



Assessing the INDCs: a comparison of different approaches

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Abstract

The “Intended nationally determined contributions” (INDCs) communicated by both developing and developed countries represent a crucial element of the Paris agreement. This brief aims at analysing the INDCs submitted by Parties, through the different tools and approaches proposed by the research community. In particular, our analysis looks at the different ways to assess the effectiveness of the proposed emission reduction pledges, both in terms of aggregate and national efforts. However, we also consider other factors that will be critical in determining the success of the Paris talks, such as the coherence and fairness of single contributions.

1. Introduction

From November 30th to December 11th, world leaders gathered in Paris to work jointly towards the definition of a new, comprehensive climate agreement that will guide international action from 2020 onward. The foundation of the agreement lays on the so-called "Intended nationally determined contributions", INDCs, which represent the pledges through which both developed and developing countries declare the actions they intend to undertake to tackle climate changes.

In setting the stage for the Paris deal, the Parties were required to communicate their INDCs "well in advance" of the start of negotiations. As of December 10, 2015, 158 Parties, representing 186 of the 196 UNFCCC members, have submitted their INDCs to the Convention. By this point, national contributions that have been communicated cover more than 95% of global GHG emissions, enough to have a clear overview of national and aggregate efforts.¹

At the end of October, the UNFCCC published a synthesis report of the aggregate effect of contributions submitted by October 1st.² The document focuses on a total of 147 Parties (including the European Union's 28 Member States), which represent 75% of UNFCCC Parties and cover 80% of the global emissions in 2010. The report pointed out that, despite the broad and **unprecedented involvement** of countries in such a global effort, the mitigation actions that have been submitted will **not be sufficient to keep the world's emissions below the 2°C trajectory**. Not all the contributions specify a quantitative mitigation goal, as some governments, especially among the least developing countries, have proposed adaptation as their main priority for addressing climate change.

Beyond the analysis of the aggregate effect, INDCs offer many interesting insights that are worth analysing. The research community has, indeed, released a range of studies on INDCs, in order to facilitate the understanding of national efforts to curb emissions by 2030 and offer a rating of commitments from different perspectives.

2. Overview of the submitted INDCs

One of the first key insights is that the participation of countries is significantly higher than in previous attempts to build a coordinated international action. Current major emitting countries have submitted a mitigation pledge, which means that the Paris agreement sees for the first time the **top 5 emitters - EU, US, China, India and Russia - cooperating together** to reduce GHG emissions.

Table 1: Top emitting countries' INDC

Country	GHG emissions reduction target	Target year	Reference year
China	60-65% per unit of GDP	2030	2005
United States	26-28%	2025	2005
EU (28)	≥40%	2030	1990
India	33-35% per unit of GDP	2030	2005
Russia	25-30%	2030	1990
Indonesia	29-41%	2030	BAU
Brazil	37% 43%	2025 2030	2005
Japan	26%	2030	2013
Canada	30%	2030	2005
Mexico	22-36%	2030	BAU (from 2013)

¹ CAIT Climate Data Explorer

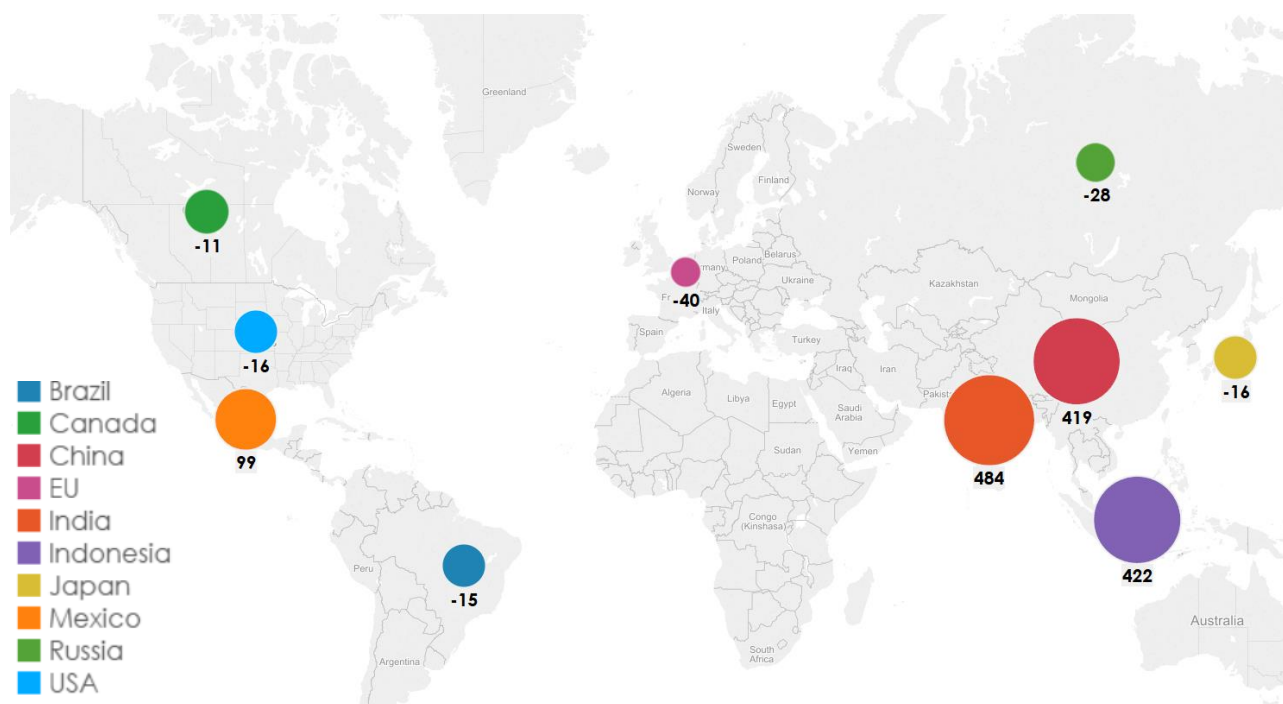
² UNFCCC, 2015. Synthesis report on the aggregate effect of the intended nationally determined contributions, [FCCC/CP/2015/7](https://unfccc.int/kyotoprotocol/items/6822.php)

Another aspect that stands out when evaluating INDCs is the **wide heterogeneity among submissions**, both in terms of scope and coverage of mitigation efforts. While developed countries generally express their contributions in the form of a quantified economy-wide mitigation effort compared to a reference year, developing countries usually formulate their pledges in terms of emission intensity or link their emission reduction target to a Business-as-Usual (BaU) scenario. With reference to INDCs that present a quantitative decrease in emissions, **different base years** have been proposed. Contributions also show **differences in GHG coverage**, as some INDCs cover only specific sectors or gases. A controversial element is represented by the **emissions from the Land Use, Land Use Change and Forestry (LULUCF)** sector. In general, taking into account emissions from LULUCF would soften mitigation efforts. This heterogeneity clearly shrinks data comparability and transparency of commitments.

3. Comparative analysis of mitigation efforts

Since mitigation actions included in the INDCs are expressed by using different metrics, it is difficult to understand how ambitious the single efforts proposed by countries are. Figure 1 facilitates the task by presenting a comparison of the efforts of major emitters, putting them on an equal footing. When pledges are **compared to 1990**, figure 1 shows that the **European Union** stands out as the first Party in terms of commitment, while both **China and India crucially increase their GHG** in absolute terms by 2030. Of course, since China and India have proposed a reduction in terms of CO₂ intensity, the assessment is highly influenced by **GDP estimates in 2030**.

Figure 1: Mitigation efforts with reference to 1990 emission levels (by percentage), top emitters



Mitigation efforts change also when comparing data **in terms of carbon intensity** (i.e. normalized on GDP). As a general trend, developing countries commit to the highest mitigation efforts per unit of GDP. This can explain why China and India prefer to express their INDCs in terms of reduction per GDP.

4. Assessing the ambition of INDCs mitigation contributions

In the attempt to compare the ambition and efficiency of the submitted efforts, many studies provide an overview of the **impact of INDCs on global temperatures** by assessing their adequacy and effectiveness in reaching an objective that is generally consistent with the main aim of the Convention and the IPCC's recommendation to keep global warming below 2°C above pre-industrial temperatures. Overall these assessments agree on the fact that the INDCs are not sufficient to remain under the 2°C threshold. Table 3 summarizes and compares five of these research efforts: the official UNFCCC assessment report, the recently published UNEP Gap Report 2015, the Climate Action Tracker (CAT), Climate Interactive's "Climate scoreboard", and the energy related estimates provided by the International Energy Agency (IEA). In particular, the analyzed studies estimate an emissions gap between the full implementation of unconditional INDCs' mitigation actions and the least-cost emission path to the 2°C target in 2030 in the range of **14 - 16 Gt CO₂eq** on average³. These figures are in some cases then translated into estimated temperature increase above pre-industrial levels in 2100. Temperature **values range from 3.5°C**, as assessed by UNEP and Climate Interactive, to a more optimistic scenario projected by both CAT and the IEA leading to **2.6/2.7 °C**.

Table 2: Comparison of estimates of global emission gap and global temperature according to different tools

	UNFCCC	UNEP	CAT	CLIMATE INTERACTIVE	IEA ⁴	Average value
Global emission gap wrt 2°C target by 2030 (average)	15 Gt CO ₂ eq	14 Gt CO ₂ eq	16 Gt CO ₂ eq	14 Gt CO ₂ eq	N/A	14.75 Gt CO ₂ eq
Global temperature by 2100	N/A	3.5° C	2.7° C	3.5° C	2.6° C	3.1° C

A different analysis can be derived by focusing on the **peaking year of emissions** led by the implementation of INDCs, which, according to the UNFCCC assessment report, will happen **in 2030**. Using data from the Energy and Climate Intelligence Unit (ECIU), analysis shows that under INDCs trend, keeping the temperature below 2° C by the end of the century would still be feasible but challenging: indeed, it would require an **annual reduction in emissions from 2030** onwards about three times higher than the maximum feasible rate estimated (3.5%)⁵.

5. A national perspective: between ambition, coherence and fairness

Beyond the rating of INDCs at a global level, some studies broaden their scope to the national framework by evaluating the contribution of each party to the global mitigation effort. These studies generally aim at a comprehensive assessment of national INDCs by analyzing also their **coherence and fairness**. According to the Netherland Agency PBL, the United States and China report the widest difference between the emission reduction proposed in their INDCs and the estimated level of emissions under current policies. On the contrary, **Brazil's and Indonesia's current policies** seem to be in line with their INDCs, although considerable uncertainty remains on LULUCF emissions (Table 4, column 2). According to CAT's rating of INDCs, that takes into consideration the abatement effect of current policies, the impact of INDCs on emissions and the fairness of efforts, **most of the commitments are considered inadequate**, including the contributions of four of the top-

³ UNEP, The Emissions Gap Report 2015, [Executive Summary](#)

⁴ Note that IEA reports only estimate for energy and process-related emissions, so they are not included in calculating the average value.

⁵ ECIU's [Emissions Peaking Tool](#).

ten largest emitters (Canada, Japan, Indonesia and the Russian Federation), whereas the INDCs of China, the US and the EU are rated as “medium” (Table 4, column 3).

Table 3: Comparison of different INDCs' ratings

CRITERIA COUNTRY	COHERENCE	IMPACT	FAIR SHARE	
	Difference between emission levels in 2030 through INDCs and current national policies [Gtons CO2 eq - average values]	1. Consistency of current policies on emissions; 2. Impact of INDC on emissions; 3. fairness of commitment towards 2°C	(a) INDCs' contribution to fair share	(b) INDCs mitigation efforts gap wrt fair share (percent)
	PBL	CAT	Oxfam	ClimateFairShares
BRAZIL	0,03	Medium	2/3	-47
CANADA	-0,19	Inadequate	N/A	-55
CHINA	-1,05	medium with inadequate carbon intensity target	>1	-15
EU	-0,47	Medium	1/5	-37 ⁶
INDIA	-0,37	Medium	1	-41
INDONESIA	-0,05	Inadequate	1	21
JAPAN	-0,10	Inadequate	1/10	-59
MEXICO	-0,21	Medium	N/A	-50
RUSSIAN FEDERATION	-0,28	Inadequate	0	-37
US	-1,72	Medium	1/5	-61

All the studies focusing on fair share agree that poorer and emerging countries have a right to the majority of the global carbon budget, while developed nations have already used almost the total amount of their fair portion. However, analyses differ on measuring single countries' fair share in the available global carbon budget. According to the index provided by Oxfam, which compares INDCs to an **equitable share of the global mitigation effort** consistent with the 2°C goal, the pledges of developed countries are far from representing a fair contribution, while efforts by developing countries generally correspond to their fair share or even exceed it, with the exception of Brazil⁷ (Table 4, column 4). Likewise, according to the **fair share index** developed by Climate Fair Shares, among the top-ten emitters **only Indonesia undertakes a fair effort**. The index, which is based on countries' **responsibilities, capacities and sustainable development**⁸, indicates that the contributions of the US, Canada and Japan show the greatest distance from a fair share (table 4, column 5).

6. Conclusions

The INDCs represent a breakthrough in terms of international efforts to curb future emissions and show a more ambitious endeavor towards de-carbonization as compared to the Copenhagen pledges. However, all the studies agree that current efforts are not sufficient to maintain global warming below the recommended level of 2°C by the end of the century. Even if it is assumed that the trend of emission reduction set out by INDCs is kept after 2030, global temperature is projected to reach **2.7 °C by 2100**.

⁶ Data referring to 2025. Data for 2030 are unavailable.

⁷ Oxfam international (2015), *A civil society equity review of INDCs*, Oxford, UK.

⁸ [Climate Fairshares solution](#)

INDCs should be therefore seen as a first step towards global climate action, in which periodical review aimed at scaling up contributions constitutes a crucial requirement. The examined studies can provide global leaders with the necessary information to analyze the possible impact of climate policies and understand what contribution is required for having a chance to reach the 2°C target by the end of the century. Reviewed studies particularly highlight the need for **upscaling mitigation commitment** by developed countries, in order to balance contributions and lay the groundwork for establishing a global cooperation on a fair basis. Besides, going beyond effectiveness and developing approaches that also take into account other dimensions, such as **coherence and fairness of the action**, will help countries to cooperate and play a proactive role in the global effort against climate change.

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