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Summary

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Keywords: Paris Agreement, INDCs, Mitigation, Ambition, Efficiency, Equity, Carbon Budget

JEL Classification: F50, F51, F53, K33

This paper has been prepared within the research activities of the International Center for Climate Governance (ICCG). The authors are grateful to Ramiro Parrado for useful assistance. The usual disclaimer applies.

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Alternative approaches for rating INDCs:

A comparative analysis

Marinella Davide * and Paola Vesco **

Abstract

The "Intended nationally determined contributions" (INDCs) communicated by both developing and developed countries represent a crucial element of the Paris agreement. This paper 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.

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1. Introduction

On December 12th, 2015, global leaders gathered at the 21st session of UNFCCC Conference of the Parties adopted a new, comprehensive climate agreement aimed at guiding the international action from 2020 onward. Crucial elements of the agreement are the so-called "Nationally determined contributions", NDCs, which represent the tools through which both developed and developing countries declare the actions they will undertake to tackle climate changes. In setting the stage for the Paris deal, the Parties were required to communicate "Intended nationally determined contributions" (INDCs) "well in advance" of the start of negotiations. As of December 15, 2015, 160 Parties, representing 187 of the 196 UNFCCC members, have submitted their INDCs to the Convention. National contributions need then to be confirmed and subsequently updated but, by this point, they cover more than 98% of global GHG emissions, enough to have a clear overview of national and aggregate efforts[1].

2. The UNFCCC Synthesis Report

The UNFCCC published its synthesis report on October 30, 2015 (UNFCCC, 2015). The 66-page document provides both qualitative and quantitative evaluations of the action plans submitted by October 1st. It therefore 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. According to the report, all of them provide information about mitigation actions, whereas 100 out of 119 contributions also contain adaptation measures. INDCs, therefore, show a clearly increasing trend towards introducing national policies and instruments for low-emission and climate-resilient development.

Comparing the proposed actions, the report states that emission growth resulting from the proposed INDCs is expected to slow down by a third in the 2010–2030 period, in comparison with the 1990–2010 period. In particular, the global emission level resulting from the INDCs is expected to amount on average to 56.7 Gt CO2eq in 2030. This means an increase in the range of 37–52% compared to 1990 levels.

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 temperature increase below the 2°C trajectory. In this regard, the report affirms that aggregate projected annual emissions resulting from the INDCs "do not fall within least-cost 2 °C scenarios by 2025 and 2030". It also adds that the temperature at the end of the century will depend heavily on many factors, including socioeconomic drivers, the development of technology and the longer term actions of countries, and concludes that "making such assumptions is beyond the scope of this report".

Overall, INDC-related emissions remain higher than the emission levels consistent with the least-cost 2°C scenarios by 15 (11 to 22) Gt CO2eq in 2030. Much greater mitigation efforts will therefore be required after 2030.

The report further analyses the adaptation components included in the INDCs. Some governments, especially among the least developing countries, have proposed it as their main

[1] CAIT Climate Data Explorer

priority for addressing climate change, in particular as they see strong linkages with national development, sustainability and security. Proposed actions cover both strengthening and scaling up existing efforts, as well as planning and implementation of new strategies, programmes and plans in the future. In particular, most Parties have committed themselves to formulating and implementing national adaptation plans (NAPs) by 2020. Often the most vulnerable sectors are identified, such as water, agriculture, biodiversity and health, while the most vulnerable communities turn out to be rural populations, in particular smallholders, women, the young and the elderly.

3. Overview of the submitted INDCs

Beyond the analysis on the aggregate effect, INDCs offer many interesting insights that are worth analysing.

First of all, the participation of countries is significantly higher than in previous attempts to build a coordinated international action, namely the Kyoto Protocol and the Cancun pledges. 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: Key emission figures and INDCs for top emitting countries

COUNTRY	DATA for 2012[2]				INDC		
	GHG emissions [MtCO2eq]	GHG emissions per capita [MtCO2eq/pop]	GDP PPP [constant 2005 US$]	Emission intensity [MtCO2eq/ 2005 trillion US$]	Percent reduction pledge	Base year	Target year
Brazil	1.012,55	5,10	1,17	865,43	-43	2005	2030
Canada	714,12	20,55	1,30	549,32	-30	2005	2030
China	10.975,50	8,13	4,56	2.406,91	from -60 to -65*	2005	2030
EU	4.399,15	8,70	14,94	294,45	-40	1990	2030
India	3.013,77	2,44	1,39	2.168,18	from -33 to -35*	2005	2030
Indonesia	760,81	3,08	0,43	1.769,33	-29	BAU	2030
Japan	1.344,58	10,54	4,70	286,08	-26	2013	2030
Mexico	723,85	5,99	1,03	702,77	-22	BAU	2030
Russian Federation	2.322,22	16,22	0,98	2.369,61	from -25 to -30	1990	2030
USA	6.235,10	19,86	14,14	440,95	from -26 to -28	2005	2025
Total major emitters	31501,65 (70% of global emissions)	10,06 (average)	44,64 (81% of global GDP)	1185,30 (average)			
Global	44.815,54	6,36 (average)	55,35	809,68 (average)			
* GHG/GDP target							

[2] CAIT Climate Data Explorer, 2012 emissions data.

Another aspect that stands out when evaluating INDCs is the wide heterogeneity among submissions, both in terms of scope and coverage of mitigation efforts. Although the original UNFCCC distinction between *Annex I* and *non-Annex I* countries has been overcome, differences endure between the efforts of developed and developing countries. First of all, 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. Among the latter there are also countries that do not specify a quantitative emission reduction commitment, while they focus on adaptation measures or propose alternative approaches. This is the case of Bolivia, which proposes the adoption of a "holistic development" as a new approach to reducing global emissions[3]. In line with this vision, Bolivia issues a Climate Justice Index aimed at assessing the fair contribution of each country to the global emission reduction target. The index is based on an assessment of country's ecological footprint, historical responsibility, development capacity, technological capacity and population. According to the index, *Annex I* countries are entitled to use 11% of the global CO2 budget, while *non-Annex I* countries have the right to exploit the remaining 89% of the budget.

With reference to INDCs that present a quantitative decrease in emissions, different base years have been proposed, since no binding rule has been established on this issue. Among the largest emitters, some countries, including China and India, take 2005 as reference year, EU and Russia relate their mitigation actions to 1990 levels of emissions, while Japan to 2013. This heterogeneity clearly shrinks data comparability and transparency of commitments.

Contributions also show differences in GHG coverage, as some of them 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. The only significant exception is Brazil, which shows a considerable increase in its emissions reduction effort when including the LULUCF sector, since the vast extent of its forests, covering 59% of Brazilian territory, operate as carbon sinks. As the Union of Concerned Scientists has pointed out, the top-ten major emitters have scope for increasing their removal capacity from land sector: particularly, United States and Canada, followed by China, India and Indonesia (Ferretti-Gallon and Boucher, 2015a). However, among these countries, only China and India detail their objectives concerning LULUCF, while Canada and United Stated do not declare any specific mitigation effort for the land sector, or any detailed action on afforestation and reforestation (Ferretti-Gallon and Boucher, 2015b).

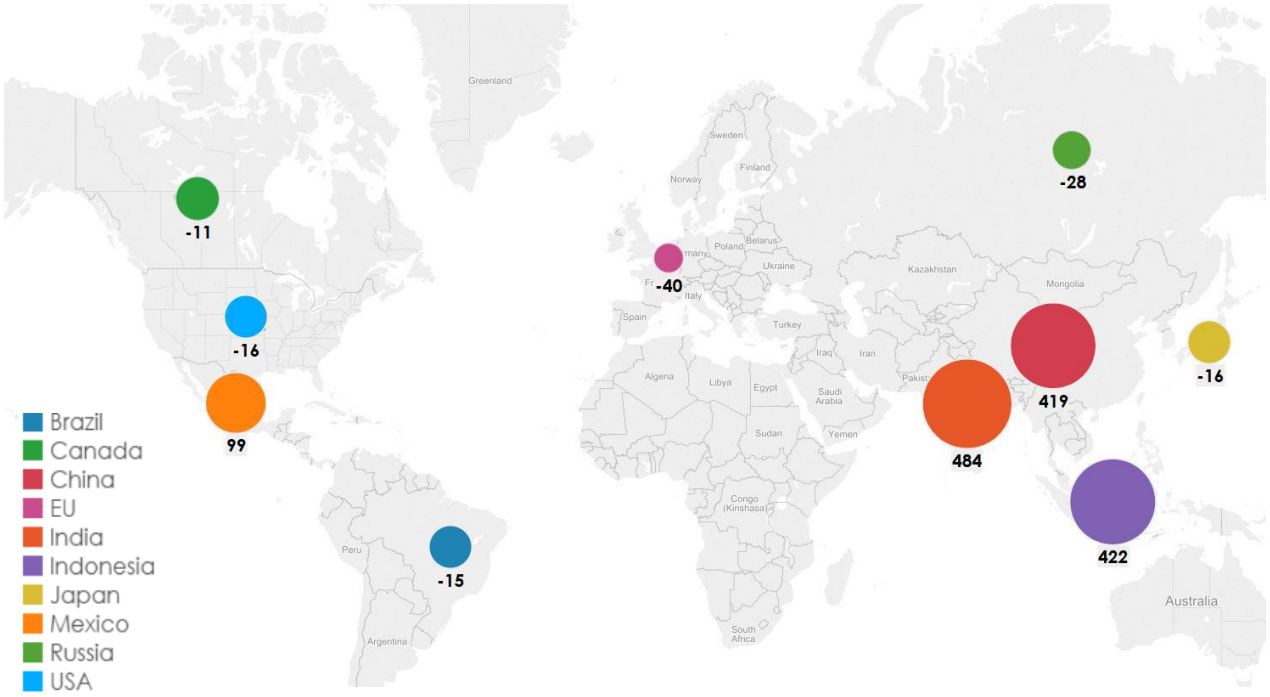
4. Comparative analysis of mitigation efforts

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. To facilitate this task, Table 2 compares the emission reduction targets proposed by the top ten emitting countries by putting them on an equal footing.

[3] http://www4.unfccc.int/submissions/INDC

When pledges are compared to 1990, figures show 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 (see Figure 1). 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. In particular, the degree of change depends on assumptions about the growth rate for GDP by 2030[4] (see column 7-8 of Table 2). Both countries have been experiencing an extremely high growth in GDP and GHG emissions in recent years; however, China's emission intensity is higher than that of India, and is projected to be higher even in 2030 (Ray et al. 2015).

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



[4] Section (a) uses the data on GDP estimates for 2030 issued by the Socioeconomic Pathway 2 (SSP2), while section (b) employs data by the Energy Technology Perspectives (ETP) of the International Energy Agency. The growth rate estimated by the first model is higher than the second one and the difference affects results in comparing the reduction commitments of India and China, which are expressed in the form of emission intensity (i.e. normalized on GDP).
Data are available at https://tntcat.iiasa.ac.at/SspDb/dsd?Action=htmlpage&page=about (SSP) and http://www.iea.org/etp/etpmodel/assumptions/ (ETP).

Table 2: Comparison of INDCs according to different metrics

COUNTRY	INDC			DATA for base year		Equivalent pledges (excl. LULUCF)		
	GHG reduction (%)	Base year	Target year	GHG emissions [MtCO2eq]	Emissions per GDP-PPP [MtCO2eq/ 2005 trillion US$]	Change wrt 1990	Change wrt 2005	Change in emission per GDPwrt 2005 [MtCO2eq/2005 trillion US$]
Brazil	-43	2005	2030	840,19	941,92	-15	-43	-87
Canada	-30	2005	2030	722,57	620,76	-11	-30	-56
China	from -60 to -65*	2005	2030	7.345,03	3238,55	**(a) SSP2 data:** from +1046 to +1210	**(a) SSP2 data:** from +418 to +492	from -60 to -65
						(b) ETP data: from +384 to +453	**(b) ETP data:** from +119 to +150	
EU	-40	1990	2030	5.235,35	511,76	-40	-37	-57
India	from -33 to -35*	2005	2030	2.081,93	2496,32	**(a) SSP2 data[5]:** from +1499 to +1548	**(a) SSP2 data:** from +851 to +881	from -33 to -35
						(b) ETP data: from +475 to +493	**(b) ETP data:** from +242 to +253	
Indonesia	-29	BAU	2030	2881,00	946,15	422	226	-93
Japan	-26	2013	2030	1344,58	294,22	-16	-26	-29
Mexico	-22	BAU	2030	1110,00	416,01	99	32	-75
Russian Federation	from -25 to -30	1990	2030	2.776,78	3293,93	from -25 to -30	from -3 to -9	from -86 to -87
USA	from -26 to -28	2005	2025	6.841,50	522,53	from -14 to -17	from -26 to -28	from -54 to -55

[5] See footnote 4.

Mitigation efforts change when comparing data in terms of carbon intensity (i.e. normalized on GDP). In this case, Indonesia, Brazil and Russia commit themselves to the highest level (with a reduction of 93, 87, and 86% respectively), while India and Japan have the least ambitious targets, with a decrease in emission intensity of around 30%. The European Union, the United States and Canada present a similar reduction in emissions per GDP by 2005, slightly above 50%. 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.

5. Assessing the ambition of INDCs mitigation contributions

Since the failure of Copenhagen climate conference in 2009, a number of studies have focused on how mitigation efforts should be expressed in order to avoid misbalances and enable comparability among countries.

Aldy and Pizer (2015) propose four principles to guide the set-up of efficient metrics to compare mitigation efforts. First, an ideal metric would comprehensively represent the entire mitigation effort of a country. Second, metrics should be observable, measurable and quantitative. Third, metrics should be replicable by independent third parties. Finally, ideal metrics would be universally applied among countries participating in global climate policy. The study analyses a range of metrics to assess their effectiveness compared to the four guiding principles: emissions metrics (emissions levels on a base year, emission intensities and emission reductions from business as usual), price metrics (carbon and energy prices), and cost metrics (such as mitigation costs). Results show that no single metric performs well on all the criteria. Emissions abatement and abatement costs are deemed to be the best indicators of mitigation efforts; however, they are the most difficult to measure. Aldy and Pizer therefore suggest employing a *portfolio* of metrics for comparing emission reductions among countries.

Before the adoption of Paris agreement, in the attempt to compare the ambition and efficiency of the proposed efforts, many studies have provided 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 should be seen as a first step toward the foundation of an ambitious global climate action but for now 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 (UNEP, 2015), the Climate Action Tracker (CAT, 2015), Climate Interactive's "Climate scoreboard" (Climate Interactive, 2015, the energy related estimates provided by the International Energy Agency (IEA, 2015a).

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 average. These figures are in some cases then

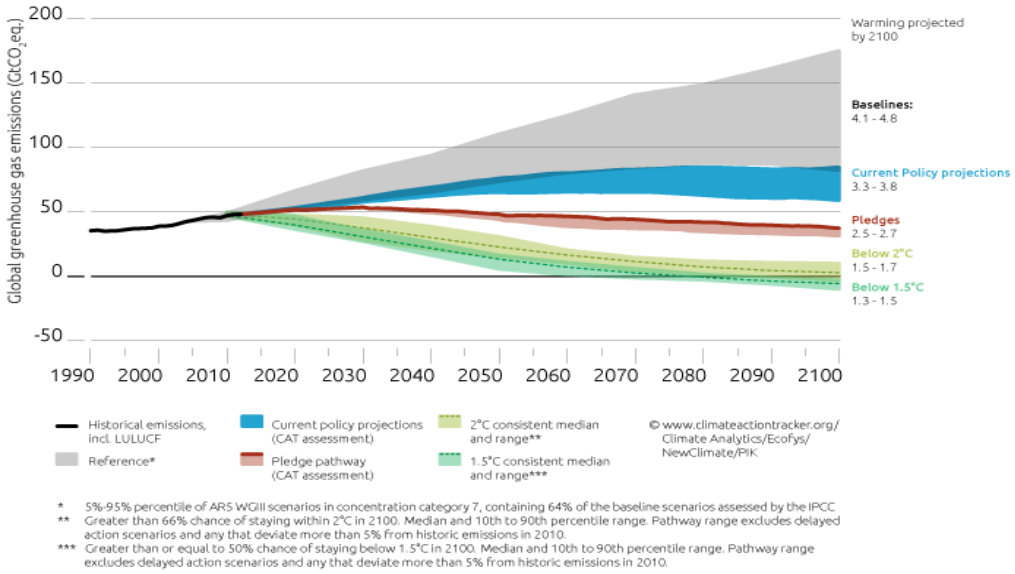
translated into estimated temperature increase above pre-industrial levels in 2100. Temperature values range from 3.5°C, as assessed by UNEP and Climate Interactive to a more optimistic scenario projected by both CAT and the IEA leading to 2.6/2.7 °C. The difference in temperature can, however, be explained by the assumptions that these models take into account, especially concerning the post 2030 period. Specifically, the CAT assumes that similar levels of effort will be undertaken after 2030, whereas Climate Interactive, and presumably also UNEP, assume no further action after 2030.

Table 3: Comparison of estimates of global emission gap and global temperature according to different tools

	UNFCCC	UNEP	CAT	CLIMATE INTERACTIVE	IEA[6]	Average value
Global emission gap wrt 2°C target by 2030 (average)	15 Gt CO2 eq	14 Gt CO2 eq	16 Gt CO2 eq	14 Gt CO2 eq	N/A	14.75 Gt CO2 eq
Global temperature by 2100	N/A	3.5° C	2.7° C	3.5° C	2.6° C	3.1° C

UNEP's assessment also points out that commitments do not present a veritable increase in ambitions as compared to current policies. In fact, the emission level resulting from INDCs is projected to be only 4 Gt CO2eq lower than the levels determined by current policies and therefore "far from enough" (UNEP, 2015). Moreover, the CAT's projections indicate that current governments' initiatives (the blue area in Figure 2) are not fully consistent with the 2030 pledges, meaning that further measures are necessary to achieve the mitigation targets stated in the INDCs (CAT, 2015).

Figure 2: Effect of current pledges and policies on global temperature



Source: CAT, 2015

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

The IEA (2015a) also adds that following the INDCs submitted so far, and the planned energy policies in other countries, the world is likely to consume the carbon budget consistent with a 2°C scenario by around 2040, thus eight months later than under current policies.

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, 2015), which adopts a counter-factual perspective to analyze the consequences of different peaking years, keeping the temperature below 2° C at the end of the century would require an annual reduction in emissions of 9.6% from 2030 onwards. This is, however, about three times more than the maximum feasible annual abatement rate estimated by the model (3.5%). In addition, ECIU suggests that if emissions peak in 2030, the only possible way to achieve the target of 2°C is by deploying negative emissions in the range of 4.1Gt CO2 per year, mainly through the carbon capture and storage system or by increasing mitigation potential from the LULUCF sector (ECIU, 2015).

6. 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 not only estimating their contribution to limit global temperature to the 2°C path, but also by analyzing their coherence and fairness. According to Bosetti and Frankel (2014), for a workable and acceptable system of emission targets, such as the one outlined in the Paris agreement, a general notion of fairness needs to be recognized. They therefore identify three principles that should guide a fair establishing of emission targets: i) national history of emissions, as it is fair to expect countries that have increased their emissions rapidly to curb them; ii) progressivity, considering that it is fair to expect rich countries to accept bigger cuts than poor countries; iii) costs, which should not be disproportionately large.

In the context of future commitments to be regularly undertaken under the Paris Agreement, assuring an equitable distribution of commitments, based on each country's capacity and responsibility, can indeed build a foundation for trust and cooperation between developed and developing countries.

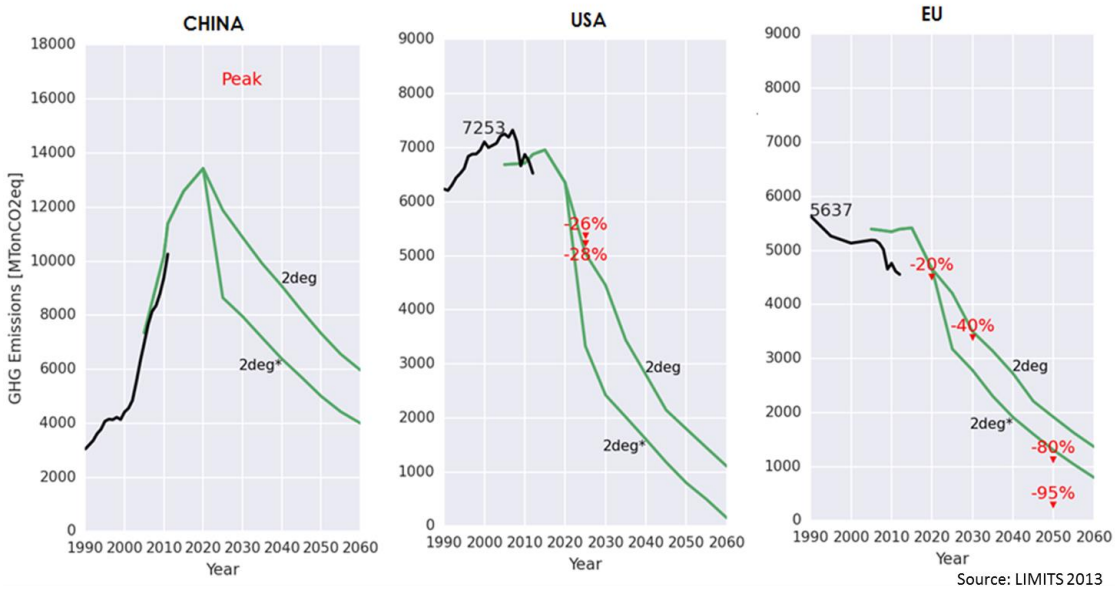
All the studies focusing on fair share agree that poorer and emerging countries have a right to the majority of the global carbon budget, while developed nations have already used almost the total amount of their fair portion. However, analyses differ on measuring single countries' fair share in the available global carbon budget.

Using data from the LIMITS exercise, is it possible to understand the consistency of the proposed action by the top 3 emitters and their single path toward the 2°C level[7]. Under current pledges, China's commitment is indeed inconsistent with the 2°C target, though it is with a 3°C target, and can therefore be seen as a continuation of the Copenhagen pledge. On the contrary, the pathways to which the USA and the EU have committed themselves are

[7] Graphs credit: Samuel Carrara (FEEM)

consistent with most of the 2°C scenarios; in addition, the EU's goal of achieving a long-term mitigation reduction of 80-95% as compared to 1990 levels will even exceed the effort required under the 2°C path.

Figure 3: Comparison of the INDC-related emissions paths of China, EU and US with the 2°trajectory



In the effort to detail the coherence of countries regarding the proposed contribution, the Netherland Environmental Assessment Agency PBL (2015) has developed a simple tool that graphically compares, for each country, the emission trends following INDC with those resulting from current policies and the BaU scenario. Data show that 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).

CAT presents a more complex rating of INDCs, assessing countries as inadequate, sufficient, medium or role model, according to three different criteria: the abatement effect of each country's current policies, the impact of INDC on emissions and the fair share of the contribution in the global effort to stay below 2°C. According to CAT, only the INDC of Bhutan is a "role model", while most of the commitments are considered inadequate or rated as medium (CAT, 2015). It is worth noting that, among those whose efforts are inadequate, four are amid the top-ten largest emitters (Canada, Japan, Indonesia and the Russian Federation), whereas China, the US and the EU are rated as "medium" (Table 4, column 3).

Table 4: 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' contribution to fair share (1= sufficient ratio)	(c)INDCs mitigation efforts gap wrt fair share (percent)
	PBL	**CAT**	**Oxfam**	**Novethic**	**ClimateFair Shares**
BRAZIL	0,03	Medium	2/3	0.82	-47
CANADA	-0,19	Inadequate	N/A	0.76	-55
CHINA	-1,05	medium with inadequate carbon intensity target	>1	0.63	-15
EU	-0,47	Medium	1/5	0.84	-37[8]
INDIA	-0,37	Medium	1	0.9	-41
INDONESIA	-0,05	Inadequate	1	1.1	21
JAPAN	-0,10	Inadequate	1/10	0.83	-59
MEXICO	-0,21	Medium	N/A	1.04	-50
RUSSIAN FEDERATION	-0,28	Inadequate	0	0.6	-37
US	-1,72	Medium	1/5	0.8	-61

A report published by Oxfam International (2015) also provides a review of INDCs' fairness, by comparing commitments to an equitable share of the global mitigation effort needed to maintain global warming below 2°C. Oxfam's rating takes into account the historical responsibility of countries and their capacity to tackle climate initiatives. According to the index, the pledges of developed countries are far from representing a fair contribution. In particular, Russia's INDC represents zero contribution compared to a fair share, as projected emissions are even higher than the BaU scenario; Japan's effort averages a tenth of a fair distribution, and the INDCs of the EU and the US are approximately a fifth of their estimated fair portion. By contrast, the report highlights that contributions by developing countries generally correspond to their fair share or even exceed it. The targets proposed by India and Indonesia approximately equal their fair share, and China surpasses it by about 2 Gtons CO2eq. Brazil represents an exception among emerging economies, covering about two thirds of its equitable part of the global effort (Table 4, column 4).

[8] Data referring to 2025. Data for 2030 are unavailable.

In advance for COP21, the French press agency Novethic (2015)[9] developed a Climate effort contribution index to assess INDCs on the basis of equity and efficiency in reaching the 2°C target. The rating results from the comparison of each country's mitigation effort with the 2°C consistent emissions reduction the same country should undertake according to its capacity and responsibility. The index rates the contributions of all the top ten greenhouse gases emitters as insufficient, with the exception of Indonesia and Mexico, whose efforts exceed the minimum required ratio. The commitments of Russia, China and Canada are the lowest in terms of a fair contribution to the global mitigation effort, while the contributions of the other largest emitters represent about 80% of their fair share (table 4, column 5).

Likewise, Climate Fairshares (2015), a joint initiative of the Stockholm Environment Institute, Ecoquity and the institute for Governance and Sustainable Development (IGSD), develops a fair share index that reflects countries' responsibilities, capacities and sustainable development. Indicators are based on the cumulative emissions of countries and their per capita income, as compared to an estimate of the global distribution of wealth. According to this analysis, among the top-ten emitters only Indonesia meets the effort required under a fair share, and even exceeds it. None of the other largest emitters are contributing fairly to the global mitigation effort. China, India and Mexico would have the right to scale-up their emissions according to a fair share, but the increase in emissions they will determine by implementing their INDCs is however excessive. The contributions of the US, Canada and Japan show the greatest distance from a fair share, as their efforts are about 50% lower than required (table 4, column 6).

According to a study by Laurent (2015) for the French Economic Observatory (OFCE), India, Indonesia, China, Brazil and Mexico can still emit over 50 billion tons of CO2eq each as a fair share of the global carbon budget at disposal up to 2040. Russia and Japan can only emit less than 10 CO2eq tons billion each by 2040, and the US and Canada have already employed more than their fair share, meaning that they have accumulated a CO2 debt with the rest of the world. The study suggests comparing net emission levels to different parameters in order to provide a better understanding of each country's carbon share. For instance, if the amount of emissions is normalized for GDP or the population, data show that the US presents the highest level of emissions per capita while China has the highest value of emissions per GDP, even considering the high economic growth ratio of the country. The paper also proposes to include in the analysis the "imported emissions", i.e. the emissions released in a country in order to produce the manufactured items exported to another country.

7. Conclusions

The INDCs represent a breakthrough in terms of international efforts to curb future emissions and can be considered as a first step in building the foundation for the successful implementation of the Paris agreement. Positive consequences go beyond benefits on climate, since the preparation of the INDCs has in many countries incentivized exploration of connections between climate and development, as well as planning of new national climate

[9] Novethic employs data from the Word Resources Institute and the Climate and Energy College of the University of Melbourne (Australia)

polices. Although INDCs show a more ambitious endeavor towards de-carbonization as compared to the Copenhagen pledges, 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 optimistically 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. Reviewed studies 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. To boost chances of success of the Paris agreement, an adequate process of monitoring and revision is fundamental to verify the progress countries make in reaching the goals and supporting compliance.

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