national planning processes that back them up, as well as on the planned implementation priorities and activities. Further improving the level of detail and transparency of this type of information will help enhance the understanding and mutual perception of credibility among the countries and stakeholders.

While the framework for the assessment of credibility presented in this study has some limitations and can be developed further, it provides a useful initial tool for countries to assess and identify potential areas for improvement as they move to implement their pledges and seek to attract investment to fund the low-carbon transition.

References

- Averchenkova, A., Stern, N., and Zenghelis, D., 2014. *Taming the Beasts of 'Burden-Sharing': An Analysis of Equitable Mitigation Actions and Approaches to 2030 Mitigation Pledges*. [pdf] London: Centre for Climate Changes Economics and Policy and Grantham Research Institute on Climate Change and the Environment. Available at: <http://www.lse.ac.uk/GranthamInstitute/publication/taming-the-beasts-of-burden-sharing-an-analysis-of-equitable-mitigation-actions-and-approaches-to-2030-mitigation-pledges/>
- Australian Government's Department of Environment, 2015. *Australia's 2030 emissions reduction target*. [pdf] Canberra: Department of Environment. Available at: <https://www.dpmc.gov.au/sites/default/files/publications/Summary%20Report%20Australias%202030%20Emission%20Reduction%20Target.pdf>
- Bernauer, T., and Gampfer, R., 2013. Effects of civil society involvement on popular legitimacy of global environmental governance. *Global Environmental Change*, 23(2), pp.439-449.
- Bernauer, T., 2013. Climate Change Politics. *Annual Review of Political Science*, 16, pp.421-448
- Bicchieri, C. and Muldoon, R., 2014. Social Norms, In *The Stanford Encyclopedia of Philosophy* (Spring 2014 Edition), (Zalta E. N. ed.). [html] Available at: <http://plato.stanford.edu/entries/social-norms/#Int>
- Bloomberg New Economic Finance (BNEF), 2015. *How ambitious are the post-2020 targets? Assessing the INDCs: comparing apples with oranges*. [pdf] London: BNEF. Available at: <http://about.bnef.com/content/uploads/sites/4/2015/10/2015-10-02-How-ambitious-are-the-post-2020-targets-UPDATE-2-Oct.pdf>
- Bowen, A., 2011. *The case for carbon pricing*. Policy brief. [pdf] London: Grantham Research Institute for Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science. Available at: http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2014/02/PB_case-carbon-pricing_Bowen.pdf
- Boyd, R., Cranston Turner, J. and Ward, B., 2015. *Tracking intended nationally determined contributions: what are the implications for greenhouse gas emissions in 2030?* Policy paper. [pdf] London: Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment. Available at: <http://www.lse.ac.uk/GranthamInstitute/publication/intended-nationally-determined-contributions-what-are-the-implications-for-greenhouse-gas-emissions-in-2030/>
- Brunner, S., Flachsland, C. and Marschinski, R., 2012. Credible commitment in carbon policy. *Climate Policy*, 12(2), 255-271
- Carbon Brief, 2015. Paris 2015: *Tracking country climate pledges*. [html] Available at: <http://www.carbonbrief.org/paris-2015-tracking-country-climate-pledges>
- Motrel, R. and Shishlov, I., 2014. *Ex-post evaluation of the Kyoto protocol: four key lessons for the 2015 Paris Agreement*. Climate Report N.44. [pdf] Paris: CDC Climat Research. Available at: http://www.cdcclimat.com/IMG/pdf/14-05_climate_report_no44_-_analysis_of_the_kp-2.pdf
- Climate Action Tracker, 2015. *Rating countries*. [html] Available at: <http://climateactiontracker.org/countries.html>
- Coady, D., Parry, I., Sears, L. and Shang, B., 2015a. *How Large Are Global Energy Subsidies?* IMF Working Paper WP/15/105. [pdf] Available at: <https://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf>
- Coady, D., Parry, I., Sears, L. and Shang, B., 2015b. *How Large Are Global Energy Subsidies?* Country-level Subsidy Estimates. IMF Working Paper WP/15/105. [html] Available at: <http://www.imf.org/external/np/fad/subsidies/data/codata.xlsx>
- Compston, H., and Bailey, I., 2014. Climate policy strength compared: China, the US, the EU, India, Russia, and Japan. *Climate Policy*, (forthcoming), pp.1-20.
- Crowley, K., 2007. Is Australia Faking It? The Kyoto Protocol and the Greenhouse Policy Challenge. *Global Environmental Politics*, 7 (4), pp.118-139.
- Dixit, A., 1996, *The Making of Economic Policy: A Transaction-Cost Politics Perspective*. Cambridge, MA: The MIT Press.
- Egebo, T. and Englander, A. S., 1992. *Institutional Commitments And Policy Credibility: A Critical Survey And Empirical Evidence From The ERM*. OECD Economic Studies No. 18. Spring 1992. [pdf] Paris: OECD. Available at: <http://www.oecd.org/eu/34250714.pdf>
- Falkner, R., 2008. *Business power and conflict in international environmental politics*. Palgrave Macmillan

- Fankhauser, S., Gennaioli, C. and Collins, M., 2015. The political economy of passing climate change legislation: Evidence from a survey. *Global Environmental Change*, 35, pp.52-61.
- Fiorino, D. J., 2011. Explaining national environmental performance: approaches, evidence, and implications. *Policy Sciences*, 44, pp.367–389
- Gilardi, F., 2002. Policy credibility and delegation to independent regulatory agencies: a comparative empirical analysis. *Journal of European Public Policy*, 9(6), pp.873-893.
- Harrison, K., 2007. The road not taken: Climate change policy in Canada and the United States. *Global Environmental Politics*, 7(4), pp.92-117.
- Harrison, K. and Sundstrom, L. M., 2007. The comparative politics of climate change. *Global Environmental Politics*, 7(4), pp.1-18.
- Harrison, K., and Sundstrom, L. M., 2010. Introduction: Global Commons, Domestic Decisions. In *'Global commons, domestic decisions: The comparative politics of climate change'* (Harrison, K., & Sundstrom eds.). MIT Press.
- Helm, D., Hepburn, C., and Mash, R., 2003. Credible carbon policy. *Oxford Review of Economic Policy*, 19(3), pp.438-450.
- Henisz, W. J., 2002. The institutional environment for infrastructure investment. *Industrial and corporate change*, 11(2), pp.355-389.
- Henisz, W., 2015. *Political Constraint Index*. [html] Available at: <https://whartonmgmt.wufoo.com/forms/political-constraint-index-polcon-dataset/>
- International Energy Agency (IEA), 2015. *Energy and Climate Change – World Energy Outlook (WEO) special briefing for COP21*. [pdf] Paris: IEA. Available at: https://www.iea.org/media/news/WEO_INDC_Paper_Final_WEB.PDF
- Intergovernmental Panel on Climate Change (IPCC), 2014. *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. [pdf] Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at: <http://mitigation2014.org/>
- IUCN, 2015. *IUCN Members' database*. [html] Available at: https://www.iucn.org/about/union/members/who_members/members_database/
- Kaufmann, D., Kraay, A. and Mastruzzi, M., 2010. *The Worldwide Governance Indicators : A Summary of Methodology, Data and Analytical Issues*. World Bank Policy Research Working Paper No. 5430. [pdf] Washington DC: World Bank. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130
- Kvaløy, B., Finseraas, H. and Listhaug, O., 2012. The publics' concern for global warming: A cross-national study of 47 countries. *Journal of Peace Research*, 49(1), pp.11-22.
- Kydland, F., Prescott, E.C., 1977. Rules rather than discretion: the inconsistency of optimal plans. *Journal of Political Economy*, 85(3), pp.473–491.
- Lee, T. M., Markowitz, E. M., Howe, P. D., Ko, C. Y., and Leiserowitz, A. A., 2015. Predictors of public climate change awareness and risk perception around the world. *Nature Climate Change*, 5(11), pp.1014-1020.
- Leiserowitz, A., 2007. International public opinion, perception, and understanding of global climate change. *Human development report 2007/2008*, pp.1-40. Available at: http://www.climateaccess.org/sites/default/files/Leiserowitz_International%20Public%20Opinion.pdf
- Lockwood, M., 2015. The political dynamics of green transformations. In *'The Politics of Green Transformations'* (Scoones, I., Leach, M. and Newell, P. eds). London and New York: Routledge.
- Majone, G., 1996. *Temporal consistency and policy credibility: why democracies need non-majoritarian institutions*. [pdf] Florence (IT): European University Institute. Available at: <http://www.eui.eu/Documents/RSCAS/Publications/WorkingPapers/9657.pdf>
- Meckling, J., 2011. *Carbon coalitions: Business, climate politics, and the rise of emissions trading*. MIT Press.
- Mitchell, R.B., 2015. *International Environmental Agreements Database Project (Version 2014.3)*. [html] Available at: <http://iea.uoregon.edu/>

- Nachmany, M., Fankhauser, S., Davidová, J., Kingsmill, N., Landesman, T., Roppongi, H., Schleifer, P., Setzer, J., Sharman, A., Singleton, C.S., Sundaresan, J. and Townshend, T., 2015. *The 2015 Global Climate Legislation Study – A Review of Climate Change Legislation in 99 Countries*. [pdf and html] London: Grantham Research Institute on Climate Change and the Environment, Globe and Inter Parliamentary Union (IPU). Available at: http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2015/05/Global_climate_legislation_study_20151.pdf
- North, D., 1993. Institutions and credible commitment. *Journal of Institutional and Theoretical Economics*, 149(1), pp.11–23.
- Organisation for Economic Co-operation and Development (OECD), 2015. *Climate Change Mitigation: Policies and Progress*. Paris: OECD.
- Park, C., Park, C., Lee, J. and Chung, C., 2015. Is “legitimized” policy always successful? Policy legitimacy and cultural policy in Korea. *Policy Sciences*, 48, pp.319–338.
- Pelham, B., 2009. *Awareness, Opinions About Global Warming Vary Worldwide*. [html] Available at: <http://www.gallup.com/poll/117772/Awareness-Opinions-Global-Warming-Vary-Worldwide.aspx>
- Property Right Alliance, 2015. *The International Property Rights Index 2015*. [html]. Available at: <http://internationalpropertyrightsindex.org/blog>
- PRS Group, 2014. *International Country Risk Guide*. [html] Available at: <https://www.prsgroup.com/about-us/our-two-methodologies/icrg>
- Schreurs, M. A., and Tiberghien, Y., 2007. Multi-level reinforcement: explaining European Union leadership in climate change mitigation. *Global Environmental Politics*, 7(4), pp.19-46.
- Stern, N. and Zenghelis, D., 2011. City solutions to Global problems. In: *Living in the endless city* (Burdett, R., Sudjic, D., and Cavusoglu, O. Eds). Phaidon Press.
- Tsebelis, G., 2002. *Veto Players: How Political Institutions Work*. Princeton, NJ: Princeton University Press.
- Transparency International, 2014. *Corruption Perceptions Index 2014: Results*. [html] Available at: <http://www.transparency.org/cpi2014/results>
- United Nations Environment Programme (UNEP), 2015. *The Emission Gap Report 2015 – Executive Summary*. [pdf] Nairobi: UNEP. Available at: http://uneplive.unep.org/media/docs/theme/13/EGR_2015_ES_English_Embargoed.pdf
- United Nations Framework Convention on Climate Change (UNFCCC), 2012. *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011- Addendum Part Two: Action taken by the Conference of the Parties at its seventeenth session*. FCCC/CP/2011/9/Add.1. [pdf] Bonn: UNFCCC. Available at: <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf>
- United Nations Framework Convention on Climate Change (UNFCCC), 2014. *Report of the Conference of the Parties on its twentieth session, held in Lima from 1 to 14 December 2014 – Addendum Part two: Action taken by the Conference of the Parties at its twentieth session – Decisions adopted by the Conference of the Parties*. FCCC/CP/2014/10/Add.1. [pdf] Bonn: UNFCCC. Available at: <http://unfccc.int/resource/docs/2014/cop20/eng/10a01.pdf>
- United Nations Framework Convention on Climate Change (UNFCCC), 2014b. *Handbook on Measurement, Reporting and Verification for developing Country Parties*. [pdf] Bonn: UNFCCC. Available at: http://unfccc.int/files/national_reports/annex_i_natcom/_application/pdf/non-annex_i_mrv_handbook.pdf
- United Nations Framework Convention on Climate Change (UNFCCC), 2015a. *Synthesis report on the aggregate effect of the intended nationally determined contributions*. FCCC/CP/2015/7. [pdf] Available at: <http://unfccc.int/resource/docs/2015/cop21/eng/07.pdf>
- United Nations Framework Convention on Climate Change (UNFCCC), 2015b. *National Inventory Submissions 2015*. [html] Available at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php
- United Nations Framework Convention on Climate Change (UNFCCC), 2015c. *Promoting Transparency and Accountability – The measurement, reporting, and verification framework for developing countries under the Convention*. [html] Available at: http://unfccc.int/national_reports/non-annex_i_natcom/items/2716.php
- United Nations Framework Convention on Climate Change (UNFCCC), 2015d. *Non Annex 1 National Communications*. [html] Available at: http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php

- United Nations Framework Convention on Climate Change (UNFCCC), 2015e. *Submitted biennial update reports (BURs) from non-Annex I Parties*. [html] Available at: http://unfccc.int/national_reports/non-annex_i_natcom/reporting_on_climate_change/items/8722.php
- United Nations Framework Convention on Climate Change (UNFCCC), 2015f. *INDCs as communicated by Parties*. [html] Available at: <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>
- United Nations Framework Convention on Climate Change (UNFCCC), 2015g. Adoption of the Paris Agreement. FCCC/CP/2015/L.9/Rev.1. [pdf] Bonn: UNFCCC. Available at: <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>
- United Nations Statistical Division, 2015a. *Detailed structure and explanatory notes – ISIC Rev.3 code C*. [html] Available at: <http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=2&Lg=1&Co=C>
- United Nations Statistical Division, 2015b. *Table 2.1 Value added by industries at current prices (ISIC Rev. 3)*. [html] Available at: http://data.un.org/Data.aspx?d=SNA&f=group_code%3a201%3bitem_code%3a2
- United Nations Statistical Division, 2015c. *Value added*. [html] Available at: <http://data.un.org/Data.aspx?d=UNIDO&f=tableCode%3a20>
- United Nations Statistical Division, 2015d. *Table 2.4 Value added by industries at current prices (ISIC Rev. 4)*. [html] Available at: http://data.un.org/Data.aspx?d=SNA&f=group_code%3a204%3bitem_code%3a26
- United Nations Industrial Development Organization, 2013. *INDSTAT4 Industrial Statistics Database (Edition: 2013)*. UK Data Service. [html] Available at: <http://dx.doi.org/10.5257/unido/indstat4/2013>
- Ward, H., and Cao, X., 2012. Domestic and international influences on green taxation. *Comparative Political Studies*, 45(9), pp.1075-1103.
- World Bank, 2015a. *The Worldwide Governance Indicators*. [html] Available at: <http://info.worldbank.org/governance/wgi/index.aspx#home>
- World Bank, 2015b. *Population, total*. [html] Available at: <http://data.worldbank.org/indicator/SP.POP.TOTL>
- World Bank, 2015c. *The Worldwide Governance Indicators, 2015 Update – Aggregate Governance Indicators 1996-2014*. [html] Available at: <http://info.worldbank.org/governance/wgi/index.aspx#home>
- Zenghelis, D. and Stern, N., 2015. *Climate change and cities: a prime source of problems, yet key to a solution*. [html] The Guardian, Thursday 19 November 2015. Available at: <http://www.theguardian.com/cities/2015/nov/17/cities-climate-change-problems-solution>

Annex 1 – Methodology: scoring system

The tables below summarises the scoring system used for the credibility assessment.

A. Rules and procedures

Determinant 1: Legislative and policy

- High-level vision

	Yes	No
Framework legislation	<i>Fully supportive</i>	<i>Not supportive</i>
Source: Nachmany et al. (2015)		

- Economy-wide emission reduction targets

Targets	Legislative strength		
	All informal	At least one formal target	Long and short formal targets
No target	<i>Not supportive</i>		
Sectoral target(s) only	<i>Slightly supportive</i>		
Overall target(s)	<i>Moderately supportive</i>	<i>Largely supportive</i>	<i>Fully supportive</i>
Source: Nachmany et al. (2015)			

- Carbon pricing policies

Economy wide	Sectoral policy	Fossil fuel subsidies (average \$million/GDP)	
		Less than 1.3%	1.3% or above
Carbon pricing (national)	Yes	<i>Fully supportive</i>	<i>Largely supportive</i>
	No	<i>Largely supportive</i>	<i>Moderately supportive</i>
Carbon pricing (sub-national)	Yes	<i>Largely supportive</i>	<i>Moderately supportive</i>
	No	<i>Moderately supportive</i>	<i>Slightly supportive</i>
Other (non-pricing) policies	Yes	<i>Moderately supportive</i>	<i>Slightly supportive</i>
	No	<i>Slightly supportive</i>	<i>Not supportive</i>
No policy	Yes	<i>Slightly supportive</i>	<i>Not supportive</i>
	No	<i>Not supportive</i>	<i>Not supportive</i>
Note: 1.3% is the world average ratio of fossil fuel subsidies over GDP, based on IMF (2015) [REF]			
Source: Nachmany et al. (2015); Coady et al. (2015)			

Determinant 2: Process

- Mechanism for building buy-in from stakeholders

INDC Consultation	Voice and accountability			
	-2.50 to -1.26	-1.25 to -0.01	0 to 1.25	1.25 to 2.50
Yes	<i>Slightly supportive</i>	<i>Moderately supportive</i>	<i>Largely supportive</i>	<i>Fully supportive</i>
No	<i>Not supportive</i>	<i>Slightly supportive</i>	<i>Moderately supportive</i>	<i>Largely supportive</i>

Source: World Bank (2015c); UNFCCC (2015a)

- Stable/consistent/not easily reversible law and policy-making process

	0 (low constraints)			1 (high constraints)	
Political constraints	<i>Not supportive</i>	<i>Slightly supportive</i>	<i>Moderately supportive</i>	<i>Largely supportive</i>	<i>Fully supportive</i>

Source: Henisz (2002; 2015)

- Transparent, consistent and effective administrative and enforcement mechanisms

This is an average of the scores from the following indicators:

	13	8 to 12	4 to 7	1 to 3	0 or older than 2003
Number of National Communications and BUR (non Annex I) and GHG Inventories (Annex I)	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>

Source: UNFCCC (2015b; 2015d; 2015e)

Quality of bureaucracy index (0-4)	4 (low risk)				0 (high risk)
	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>

Source: PRS (2014)

Corruption Perception Index (0-100)	100 (low corruption)			0 (high corruption)	
	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>

Source: Transparency International (2014)

Law and order index (0-6)	6 (strong)				0 (weak)
	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>

Source: PRS (2014)

International property rights index (0-10)	10 (strong rights)					0 (weak rights)
	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>	
Source: Property Right Alliance (2015)						

B. Players and organisations

Determinant 3: Public bodies

Dedicated climate change body	Consultative body		
	Independent	Non-independent	None
Yes	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>
No	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>
Source: Nachmany et al. (2015)			

Determinant 4: Private bodies

Carbon lobby (Value Added/GDP)	Environmental lobby (IUCN/10 million inhabitants)		
	More than 4	2 to 4	Less than 2
Less than 20%	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>
20-60%	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>
More than 60%	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>
Source: World Bank, 2015; IUCN (2015); United Nations Industrial Development Organization (2013); United Nations Statistical Division (2015a; 2015b; 2015c; 2015d)			

C. Norms and public opinion

Determinant 5: International engagement

- Commitment to UNFCCC initiatives

Withdrawn	Signed/committed to				
	4	3	2	1	None
None	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>
Some or all	<i>Slightly supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>	<i>Not supportive</i>	<i>n/a</i>
Source: Authors					

- Participation in Multilateral Environmental Agreements (MEAs)

Number of ratifications	Number of withdrawals		
	2 or less	3 to 4	More than 4
More than 100	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>

60 to 100	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>
Less than 60	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>
Source: Mitchell (2015)			

Determinant 6: Public opinion

Aware of climate change and:			
Seriousness of climate change	Caused by human activity		
	60% or above	60% to 35%	Below 35%
70% or above	<i>Fully supportive</i>	<i>Largely supportive</i>	<i>Moderately supportive</i>
50% to 70%	<i>Largely supportive</i>	<i>Moderately supportive</i>	<i>Slightly supportive</i>
Below 50%	<i>Moderately supportive</i>	<i>Slightly supportive</i>	<i>Not supportive</i>
<p>Note: For the combination 'Aware of climate change' and that is 'Caused by human activity': 39% is the world average; 59% is the 90th percentile; aware of climate change and of the 'Seriousness of climate change': 49% is the world average; 73% is the 90th percentile. No data was available for the European Union as an aggregate; therefore results are an average of individual Member States.¹⁵</p>			
Source: Lee et al, 2015			

D. Past performance

Determinant 7: Past UNFCCC performance

	Kyoto Protocol ratified and:			Kyoto not ratified/ withdrawn/not met
	Annex B: Target met	Others: Biennial report submitted	Others: biennial report not submitted (nA1)	
Achievement of UNFCCC mitigation requirements	<i>Fully supportive</i>	<i>Fully supportive</i>	<i>Moderately supportive</i>	<i>Not supportive</i>
Source: UNFCCC (2015e); Morel and Shishlov (2014)				

Determinant 8: No history of policy abolition

	Yes	No
Abolition of climate change legislation	<i>Fully supportive</i>	<i>Not supportive</i>
Source: Authors		

14 Based on 23 Member States. Data were missing for: Bulgaria; Croatia; Cyprus; Slovak Republic; and Slovenia.

Annex 2 – Estimated carbon reductions

In Chapter 3.2, the score for three determinants of credibility ('Legislation and Policy' in Figure 7; 'Decision-making Processes' in Figure 8; and 'Public bodies' in Figure 9), as well as for the four elements in which the determinant are aggregated (Figure 11), are plotted against the potential emissions reductions that each country has pledged in their INDCs. The assessment of such emissions reductions requires:

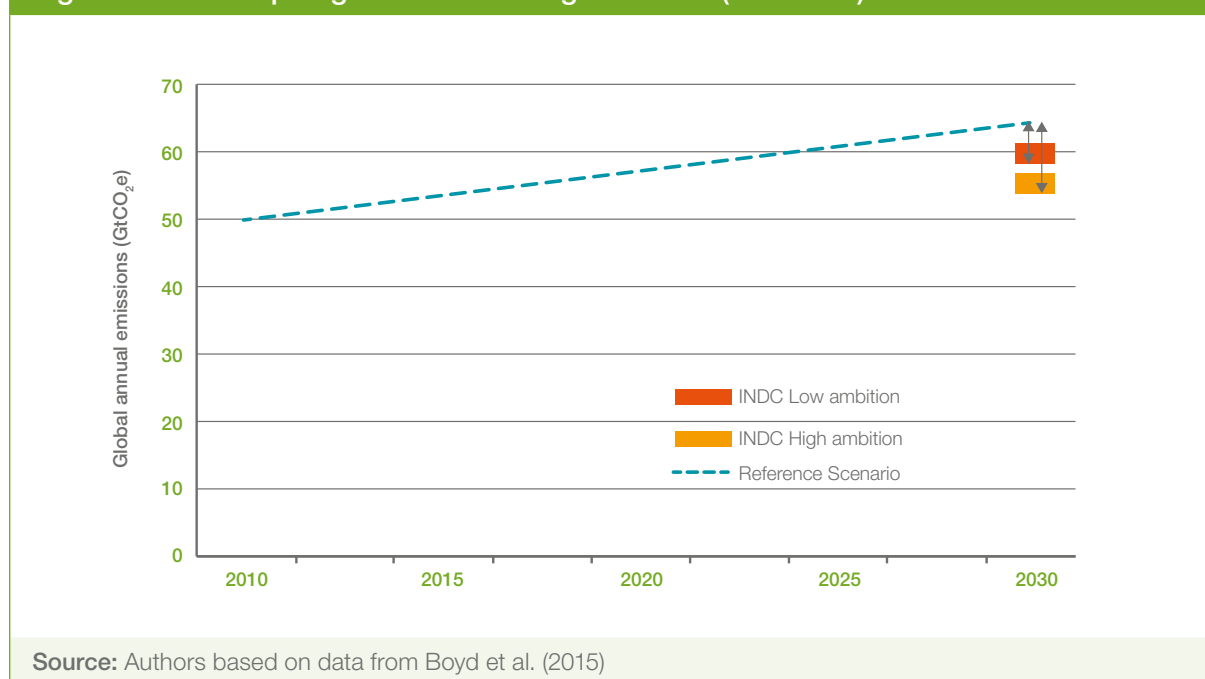
- an estimate of countries' emissions levels in 2030 according to their INDC's pledges
- an estimate of a reference case against which those future emissions levels compare to, in order to determine the level of 'reduction'.

The assessment of emissions reductions is complicated by the fact that countries express their INDCs' emissions targets in different ways: some countries refer to a reduction compared to a base-year (e.g. 2005); some to a reduction compared to a BAU scenario (often estimated by the countries themselves); some to a reduction in GDP carbon intensity; and some to an absolute level of emissions (e.g. million tonnes of CO₂eq.) for 2030.

This paper relies on the 2030 emissions levels estimated in a recent analysis by Boyd et al. (2015). These are compared to the BAUs stated by the countries themselves, whenever these are reported in their INDCs. When an INDC does not include such information, 'reference scenarios' developed by Boyd et al. (2015) are used as a proxy for the 2030 BAU of individual countries. These reference scenarios are built on the basis of countries' characteristics (such as current GHG emissions, GDP, population, etc.) and rely on comparable data from international databases (such as the OECD, IEA, etc.).

To illustrate the process, Figure 12 below shows the global reference (or BAU) scenario estimated by Boyd et al. (2015) and a high and low range of aggregate emissions levels pledged in the INDCs, for high and low levels of ambition. The arrows indicate the potential emissions reductions that could be achieved at global level.

Figure 12. Global pledged reductions against BAU (reference) scenario



For simplicity, this paper only takes into account INDCs' unconditional pledges. The table below summarizes the approach followed to estimate emission levels and BAU for each of the G20 countries:

Countries	Targets in INDC expressed in relation to:	Approach to estimate 2030 INDC emission levels	Approach to estimate 2030 BAU
Australia, Brazil, Canada, EU, Japan, Russia, US	Base year	Pledged percentage of historical emissions, as reported in UNFCCC Inventory and other official sources. In case of a range, the mid-value (average) is taken.	'Reference scenario' estimated by Boyd et al. (2015)
Argentina, Indonesia, South Korea, Mexico, Turkey	BAU	Pledged percentage of 2030 BAU levels as stated in the INDC. In case of a range, the mid-value (average) is taken.	BAU stated in INDCs.
China, India	GDP carbon intensity	GDP and emission data from national sources and modelling by Boyd et al. (2015).	'Reference scenario' estimated by Boyd et al. (2015)
South Africa	Absolute level	2030 emission levels stated in INDCs. In case of a range, the mid-value (average) is taken.	'Reference scenario' estimated by Boyd et al. (2015)
Source: Authors; for country-by-country detailed methodologies see Boyd et al. (2015)			

The estimated INDC emission levels, 2030 BAU scenarios and resulting emissions reductions are shown in the table below. The individual European Union Member States participating in the G20 (France, Germany, Italy and the UK) are not included, given that the INDC target applies to the whole of the European Union, while individual countries' contribution have not yet been defined.

As a word of caution, it should be stressed that this paper aims to provide an order of magnitude, rather than an exact assessment of emissions reductions. Notably, comparing an INDC's target with a country's own BAU scenario implies taking its commitments at face value. This may be an overestimate, as countries may be tempted to use higher BAU levels to be able to report more ambitious emissions reductions. Indeed, the BAU provided by some of the G20 countries in their INDCs are higher than the reference scenarios calculated by Boyd et al. (2015). Turkey is the most extreme case, where the BAU estimates in its INDC are nearly twice as high as reference scenario of Boyd et al.

Furthermore, for some countries, estimating a reference scenario was simply not possible due to lack of data and the discrepancies between the assumptions used in the countries' INDCs and in Boyd et al. (2015).

For instance, in the case of India, the limited amount of information supporting the target, together with some necessary simplifications in Boyd et al.'s reference scenario, resulted in their theoretical reference scenario to be lower than the estimated emission reduction in 2030. This highlights the challenge of defining BAU scenarios, especially for intensity projections based on growth rates which differ between projections. Because of the uncertainty around appropriate growth rates, the assessment for India and, for similar reasons, for Saudi Arabia could not be attempted.

Country	2030 BAU (Mt CO ₂)		2030 INDC emissions level (Mt CO ₂)			Emissions reduction (Mt CO ₂)	
	INDC BAU (if available)	Reference scenario	INDC scenario (low)	INDC scenario (high)	INDC scenario (average)	Reduction vs INDCs' BAU	Reduction vs Reference scenario
Argentina	670	–	570	570	570	101	–
Australia	–	649	453	441	447	–	202
Brazil	–	2,576	1,172	1,172	1,172	–	1,404
Canada	–	959	579	579	579	–	380
China	–	16,588	14,294	12,810	13,552	–	3,036
EU	–	4,007	3,126	3,126	3,126	–	881
India	–	n/a	6,709	6,509	6,609	–	n/a
Indonesia	2,881	–	2,046	2,046	2,046	835	–
Japan	–	1,242	1,008	1,008	1,008	–	234
S. Korea	851	–	512	512	512	339	–
Mexico	973	–	759	759	759	214	–
Russia	–	2,643	2,577	2,406	2,492	–	151
S. Arabia	–	n/a			130/year	–	n/a
S. Africa	–	627	614	398	506	–	121
Turkey	1,175	–	929	929	929	246	
US	–	6,808	4,028	3,780	3,904	–	2,904

Source: Authors, based on Boyd et al. (2015) and UNFCCC (2015f)

The actual pledges, as reported in each individual INDC's, are briefly summarised below:

Country	Target type	Short description
China	Carbon intensity	Achieve the peaking of carbon dioxide emissions around 2030 and making best efforts to peak early; to lower carbon dioxide emissions per unit of GDP by 60-65% vs 2005 levels
US	Base year	Reduction of 26-28% below its 2005 level in 2025
EU	Base year	40% reduction on 1990 figure (this translates to 41% including LULUCF)
Argentina	BAU reduction	15% unconditional, and 30% conditional reduction on BAU of 670Mt in 2030
Australia	Base year	26% to 28% reduction on 2005 including LULUCF baseline. 441 and 453Mt of allowed emissions in 2030 (Australian Government's Department of Environment, 2015)
Brazil	Base year	Indicative 43% reduction on 2005.
Canada	Base year	30% reduction on 2005 target, excluding LULUCF baseline (This translates to -28% including LULUCF with net-net accounting rules).
India	Carbon intensity	Reduce the emission intensity of its GDP by 33-35% by 2030 from 2005 level
Indonesia	BAU reduction	29% to 41% reduction unconditional and conditional by 2030. BAU is 2881Mt in 2030
Japan	Base year	26% reduction on 2013 level excluding LULUCF (this translates to 20.3% reduction on 2005 level including LULUCF)
South Korea	BAU reduction	37% reduction on 2030 BAU. BAU given in INDC is 850.6Mt, excluding LULUCF (this translates to 512Mt including LULUCF)
Mexico	BAU reduction	Unconditional: Reduction of 22% GHG and 51% black carbon (25% in total) vs BAU. Conditional: 36% GHG and 70% black carbon (40% in total) vs BAU. Baseline 2030: 973 Mt GHG and 137 Mt black carbon (total 1110 MtCO ₂)
Russian Federation	Base year	Reduction of 25-30% of 1990 levels by 2030
Saudi Arabia	Absolute level	Mitigation co-benefit ambitions of up to 130Mt CO ₂ eq. avoided by 2030 annually though economic diversification and adaptation
South Africa	Absolute level	Between 398 and 614 Mt CO ₂ eq.
Turkey	BAU reduction	21% reduction on BAU by 2030. 2030 BAU are 1175 Mt, hence 2030 target emissions are 929 Mt
Source: UNFCCC, 2015f		

Annex 3 – Country overview: summary tables

		CHINA	UNITED STATES	EUROPEAN UNION	ARGENTINA	AUSTRALIA	BRAZIL	CANADA	
A	Rules and procedures	Moderately supportive 2.1	Moderately supportive 2.2	Largely supportive 3.5	Slightly supportive 1.2	Moderately supportive 2.2	Moderately supportive 2.0	Moderately supportive 2.3	
1	Legislation and policy	Largely supportive 3.3	Moderately supportive 1.7	Fully supportive 4.0	Slightly supportive 0.7	Slightly supportive 1.3	Largely supportive 2.7	Slightly supportive 1.3	
	High-level vision	Fully supportive 4.0	Not supportive 0.0	Fully supportive 4.0	Not supportive 0.0	Not supportive 0.0	Fully supportive 4.0	Not supportive 0.0	
	Economy-wide emission reduction targets	Largely supportive 3.0	Moderately supportive 2.0	Fully supportive 4.0	Slightly supportive 1.0	Moderately supportive 2.0	Largely supportive 3.0	Slightly supportive 1.0	
	Carbon pricing policies	Largely supportive 3.0	Largely supportive 3.0	Fully supportive 4.0	Slightly supportive 1.0	Moderately supportive 2.0	Slightly supportive 1.0	Largely supportive 3.0	
2	Process	Slightly supportive 0.9	Largely supportive 2.8	Largely supportive 3.2	Moderately supportive 1.8	Largely supportive 3.0	Slightly supportive 1.4	Largely supportive 3.3	
	Mechanism for building buy-in from stakeholders	Slightly supportive 1.0	Largely supportive 3.0	Largely supportive 3.0	Largely supportive 3.0	Fully supportive 4.0	Moderately supportive 2.0	Fully supportive 4.0	
	Stable/consistent-not easily reversible law and policy-making process	Not supportive 0.0	Moderately supportive 2.1	Fully supportive 3.6	Slightly supportive 0.9	Moderately supportive 1.5	Not supportive 0.5	Moderately supportive 2.3	
	Transparent, consistent and effective administrative and enforcement mechanisms	Moderately supportive 1.6	Largely supportive 3.5	Largely supportive 3.2	Slightly supportive 1.5	Fully supportive 3.6	Moderately supportive 1.7	Fully supportive 3.6	
B	Players and organisations	Slightly supportive 1.0	Moderately supportive 2.0	Fully supportive 4.0	Moderately supportive 2.0	Fully supportive 3.5	Moderately supportive 2.0	Largely supportive 2.5	
3	Public bodies	Moderately supportive 1.8	Moderately supportive 2.0	Fully supportive 4.0	Slightly supportive 1.0	Fully supportive 4.0	Largely supportive 3.0	Moderately supportive 2.0	
4	Private bodies	Not supportive 0.0	Moderately supportive 2.0	Fully supportive 4.0	Largely supportive 3.0	Largely supportive 3.0	Slightly supportive 1.0	Largely supportive 3.0	
C	Norms and public opinion	Moderately supportive 1.8	Moderately supportive 1.8	Largely supportive 2.8	Largely supportive 3.3	Largely supportive 2.8	Largely supportive 3.0	Moderately supportive 1.8	
5	International engagement	Largely supportive 2.5	Moderately supportive 1.5	Fully supportive 3.5	Largely supportive 2.5	Largely supportive 2.5	Moderately supportive 2.0	Slightly supportive 0.5	
	Commitment to UNFCCC initiatives	Fully supportive 4.0	Moderately supportive 2.0	Fully supportive 4.0	Largely supportive 3.0	Fully supportive 4.0	Largely supportive 3.0	Not supportive 0.0	
	Participation in MEAs	Slightly supportive 1.0	Slightly supportive 1.0	Largely supportive 3.0	Moderately supportive 2.0	Slightly supportive 1.0	Slightly supportive 1.0	Slightly supportive 1.0	
6	Public opinion	Slightly supportive 1.0	Moderately supportive 2.0	Moderately supportive 2.0	Fully supportive 4.0	Largely supportive 3.0	Fully supportive 4.0	Largely supportive 3.0	
D	Past performance	Largely supportive 3.0	Moderately supportive 2.0	Fully supportive 4.0	Moderately supportive 2.0	Moderately supportive 2.0	Fully supportive 4.0	Not supportive 0.0	
7	Past UNFCCC performance	Moderately supportive 2.0	Not supportive 0.0	Fully supportive 4.0	Not supportive 0.0	Fully supportive 4.0	Fully supportive 4.0	Not supportive 0.0	
8	No history of policy abolition	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Not supportive 0.0	Fully supportive 4.0	Not supportive 0.0	

		INDIA	INDONESIA	JAPAN	KOREA	MEXICO	RUSSIA	SAUDI ARABIA
A	Rules and procedures	Moderately supportive 2.5	Moderately supportive 2.2	Largely supportive 3.1	Largely supportive 3.1	Largely supportive 3.1	Moderately supportive 2.9	Not supportive 2.0
1	Legislation and policy	Largely supportive 3.3	Moderately supportive 2.3	Largely supportive 3.3	Fully supportive 3.7	Fully supportive 4.0	Moderately supportive 4.0	Not supportive 2.3
	High-level vision	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Not supportive 4.0
	Economy-wide emission reduction targets	Moderately supportive 2.0	Moderately supportive 2.0	Moderately supportive 2.0	Largely supportive 3.0	Fully supportive 4.0	Largely supportive 4.0	Slightly supportive 3.0
	Carbon pricing policies	Fully supportive 4.0	Slightly supportive 1.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Not supportive 4.0	Not supportive 0.0
2	Process	Moderately supportive 1.6	Moderately supportive 2.1	Largely supportive 3.0	Largely supportive 2.6	Moderately supportive 1.7	Moderately supportive 1.7	Slightly supportive 0.7
	Mechanism for building buy-in from stakeholders	Moderately supportive 2.0	Moderately supportive 2.0	Largely supportive 3.0	Largely supportive 3.0	Moderately supportive 2.0	Slightly supportive 2.0	Not supportive 1.0
	Stable/consistent-not easily reversible law and policy-making process	Slightly supportive 1.1	Largely supportive 2.8	Moderately supportive 2.4	Moderately supportive 2.2	Slightly supportive 1.3	Moderately supportive 2.2	Not supportive 0.0
	Transparent, consistent and effective administrative and enforcement mechanisms	Moderately supportive 1.9	Slightly supportive 1.5	Largely supportive 3.5	Largely supportive 2.6	Moderately supportive 1.9	Moderately supportive 1.8	Moderately supportive 2.0
B	Players and organisations	Moderately supportive 2.0	Slightly supportive 1.0	Largely supportive 2.5	Largely supportive 3.0	Moderately supportive 2.0	Moderately supportive 2.0	Slightly supportive 1.0
3	Public bodies	Largely supportive 3.0	Moderately supportive 2.0	Largely supportive 3.0	Largely supportive 3.0	Largely supportive 3.0	Largely supportive 3.0	Moderately supportive 2.0
4	Private bodies	Slightly supportive 1.0	Not supportive 0.0	Moderately supportive 2.0	Largely supportive 3.0	Slightly supportive 1.0	Slightly supportive 1.0	Not supportive 0.0
C	Norms and public opinion	Slightly supportive 1.0	Slightly supportive 1.0	Largely supportive 2.8	Largely supportive 3.3	Largely supportive 2.5	Largely supportive 2.5	Slightly supportive 1.0
5	International engagement	Moderately supportive 2.0	Moderately supportive 2.0	Moderately supportive 1.5	Largely supportive 2.5	Largely supportive 3.0	Largely supportive 3.0	Moderately supportive 2.0
	Commitment to UNFCCC initiatives	Largely supportive 3.0	Fully supportive 4.0	Largely supportive 3.0	Fully supportive 4.0	Fully supportive 4.0	Largely supportive 3.0	Moderately supportive 2.0
	Participation in MEAs	Slightly supportive 1.0	Not supportive 0.0	Not supportive 0.0	Slightly supportive 1.0	Moderately supportive 2.0	Largely supportive 3.0	Moderately supportive 2.0
6	Public opinion	Not supportive 0.0	Not supportive 0.0	Fully supportive 4.0	Fully supportive 4.0	Moderately supportive 2.0	Moderately supportive 2.0	Not supportive 0.0
D	Past performance	Largely supportive 3.0	Largely supportive 3.0	Moderately supportive 2.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Largely supportive 3.0
7	Past UNFCCC performance	Moderately supportive 2.0	Moderately supportive 2.0	Not supportive 0.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Moderately supportive 2.0
8	No history of policy abolition	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0	Fully supportive 4.0

		SOUTH AFRICA	TURKEY	FRANCE	GERMANY	ITALY	UK
A	Rules and procedures	Moderately supportive	Moderately supportive	Largely supportive	Fully supportive	Largely supportive	Fully supportive
1	Legislation and policy	Largely supportive	Moderately supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive
	High-level vision	Fully supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive
	Economy-wide emission reduction targets	Moderately supportive	Slightly supportive	Largely supportive	Fully supportive	Largely supportive	Fully supportive
	Carbon pricing policies	Moderately supportive	Slightly supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive
2	Process	Moderately supportive	Moderately supportive	Largely supportive	Largely supportive	Moderately supportive	Largely supportive
	Mechanism for building buy-in from stakeholders	Largely supportive	Slightly supportive	Largely supportive	Fully supportive	Largely supportive	Fully supportive
	Stable/consistent-not easily reversible law and policy-making process	Moderately supportive	Slightly supportive	Moderately supportive	Moderately supportive	Moderately supportive	Moderately supportive
	Transparent, consistent and effective administrative and enforcement mechanisms	Moderately supportive	Moderately supportive	Largely supportive	Largely supportive	Moderately supportive	Fully supportive
B	Players and organisations	Largely supportive	Moderately supportive	Largely supportive	Largely supportive	Largely supportive	Fully supportive
3	Public bodies	Moderately supportive	Moderately supportive	Slightly supportive	Largely supportive	Moderately supportive	Fully supportive
4	Private bodies	Largely supportive	Moderately supportive	Fully supportive	Largely supportive	Largely supportive	Fully supportive
C	Norms and public opinion	Moderately supportive	Moderately supportive	Largely supportive	Largely supportive	Largely supportive	Largely supportive
5	International engagement	Largely supportive	Moderately supportive	Fully supportive	Fully supportive	Largely supportive	Largely supportive
	Commitment to UNFCCC initiatives	Fully supportive	Slightly supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive
	Participation in MEAs	Moderately supportive	Moderately supportive	Largely supportive	Fully supportive	Moderately supportive	Slightly supportive
6	Public opinion	Not supportive	Moderately supportive	Largely supportive	Moderately supportive	Largely supportive	Largely supportive
D	Past performance	Fully supportive	Largely supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive
7	Past UNFCCC performance	Fully supportive	Moderately supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive
8	No history of policy abolition	Fully supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive	Fully supportive

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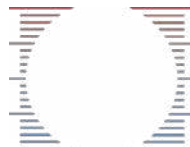
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