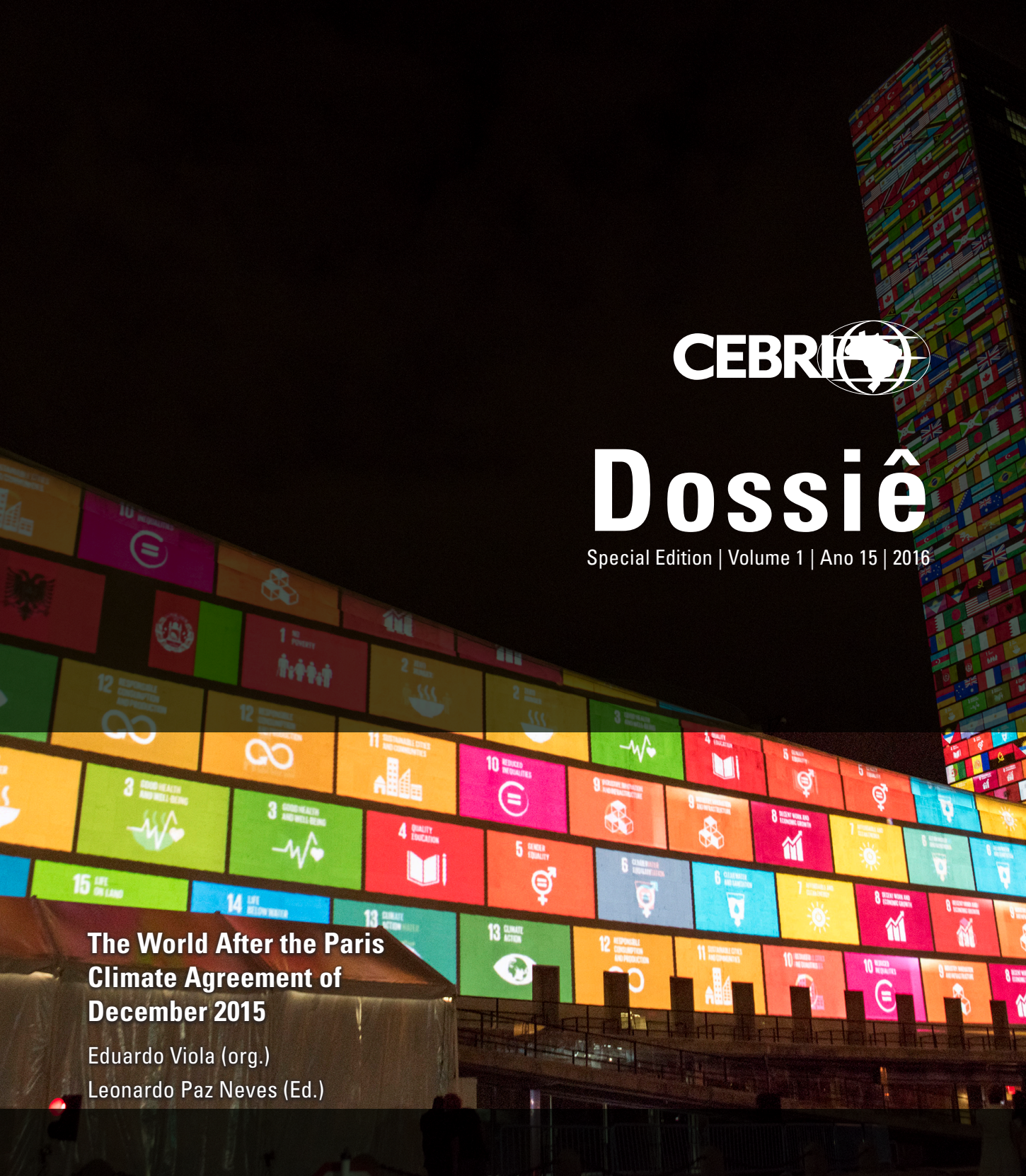

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The World After the Paris Climate Agreement of December 2015

Eduardo Viola (org.)
Leonardo Paz Neves (Ed.)

BRAZILIAN CENTER FOR INTERNATIONAL RELATIONS

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Letter from the President

Currently, there are few issues on the international political agenda that are as pressing as climate change. The already present effects of climate change indicate very significant future impacts on our planet at several levels, including social, economic and even political arenas. However, the greatest challenge for this issue is the cooperation and commitment of various countries to reach acceptable terms so that can we mitigate such effects.

COP21 Paris represented an important advance in this direction, with an unprecedented number of countries in reaching a final agreement.

With this publication, our goal is to reaffirm CEBRI's commitment to raising the level of international debate on the most important issues in the contemporary world, based on our values of independence, non-partisanship, ethics, plurality and transparency. as one of the world's most important think tanks.

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Summary

Introduction

Eduardo Viola[1] and Larissa Basso[2]

The Paris COP 21 Agreement and the future of the international climate regime

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In December 2015, members of the United Nations Framework Convention on Climate Change (UNFCCC) gathered in Paris at the 21st Conference of Parties (COP). Expectations regarding the Conference were high: having failed to agree on a legally binding treaty to replace the Kyoto Protocol at COP 15, in Copenhagen, when expectations were very high because of the new climate friendly presidency of Obama and the possibility of a shift in the Chinese position, and in 2012, when the first commitment period of the Protocol expired, members settled COP 21 as the new deadline. Achievements of the Conference, especially the Paris Agreement, will be judged differently depending from the point of view.

From a diplomatic point of view, the Paris Agreement was a success. Different and often opposing national interests were combined in the text, due to intensive leadership of French and European diplomats with support of very influential global leaders such as Fabius, Kerry, Hollande, Obama, Ban Ki Mon and Merkel. The text is a masterpiece of consensus in wording, but there is deep disjunction between some ambitious goals presented at the Agreement and the generic and diffuse paths that are formulated to achieve it.

Compared to previous treaties in the regime, the agreement represented some improvement with climate change mitigation. The Convention, signed in Rio in 1992, was a programmatic compromise of members to mitigate climate change – it did state the concern of members with the issue and their promise to tackle it, but it did not translated the measures that would be taken to do it, except for a general and

diffuse statement that Annex 1 countries should reduce emission in 10% in 2000 in comparison with 1990. The Kyoto Protocol, signed in 1997 and in force between 2005 and 2012 for the first period, was the first agreement to impose compulsory Greenhouse Gases (GHG) emission reduction targets on developed countries and the so called countries in transition from central planning. Yet it suffered several setbacks: the United States did not ratify it, arguing it would lead to unfair competition with emerging economies, especially China, in global markets; several members did not comply with the settled targets, and no sanction was imposed on them; Japan, Canada and Russia did not sign the Doha Amendment, which extended the Protocol to a second commitment period, between 2013 and 2019. The Amendment is not yet in force; when it does, it will bind countries that represented 13.62% of total global GHG emissions in 2012 and 12.83% in 2013 (IEA, 2014; IEA, 2015).[3]

The Paris Agreement, on the other hand, was successful in setting 1.5º C – and not 2º C, as previously envisaged – as the limit to safe average rise in global temperature. This means that political leaders came closer to the limits already defined by the scientific community and pushed in the international arena by very pro-active small island states. The Agreement was also successful in gathering mitigation efforts from all UNFCCC members, and not only developed countries. Previously to the Conference, members presented their Intended Nationally Determined Contributions (INDCs). INDCs would provide detailed information regarding the commitment each country would be willing to undertake in Paris, including quantifiable information on the reference point and base year, time frames and periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches for estimating and accounting GHG emissions and removals. This bottom-up effort to conciliate different national and sectorial interests is a better strategy than assigning targets to few UNFCCC members because it induces more countries to engage. Yet, considering their voluntary nature and the lack of sanctions for non-compliance, the level of commitment and their implementation become even more important than before, and this is the topic of the four papers presented in this publication.

In the first one, Matías Franchini assesses the credibility of INDCs of five Latin American countries – Argentina, Brazil, Colombia, Mexico and Venezuela – according to the trajectory of their commitments in the climate regime, the level of ambition of their INDCs and the level of uncertainty regarding their implementation, based on implementation of previous climate commitments. The five countries are among

3 Own calculation based on data.

climate powers, actors of the international system that, according to the trajectory of their emissions and their technological and human capital to promote decarbonization, are able to influence the climate regime (Viola et al, 2013). Countries are divided in middle, moderate conservative and conservative regarding their positions in the climate regime; their INDCs are classified as moderately ambitious or unambitious, and the implementation is judged moderately uncertain or highly uncertain. The author notes that the five countries are very different among them, although similarities can be found.

Among the five countries, Mexico is in advance. A moderate conservative climate power due to the deceleration of its emissions, advances regarding climate policy and cooperative behavior in the international regime, Mexico falls short from a reformist position due to low levels of implementation of climate policy, especially the 2020 target, and energy reform contradicting low carbon development objectives. Mexican INDC is considered of middle ambition, but its implementation is judged highly uncertain. Colombia is a similar case: a moderate conservative climate power due to low levels or per capita emissions, decreasing carbon intensity of its GDP and cooperative standings in the climate regime, the country cannot be classified as reformist as no major domestic climate policies were enacted until 2015. Colombian INDC is considered moderately ambitious, but its implementation is also highly uncertain. Brazil is the third moderate conservative Latin American climate power, sustaining the position due to significant reduction of carbon emissions from deforestation and some advances in domestic climate policy. Brazilian INDC is also moderately ambitious, but implementation is considered medium uncertain because targets are consistent with the trajectory of implementation in the country but there are many doubts regarding the implementation of non-Land Use, Land Use Change and Forestry (LULUCF) climate policy. Argentina and Venezuela are conservative climate powers, the latter an extremely conservative one. Both countries have higher levels of per capita emissions and of carbon intensity of their GDP compared to their neighbors and defend conservative standings in the climate regime. Both INDCs are judged unambitious.

In the second paper, Suely Araujo and Henrique Leite address the Brazilian INDC and its relations to Brazilian energy policy. In their opinion, the INDC is in tandem with the developments of Brazilian climate policy since 2009, when the Climate Change National Policy was enacted, and does not represent further advance towards low carbon development. Regarding specific targets for the energy sector, they are

considered shy compared to Brazilian potential: new renewable energy sources, such as wind, have proved very competitive in Brazil following incentives from previous policy developments, such as the Alternative Energy Sources Incentive Programme (in Portuguese, PROINFA). Yet, energy planning still considers these sources only complementary to the matrix, relying heavily in the expansion of large hydropower plants, which face several constraints, from environmental licences to lack of financial resources, to their building, and thermal power plants to guarantee base load power. Energy targets in the Brazilian INDC are not ambitious: they translate the trajectory of energy developments in Brazil and in some aspects, such as energy efficiency and share of renewable energy in the matrix, represent a setback compared to levels of 2000. Although the Brazilian INDC innovated little, the authors consider it could be a positive sign of keeping a low carbon development track were domestic policy signs not contradictory with it. They also point policy implementation as a great challenge to climate change mitigation in Brazil.

Ricardo Abramovay reads the results of the Paris Conference as positive, but warns that multilateral agreements are only a starting point in climate change mitigation: the relation between prices of fossil fuels and alternative energy, as well as resources available to finance their development, is much more central in determining the pace of global decarbonization. In this regard, the author highlights the significant decrease in the price of alternative renewable energy between 2010 and 2015, mainly due to the learning curve in these technologies. Yet, the world is still very dependent on fossil fuels, and dependence has deepened recently, as oil prices have plummeted recently. The fact that countries, even emerging economies, such as India, were previously reluctant to value leadership in renewable energy and are now alert to it is a positive incentive to change this picture, but it is not enough. Increasing, exponentially, investments, especially private investments, in renewable energy is key. Investors, however, follow closely developments regarding the establishment of carbon prices as well as progress in competitiveness of renewable energy compared to fossil fuels before diverting substantial amounts from the latter. This is why international action on eliminating subsidies to fossil fuels and establishing a global carbon price, still at their infancy, are of utmost importance in the contemporary picture of climate change mitigation.

Last, but not least, José Eli da Veiga discusses the effectiveness of the climate regime compared to other environmental regimes designed differently, such as the ozone depletion regime, and defends a polycentric approach to climate governance. In

his opinion, due to the complexity of climate change mitigation, there is no one size fits all policy capable of addressing the issue: stimulus to experimentation, at local, regional and national levels, should be given, and assessment methods should be improved. In tandem with Abramovay, Veiga points that investment in renewables are short from the amount needed for a transition towards a global low carbon economy. Renewable energy, energy storage and transmission infrastructure are consistently underfunded; fortunately, energy efficiency, carbon capture and storage and nuclear fusion have been receiving more capital. Due to lack of available public funding in times of global financial constraints, the author defends the creation of a monetary innovation, the social value of carbon not emitted, as an asset to be negotiated in market in order to push global energy transition. Veiga highlights the importance of cooperative international development of new low carbon technologies, and of strengthening effectiveness and efficiency of existing ones.

In common, all four papers present the Paris Conference as a starting point of change in the climate regime, but insufficient to promote substantial decarbonization in the global economy. It was a diplomatic success, but very limited from the point of view of the deep global decarbonization that is needed to put the world on track with low carbon development. Franchini and Araujo & Leite relate to national/regional situations and converge in analyzing the Brazilian policies as very limited in relation to the needs of a true decarbonization process. Abramovay's and Veiga's analyses focus the global level and demonstrate that the capacity of resistance of vested interest centered in fossil fuels is key to understand the future of the climate regime.

In fact, understanding the dynamics taking place in climate powers is key for the future of the decarbonization power. Core climate powers are the United States, China, the European Union and India. They share around 60% of global carbon emissions: the European Union and the United States have been reducing their share; China seems to have started a trend of moderate growth that could reach the stabilization point in around one decade; and India's trajectory remain of rapid emissions growth. Per capita emissions of the United States are 22 tons of CO_2 equivalent, well above the world average; in order to be in tandem with global decarbonization, this number require a rapid decline – not what has taken place. Chinese per capita emissions are already 8 tons of CO_2 equivalent and require some reduction, but their trajectory has been upward. European emissions are 10 tons of CO_2 equivalent and should decline moderately; they are in this trajectory but not fast enough. Indian per capita emissions are around 4 tons of CO_2 equivalent; Indian

emissions could moderately grow without hurting global decarbonization – not in the pace they are currently increasing. Russia, Japan, South Korea, Indonesia, Australia, Turkey, Saudi Arabia, Iran, Nigeria, South Africa, Brazil, Mexico and Canada are also important actors for global decarbonization. Australia, Canada, Saudi Arabia, Russia, Turkey and Indonesia have already very high or high carbon per capita emissions and should be in a trajectory of reduction in order to help decarbonize, but in the majority of cases of their emissions are growing very fast. Iran and Nigeria – the latter having the highest fertility rate in the world and estimated to have around 500 million inhabitants in 2050 – have lower per capita emissions but they are growing very fast.

Besides the dynamics in climate power, the economic and security dimensions of the international system have a key impact on the climate dimension. On the one hand, global economic slowdown, low oil prices, terrorism and increased geopolitical rivalries undermine global climate governance; on the other hand, the dramatic growth of low carbon energy systems and extreme weather events enhance the development of global climate governance. Both contradictory forces will be acting in the years to come.

The structural limitations of the Paris agreement would be overcome by the formation of a deep decarbonization coalition or club. Depending on the dynamics of the political economy in major climate powers, this coalition could become real in the future. Reformist climate powers – countries that push for a more consistent climate regime, following the scientific advice on the issue – would be the basis of the coalition. As of today, only the European Union classify as reformist. Yet moderate conservative powers could join it depending on significant advances of reformist forces (corporations, politicians, civil society, public opinion in general) in comparison to status quo forces. In fact, continuous progress in low carbon technologies and deepening economic and political power of reformist transnational corporations networks are crucial for this transition to reformist. This deep decarbonization coalition, if materialized, will have the capacity to constrain major conservative powers, like India, Russia and Saudi Arabia, in international negotiation.

Countries that are currently moderately conservative and would play an important role in a reformist coalition are the United States, China, Japan, Brazil, Mexico, South Korea, Canada, Indonesia and South Africa. The dynamics in three of them – the United States, China and Japan – due to their position in the international system, however, are crucial. In the United States, due to climate skepticism still supported by

part of the Republican Party, it is hard to envisage further commitment with climate change mitigation without the leadership of the Democratic Party. For this reason, the victory of the Democratic Party in the presidential elections of 2016, which is likely to happen observing the picture in March 2016, is key, but a Democratic majority in the House of Representatives and the Senate is needed. Considering the current state of American politics, is much more difficult to take place. The unlikely victory of the Republican Party in the presidential election would be a major retrogression to the small progress reached in the Paris Agreement.

In China, there are three forces pushing climate reformism: the grassroots movements against air and water pollution, synergic with reduction of carbon emissions; the growing importance of the low carbon energy sector – wind, solar and nuclear, smart grid – in the Chinese economy; and the Chinese transition from manufacturing to a service driven economy. However, there are two trends pushing against reformism: recent misplaced strategies in the implementation of needed deep economic reforms; and the extremely assertive military policy in the South and East China seas. If geopolitical rivalry increases, decarbonization will become second in importance after defense and conventional national power, and military elites will also shadow civilian, pro-decarbonization, ones.

Japan is the first developed country that has gone through a secular economic stagnation (started in 1991) with relative acceptation of its population. Even if was not a deliberate choice; Japan recent experience shows to the world that is possible to enter in secular stagnation – economic de-growing, if compared with the rest of the world – without social contestation. In terms of standings in multilateral negotiations on climate change, Japanese positions have retrogressed in Paris compared with Kyoto and Copenhagen. In spite of this, Japan is still in the global vanguard in energy efficiency, rational public transportation system, social equality and low carbon intensiveness of GDP. Japan could add significantly to the research and deployment of low carbon technologies, which would have major global impact.

In the European Union, already a reformist climate power, fragmentation, due to the refugee crisis, persistent economic stagnation and growing nationalist political forces and, in some countries (particularly France, Belgium and the United Kingdom) ghettos of radicalized young Muslims increasingly engaging in terrorist activities, direct or indirectly, could affect climate policies and standings. European reformist positions over the years have been based in the prevailing integrative post-sovereign forces

from Northern Europe driving the Union against more nationalist forces located in Southern and Eastern Europe. The stronger status of the first compared to the latter is key for a successful global deep decarbonization coalition; reestablishing the rule of law and overcoming social issues in the Muslim ghettos of many metropolitan areas and large cities is also very important. Terrorism, by redirecting European societal attention, is one of the most important forces acting against decarbonization in Europe.

In sum, despite the normative participation of almost 200 countries in the climate regime, few countries have the heaviest influence on climate change, so action taken in plurilateral forums or clubs could actually produce better results to climate change mitigation. If climate powers undertake measures to promote energy efficiency and low carbon energy, as well as disincentives to produce and use fossil fuels, climate change will be substantially mitigated. Yet, this real advance in climate change mitigation remains to be seen. In the regime itself, the Paris Agreement did not address several setbacks already present in previous agreements: commitments are voluntary; lack of compliance is still not subject to sanctioning; monitoring is weak; five-year revisions do not imply deeper commitments. Thus, at best, the Paris Agreement is a sign that the world is starting to understand how complex the necessary change is, and that many more need to be involved if climate change is to be efficiently tackled. This is positive, yes, but a small advance and very far from the panacea for world climate problems.

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How credible are Latin-American Intended National Determined Contributions (INDCs)?

Matías Franchini[1]

How credible are Latin-American Intended National Determined Contributions (INDCs)?

Introduction

In December 2015 the international community reached a tiring deal in Paris. For some, this was a historic breakthrough in global climate governance as almost all countries accepted to limit in some way their GHG emissions for the first time in history; for others, it was yet another failure in avoiding the worst effects of global warming, given the lax and not legally binding nature of the Intended National Determined Contribution (INDC) and their inadequacy to avoid the 2C degree threshold. Between these extremes, analyses vary widely.

However, two statements can be done regarding the Paris Agreement. First, it is not a "solution" to the problem – probably humanity is beyond that path – but a vague outline to deal with it and, second, its chances of succeeding in "managing" the climate crisis will depend on each country´s INDC level of ambition and the degree of compliance over the next decades.

This paper deals with this challenge, namely, how high – or low – is the level of ambition and the chances of implementation of current INDCs, in this case, among major Latin-American climate powers: Argentina, Brazil, Colombia, México and, Venezuela. This is of course an impossible question to answer in full on this early stage, but it is argued here that some understanding can be gained by focusing on how each country has dealt with the climate issues before the submission of the

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INDC. This is, the level of climate commitment previous to the INDC could provide some light over the ambition and credibility of the Intended Contributions.

Following this goal, the paper analyzes each Latin-American country under these terms:

- The level of climate commitment at the national level in the last decade;
- The level of ambition of the INDC;
- The implementation uncertainty of the INDC;

However, before starting, two clarifications are needed. First, more space is dedicated to Brazil and Mexico because their larger share of global emissions and GDP, more central position in the international system – including climate affairs - and, their higher climate policy development. Less space is dedicated to Venezuela because of the very low data availability on the country.

The second clarification is conceptual: **Climate commitment** can be broadly defined as the level of awareness that a specific society has of climate change as a central civilizational driver (Viola et al, 2013). This commitment is expressed in the emissions trajectory of GHG emissions, the depth of domestic climate policy and, the position in international climate negotiations. In the following pages, low committed countries are called conservatives, middle committed moderate conservatives and, high committed reformists.

1. Country Analysis: Climate Commitment and INDCs in Argentina, Brazil, Colombia, Mexico and, Venezuela

This segment assesses the level of climate commitment of each country – emission and policy trajectory; the level of ambition of the INDC – based on independent reports and the Contribution´s pursued level of per capita emissions in 2030 and; the implementation uncertainty of the INDC – based on the climate policy record of each country.

Figure 1: Basic Country Indicators (2012)

	Argentina	Brazil	Colombia	Mexico	Venezuela
Climate Commitment	Conservative	Moderate Conservative	Moderate Conservative	Moderate Conservative	Conservative
INDC ambition	Low	Moderate	Moderate	Moderate	Low
INDC implementation uncertainty	Irrelevant - INDC means no mitigation effort	Medium	High	High	Irrelevant - INDC means no mitigation effort
GDP 2015 (US$ Billions PPP)	860	2,780	604	1,760	402
GHG Emissions Total (MtCo2e.)	405	1.823	200	749	397
GHG Emissions Global Share (%)	0.85	4.7	0.42	1.6	0.83
GHG per capita emissions (TCo2e.)	9.9	9.2	4.2	6.2	13.2
Carbon Intensity of GDP (TCo2e./ US$ million GDP)	545 [2]	640	360	380	751
INDC (Unconditional)	-15% (BAU)	-43% (2005 base year)	-20% BAU	-22% (BAU)	-20% (BAU) Conditional
INDC GHG target (MtCo2e.)	560	1.200	270	760	260
INDC per capita target (TCo2e.)	11	5.2	4.6	5.5 [3]	7.2 [4]

Source: WRI[5] for Emission data; IMF[6] for GDP; own assessment for INDC ambition and implementation potential.

2 WRI has no data on this category. The calculation is our own based on FMI data: US$ (PPP) 743,000,000,000/41,000,000 people.

3 Own calculation with an estimated population of 137,000,000 in 2030. [http://www.conapo.gob.mx/es/CONAPO/Proyecciones_Datos].

4 Own calculation with an estimated population of 36,000,000 in 2030: [http://www.ine.gov.ve/index.php?option=com_content&view=category&id=98&Itemid=51].

5 http://www.wri.org/

6 http://www.imf.org/external/index.htm

1.1 Argentina: Unambitious INDC convergent with a conservative record

Argentina has been a conservative agent in the global governance of climate change because of:

a) The high and stagnant level of per capita emissions and carbon intensity of GDP;

Total emissions in Argentina have increased in the last decade, driven mainly by some carbonization of the energy matrix. However, data availability is low, since the last official national emission inventory is almost a decade old (2007) and contains data up to 2000 and was only updated in 2015, with the publication of the first Biennial Update Report with 2010 data.

b) The lack of any sound domestic climate policy;

Argentina has no specific climate legislation or mitigation program with quantifiable targets. The most promising piece of climate policy – The National Strategy on Climate Change– is under construction since 2009. (Viola et al, 2013; Nachmany et al, 2014)

c) A conservative international standing and the reluctance to make quantifiable voluntary commitments;

Since the early 1990s Argentina has displayed a radical interpretation of the Common but Differentiated Responsibilities (CBDR) principle, rejecting the possibility of establishing binding quantitative emission reduction targets for developing countries - expect for a short period between 1998 and 1999 (Franchini & Viola, 2013).

Consistently with this interpretation, Argentina did not sign the Copenhagen Accord, although, it submitted a document listing some actions consistent with mitigation – biofuels and clean energy, energy efficiency, forest management and, waste management (Franchini & Viola, 2013). According to CAT (2013) those actions would probably lead only to a small deviation from the BAU scenario.

INDC

Argentina proposed an unconditional emission reduction of 15% in 2030 below BAU – targeting approximately 560 MTCo2e for that year. With international support, the reduction could reach 30% (Argentina, 2015).

We consider the argentine contribution to have a low level of ambition, because:

- It uses a BAU scenario and not a base year;
- Does not establish a pick emissions year;
- The BAU scenario used by Argentina appears unrealistic, since it implies a strong decoupling between emissions and economic growth, particularly between 2005 and 2011, when emissions grew approximately 5%, and GDP roughly 50% (Argentina, 2015, FMI[7]). That kind o decoupling would manifest a revolutionary transition to a low carbon economy that – by far - did not happened in Argentina;
- The projected per capita emissions for 2030 is roughly 11T, higher than the current level and way over the world average;
- CAT (2015) considers that the Contribution is inadequate, since it does not involve any mitigation effort;

In terms of implementation potential, technically, the uncertainty is low. However, it seems pointless to be able to implement a contribution that means no effort in terms of mitigation.

1.2 Brazil: Moderate conservative agent, moderate ambition INDC and, medium uncertain implementation;

Brazil has been a moderate conservative agent in the global governance of climate change in the last decade because:

a) A drastic emission reduction – roughly 35% - between 2005-2012, with positive impacts over per capita emissions and carbon intensity of GDP[8];

7 http://www.imf.org/external/.

8 http://plataforma.seeg.eco.br/total_emission

The major driver for this process was a decrease in deforestation rates in the Amazon Region, from roughly 24,000 km2 in 2004 to 5,800 in 2015 (INPE[9]). However, emissions in other sectors have been increasing. Data availability is medium, since the government published the last National Communication in 2010 with 2005 numbers, but has released partial information in 2013 and its first BUR in 2014 with 2010 numbers. Also there are non-governmental sources of emissions information (SEEG[10]), which have high levels of confidence among specialists, for some, even more than the government numbers (Viola & Franchini, 2014). For 2010, SEEG calculated Brazilian emissions to be 1,520 Billion TCo2e., while governmental offices calculated 1,246 BtCo2e. (Brazil, 2013) and around 1,350 (Brazil, 2014).

b) Some advances in climate policy - programs and legislation - at the domestic level;

Brazil established its first "National Plan for Climate Change" in 2008, which set targets for deforestation control, energy efficiency, waste management and renewable energy. In 2009, the Congress passed the National Climate Law, which instituted the National Policy of Climate Change (NPCC), assumed the international voluntary commitment (see below) and, mandated that specific adaptation and mitigation sector plans would be established by the Executive Power, pursuing the transition to a low carbon economy. Those plans, however, were only partially developed and implemented in the following years.

c) An international climate standing that combined a rigid negotiation narrative with the inclination to assume voluntary mitigation commitments;

The Brazilian narrative regarding the CBDR principle has always related to the G-77's: the developed world is the main responsible for climate action and financial support, while the developing world should have no binding commitments. However, in November 2009, the country committed to reduce its emissions 20% in 2020 below BAU. According to several reports (CAT, 2013; UNEP, 2014), Brazilian climate actions are consistent this target, mainly because of the success of deforestation control policies.

With these movements, Brazil achieved its maximum level of climate commitment (2009-2010). However, it rapidly began do decrease due to:

9 http://www.obt.inpe.br/prodes/prodes_1988_2015n.htm

10 http://seeg.eco.br/

The increase of non-forestry related emissions, the stagnation of the deforestation rate in the Amazon, the insufficient implementation of the NPCC and, the come-back of the "Brazilian Proposal[11]" in the UNFCCC in Warsaw 2013.

All these movements are consistent with a government that conceives development in the traditional way, with little regard to environmental concerns, as reflected in the Brazilian position in Rio+20, or the priority given to the oil sector and the car industry (Viola et al, 2013).

INDC

Brazil "intends to commit to reduce greenhouse gas emissions" by 43% below 2005 levels in 2030 (Brazil, 2015:1), targeting 1.2 billion TCo2e. The goal is economy wide, not contingent upon international support and, includes further measures "that are consistent with the 2ºC temperature goal", inter alia: increasing the share of biofuels in the energy matrix, zeroing illegal deforestation in the Amazon and, expanding the share of renewables sources in the energy mix.

We consider the Brazilian contribution to be of moderate ambition because:

- It is referred to a base year and not to a BAU scenario, however, the chosen base year – 2005 – is the higher ever recorded and the previous year before the beginning of emission decrease;
- It does not establish a pick emissions year;
- The projected per capita emission´s level for 2030 is 5.2, only higher than the Colombian pledge;
- CAT (2015) considers the contribution as medium;

In terms of implementation potential, we consider it to be of medium uncertainty:

- The implementation of the 2020 target is adequate, as stated before;
- According to CAT (2015) Brazil can achieve the 2030 target with current policies;
- The uncertainty come from sectors outside LULUCF: Brazil has achieved success mainly in deforestation control and has define its emission targets based on this

11 A conservative doctrine that trace the historic responsibilities of countries for GHG emissions back to the industrial revolution.

"buffer zone", however, that low hanging fruit of mitigation won't last for ever (Edward & Roberts, 2015);

1.3 Colombia: Moderate conservative agent, moderate ambition INDC and, highly uncertain implementation;

Colombia has been a moderate conservative agent in the global governance of climate chance, because of:

a) The low level of per capita emissions and the low and decreasing level of carbon intensity of its GDP in the last decade;

This situation has to do with the high share of hydropower in the electric matrix and the low share of industrial output in total GDP, both features related to the path dependence of the economy and no to climate concerns. Data availabity is medium, since the last National Comunication in from 2010 with data up to 2004 and updated up to 2012 with the recent BUR.

b) A cooperative international standing but without voluntary commitments before the INDC;

Colombia is part of the G-77, however, it has departed from its rigid view of the CBDR principle, arguing that countries' commitments should be based on both past and future responsibilities and capabilities. As such, it has participated in AILAC and the Cartagena Dialogue. However, is spite of this more flexible position, Colombia did not commit to a quantifiable mitigation target for 2020 within the Copenhagen Accord, and only submitted some measures consistent with emission reduction – clean energy, deforestation control and, biofuels.

c) No major climate policy developments in the domestic realm until 2015;

Colombia has not developed a sound climate legislation or mitigation programs with quantifiable economy wide targets. On the contrary, the country has been slowly developing a National Climate Policy since the late 2000s, as mandated by the National Development Plans (2006-2010 and 2010-2014). This process included, inter alia, an Institutional Strategy (Compes 3700) in 2011 that organized the climate bureaucratic structure, a REDD Strategy and, the Colombian Low

Carbon Development Strategy (CLCDS). The CLCDS was launched in 2012 with the mandate to develop sectoral mitigation plans – energy, transportation, agriculture, industry, waste and, housing - which were released in 2015, one year past due. Those plans were not created having in mind an economy wide quantifiable mitigation target, however, they have become the main instrument to pursue the INDC and assume its target.

INDC

Colombia committed to reduce its emissions by 20% below BAU in 2030, unconditionally (Colombia, 2015). With international support, the reduction could reach 30%. The unconditional target would set Colombian emissions in approximately 270 MTCo2e.

We consider the INDC[12] target to be of moderate ambition, because:

- It uses a BAU scenario and not a base year;
- Does not establish a pick emissions year;
- The projected per capita emissions for 2030 is the lower among our Latin-American sample, roughly 4.6 TCo2e:

In terms of implementation potential, uncertainty is high:

- This is the first time Colombia commits to an economy wide mitigation target;
- There is no record on complex climate policy implementation;
- There is no sound normative and institutional framework for climate action;

1.4 Mexico: Middle climate commitment, moderate ambition INDC and highly uncertain implementation;

Mexico has been a moderate conservative agent in the global governance of climate change in the last decade, because of:

12 There is no CAT (2015) assessment for this INDC.

a) Deceleration of its emissions curve growth, including per capita emissions and carbon intensity of GDP.

This process was led by replacing oil with gas in electric generation and deforestation and reforestation. Data availability is high since México has released five National Communications so far and its 2015 BUR includes 2013 data.

b) The advance of climate programs and legislation at the domestic level.

Since 2009 Mexico has progressively established a sound legal and bureaucratic framework for climate policy expressed in: two short-term climate programs with mitigation targets in 2009 and 2014 (Programa Especial de Cambio Climático – PECC- 2009-2012 e 2014-2018); a General Law of Climate Change in 2012, that included a carbon tax approved in 2014 and; a National Strategy on Climate Change in 2013. This policy process has included "aspirational" mitigation targets for 2020 (-30% BAU) and 2050 (-50% in reference to 2000); clean energy targets for 2024 (35%) and; zero carbon loss in original ecosystems by 2020.

c) A cooperative behavior in international negotiations, including the tendency to summit voluntary mitigation commitments.

Mexico has displayed a post-G-77+China narrative within the UNFCCC, departing from the notion that only the developed world should commit to the mitigation and financing effort – actually Mexico has not been part of the G-77 since mid 1990s. It has supported this narrative with a voluntary commitment in 2009 (- 30 BAU in 2020) and being the first developing country to submit the INDC.

These features have nurtured the image of Mexico as a "poster child" for climate commitment, image not only shared – and fed – by the government, but by part of international media, NGOs and, IFIs.

However, this paper puts that image into question, given that:

d) The implementation of the committed targets has been low.

According to several reports (CAT, 2013; UNEP, 2014) Mexican policy efforts are not consistent with the 2020 targets. This seems to be validated even by the Peña Nieto administration, given that the target for 2018 contained in PECC2 (925

TCo2e) seems inconsistent with the 2020 pledge (650 TCo2e).

e) The perspectives of low carbon developments are clouded by the energy reform.

In 2013, Mexican Congress passed a constitutional amendment that broke the historical estate monopoly of the energy sector, aiming primarily to expand gas and oil production and refinery. The "Green Package" of the Reform, aimed to stimulate clean sources of energy, never passed. The inconsistency between the climate agenda and targets, and the energy reform, is a shared opinion among Mexican specialists.

INDC

"Mexico is committed to reduce unconditionally 25% of its Greenhouse Gases and Short Lived Climate Pollutants emissions (below BAU) for the year 2030. This commitment implies a reduction of 22% of GHG and a reduction of 51% of Black Carbon" (Mexico, 2015:2). With international support, the reduction could reach 40%. The target is economy wide, and targets all major emitting sectors. The INDC also includes an emission´s pick year, 2024. This means around 760 MTCO2e in 2030 (WRI[13]).

We consider this Contribution to have middle level of ambition, because:

- The target is not clear, since it involves both GHG and BC;
- It uses a BAU scenario and not a base year, although it has a pick year;
- The implicit per capita emission level for 2030 is around 5.5 TCo2e, higher than Colombia and Brazil;
- CAT (2015) considers a the INDC ambition as medium;

In terms of implementation potential, we consider it to be highly uncertain due to:

- In spite of Mexican advances in terms of climate policy framework, implementation of the 2020 target has been inadequate;
- CAT (2015) considers that more action is needed to comply;
- The energy reform threatens the climate agenda;

13 http://www.wri.org/blog/2015/03/mexico-becomes-first-developing-country-release-new-climate-plan-indc

1.5 Venezuela: Extremely Conservative actor with unambitious INDC

Venezuela is an extremely conservative agent in the climate global governance because of:

a) The high level of emission per capita and carbon intensity of GDP;

Venezuela has had the lowest pump price for gasoline and diesel in the world between 2003-2015, reaching the level of US$00,2 per liter in 2014 (WB[14]). Official data availability is very low, Venezuela has published only one National Communication in 2005 with 1999 numbers, and has not update emission data since.

b) The absence of any relevant climate policy development at the domestic level;

Data availability is very low on this topic, and no sign of a climate program or strategy – even in development – has been identified.

c) A conservative international position and the reluctance to make quantifiable mitigation commitments;

Venezuela has deployed a very rigid interpretation of the CBDR principle, stating not only that the developed world is responsible for the climate crisis, but that the only way to manage it is to abandon the capitalist system (Venezuela, 2015). It has frequently operated as a blocking actor in UNFCCC negotiations and it did not commit a pledge for 2020. Venezuela's inflated discourse on climate justice in the international realm is deeply inconsistent with its absence of progress at the domestic level.

INDC

Venezuela has commit to reduce emissions 20% in relation to BAU. However, this target is conditional to the provision of assistant from the developed world. A clear assessment of its level of ambition and implementation potential is difficult because of the quality of the data. In particular, the emission and BAU scenario data is problematic – 200 MTCo2 in 2010 - since it is not consistent with other sources,

14 http://data.worldbank.org/indicator/EP.PMP.SGAS.CD

such WRI (see Figure 1). There is also no precision regarding the policy instruments to fulfill the commitment. Hence, we consider the Venezuelan Contribution as low ambition, and in consequence – as in the case of Argentina – the implementation potential becomes irrelevant.

Conclusions

Argentina and Venezuela have submitted contributions that are basically consistent with the BAU scenario, this is, they mean no effort in terms of mitigation. Also, the credibility of the numbers is difficult to assess. This is coherent with their low level of climate commitment previous to the INDC. Both Argentina and Venezuela have a bad record in terms of emission trajectory in the last decade, no sound domestic climate policies, have been very rigid in their interpretation of CBDR and, reluctant make voluntary commitment before Paris. However, Venezuela's situation regarding climate commitment is much worst than Argentina, mainly because of the extreme subsidies to the consumption of oil derivatives.

Among the Latin-American climate powers with medium level of climate commitment, circumstances vary. The three of them have submitted contributions that are moderate. Although, if the emission per capita metric is used, Colombia ranks first, Brazil, second and, Mexico, third.

In terms of implantation potential, Brazil has the highest among this countries, basically due to its positive record in term of complying with the 2020 commitment. However, the record of emissions outside LULUCF is a bad sign, that is why uncertainty is still medium. Mexico and Colombia both share high levels of uncertainty, Mexico due to the failure to implement the 2020 commitment and the shadow of the energy reform and, Colombia because it has no record in terms of implementing climate policies with mitigation targets.

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The Brazilian Intended National Determined Contribution (INDC) and energy policy

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The Brazilian Intended National Determined Contribution (INDC) and energy policy

1. Introduction

The Government of the Federative Republic of Brazil has set the target to reduce greenhouse gas (GHG) emissions by 37% below 2005 levels in 2025 in its intended Nationally Determined Contribution (iNDC). The next indicative target is the reduction of GHG gas emissions by 43% below 2005 levels in 2030. The iNDC is mandatory for the whole country and encompasses all sectors of the economy, including CO2, CH4, N2O, perfluorocarbons, hydrofluorocarbons and SF6. (Brazil 2015).

In a complementary document to its iNDC, Brazilian government has expressed the intention, among other initiatives, to:

> 1. raise the share of sustainable bioenergy in the Brazilian energy matrix to about 18% in 2030, expanding the use of biofuels, increasing the supply of ethanol considering also the share of advanced biofuels (second generation), and increasing biodiesel portion of the mixture of diesel fuel;
>
> 2. achieve an estimated share of 45% of renewable energy in the composition of the energy matrix in 2030, including:
>
> – expanding the use of renewable energies in the energy matrix, other than hydropower, from 28% to 33% in 2030;
>
> – expanding domestic use of non-fossil energy sources, increasing the share of

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renewable energy in electricity supply, other than hydropower, to at least 23% in 2030, considering wind, biomass and solar sources;

– achieving 10% efficiency gains in the energy sector until 2030;

3. promote new standards of clean technologies and disseminate energy efficiency measures and low carbon infrastructure in the industrial sector; and disseminate efficiency measures in the transport sector, promoting improvements in transport infrastructure and public transport in urban areas. (Brazil 2015a).

These actions are conjoined to others not directly related to energy, such as enforcing more effectively the Act on the Protection of Native Forests (Law 12,651/2012), as well as measures in order to achieve, in Brazilian Amazonia, zero illegal deforestation rate in 2030.

The questions that arise are: Are the above commitments consistent with the legal framework and concrete practices in public policies implemented in Brazil? Which elements need adjustments at legislation and government actions to ensure achievement of the objectives expressed in Brazilian iNDC? This paper analyzes these questions critically, focusing on energy issues.

2. The National Policy on Climate Change

The Act on the Brazilian National Policy on Climate Change (Law 12,187/2009) was passed on 29 December 2009. It is a framework law, which sets out objectives and guidelines and lists instruments, such as the National Plan on Climate Change, the National Climate Change Fund, and plans to conserve the country's biomes.

Law 12,187/2009 has established the country's voluntary reduction target of 36.1% to 38.9% in its GHG emissions estimated to 2020, using 2005 as baseline. One should realize, therefore, that the targets set for 2025 in 2015 iNDC do not really advance in relation to what is already established by the domestic law in force in Brazil.

In the process of formulating Law 12,187/2009, there was a presidential veto on the article that established the gradual increase in the share of renewable energy in Brazilian energy matrix, to replace fossil fuels, setting out aims such as: a gradual increase in the share of electricity produced by autonomous independent producers,

based on wind generation, small hydroelectric power plants (called in Portuguese "pequenas centrais hidroelétricas" – PCHs) and biomass; incentives to produce biodiesel, preferably from small producers, and the progressive replacement of diesel fuel derived from oil, particularly in the transport sector; stimulating the production of energy from solar, wind, thermal and biomass sources and cogeneration, and the use of the hydroelectric potential of small isolated systems; and differential tax treatment of equipment for power generation from renewable sources.

In the explanations of this veto, it is stated that the text did not include the hydroelectric plants within the planned measures[3]. This criticism might make some sense, given the importance of large hydroelectric plants in Brazilian electric matrix, but the presidential veto has left a legal vacuum in relation to other sources of renewable energy. The policy leaves specific implementation measures to be established by decree or other kind of secondary legislation.

The President edited a secondary legislation in 9th December 2010 (Decree 7,390/2010) determining that total emissions should not surpass 2 Gt and that emissions should be reduced by 5.8% reduction by 2020 considering 2005 levels. This decision has made Brazil the first developing country to establish an absolute limit to its GHG emissions (Globe International 2014:75).

It should be commented that, prior to Law 12,187/2009, Brazil already had the National Plan on Climate Change, published in 2008 by the Inter-ministerial Committee on Climate Change. The main actions directly related to energy planned in this document (that has no legal force) were:

1. stimulating efficiency, taking into account, among other topics:

– energy efficiency – implementation of the National Policy for Energy Efficiency, which should result in a gradual energy saving up to 106 TWh/year to be reached in 2030, avoiding emissions of around 30 million tons of CO2 in that year;

– charcoal – consumption increase of sustainable charcoal to replace coal in steel plants, mainly through the promotion of forestation in degraded areas;

– solar heating – favouring the use of water solar power heating systems, reducing electricity consumption in 2,200 GWh per year by 2015;

2. keeping the high share of renewable energy in the energy and electric matrices,

3 See: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/Msg/VEP-1123-09.htm. Accessed: 3th March 2016.

considering the content of the National Energy Plan (in Portuguese "Plano Nacional de Energia" – PNE) 2030; and

3. favouring the sustainable increase in the share of biofuels in the national transport matrix and work towards the structuring of an international market of sustainable biofuels (Brazil 2008).

Besides this, the National Plan on Climate Change highlights several actions related to the control of deforestation.

Brazil has achieved impressive results in reducing emissions from deforestation between 2004 and 2014, reducing the deforestation rate in Brazilian Amazonia by 82%[4] (Brazil 2015a). In other biomes, however, especially in Cerrado – the most biodiverse savanna in the world and where many agribusiness activities take place – deforestation rates remain high. Incidentally, it is worth noting that iNDC only makes explicit reference to Amazonia.

In the following section, the Brazilian energy and electric matrices and the provisions of PNE 2030 and other official documents will be analyzed.

3. The National Energy Plan (PNE) 2030 and related discussions

PNE 2030, a complex document published by the Ministry of Mines and Energy (MME)[5] and published in 2007, was the first comprehensive study of integrated planning of energy resources produced by the Brazilian government. It proposes strategic directions and policies for expanding the national energy supply, including different kind of energy sources. It was based upon the principle of the energy matrix diversification (Brazil 2007).

The evolution of energy consumption in Brazil shows predominance of petroleum derivatives, largely due to the road transport domain in the transport sector (Table 1). Anyway, Brazil has historically important comparative advantages over other countries regarding the use of renewable sources, by the predominance of hydroelectric generation in the composition of electricity, by the inclusion of ethanol and other sugarcane products into the energy matrix and, although still undervalued as alternatives in the country (including in PNE 2030), by the potential of wind and solar sources.

4 The relevance of this achievement, however, should be taken with a grain of salt: the deforestations rates were exceptionally high between 2000-2005, making the country responsible for nothing less than 42% of the net global loss of forested areas (Barreto et al. 2005).

5 The studies have been prepared by the Energy Research Office – EPE, linked to MME.

Table 1. Evolution of final energy consumption in Brazil

In thousands of tons of oil equivalent (TOE).

Source	1970	1980	1990	2005	annual Δ% 1970-2005
petroleum derivatives	21,040	44,770	44,944	66,875	3.4
electricity	3,231	10,189	18,123	31,103	6.7
sugarcane products	3,158	6,221	10,414	20,046	5.4
firewood	28,345	21,862	15,636	16,119	-2.9
natural gas	3	320	1,385	9,411	14.5
others	3,306	9,506	15,308	21,490	5.5
total	59,083	92,868	105,540	165,044	3.0

Source: PNE 2030 (Brazil 2007:56).

There is a high share of renewable sources in Brazilian energy matrix. PNE 2030 states that 44.5% of the energy consumed in Brazil came from renewable sources in 2005. However, this percentage had been higher, representing 53% in 2000 (Brazil 2007:240). It is important to understand that iNDC's goal of achieving an estimated share of 45% renewable energy in the composition of the energy matrix in 2030 is far below the 2000 reality.

PNE 2030 explore different scenarios for Brazilian economy and therefore for energy demand. In all of them, it takes into account the tendencies to increased electrification; increased penetration of renewable liquid fuels (ethanol and biodiesel), replacing oil products; greater penetration of natural gas; and increased

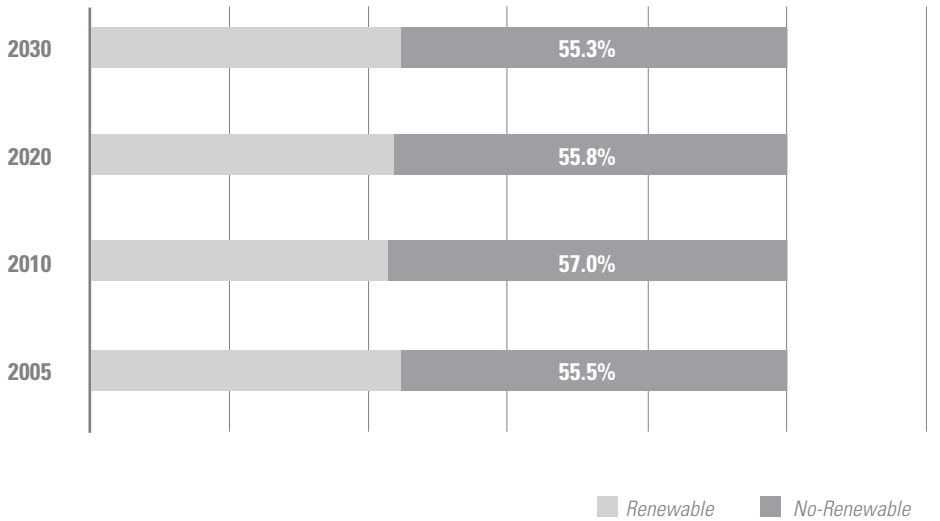
use of mineral coal, due to the growth of the steel industry (Brazil 2007:64-65).

Even in the less optimistic scenario regarding the country's economic growth, PNE 2030 previews increase of 144.3 million TOE between 2005 and 2030, equivalent to approximately 90% of final consumption registered at the starting point (Brazil 2007:60). In this situation, one must address both energy efficiency and the expansion of energy supply.

With regard to energy efficiency, the proposal of PNE 2030 is to reduce about 5% of the total projection of electricity consumption estimated for 2030, equivalent to 53 TWh (Brazil 2007:191-192). One must realize that this percentage is below iNDC's forecast of achieving 10% of efficiency gains in the energy sector until 2030.

PNE 2030's proposals about the participation of renewable energies in the energy matrix are also very unambitious, as shown in Figure 1. The target is to maintain, not to increase the rate of renewable sources.

Figure 1. Renewable sources in Brazilian energy matrix: perspectives PNE 2030



Source: PNE 2030 (Brazil 2007:241).

The percentage of 44.7% expected for 2030 is consistent with the percentage of 45% included in the Brazilian 2015 iNDC. As stated above, this goal is significantly below the percentage of the year 2000. The problem is that, probably due to the water crisis and/or lack of planning, the country has regressed in this field. The iNDC assumes that the energy matrix includes currently only 40% of renewable energy (Brazil 2015a). It is a high percentage in the world reality, but low when considering Brazil's potential.

In Brazilian electric matrix, the prevalence of hydroelectricity has been historically a key element, a situation that puts the rate of renewable sources on great prominence. In 2005, this source accounted for about 90% of electricity generation, not considering the autonomous systems (Brazil 2007:249). The 2015 iNDC says that currently renewable sources account for 75% of the electricity supply (Brazil 2015a). Dinato and Kulay (2015:39) call attention to the fossilization that occurred in the last decade, mainly by reducing the hydraulic participation and by increasing the share of natural gas.

The tendency, according to PNE 2030, is really reducing the contribution of hydropower to the total generation, because of the limitations for new developments, derived especially from environmental legal constraints in Brazilian Amazonia, and because of the tendency to diversification of the energy sources in Brazil. The document presents the estimates shown in Table 2.

Table 2. Electricity matrix: perspectives PNE 2030

In TWh.

Source	2005	2010	2020	2030
PUBLIC SYSTEM	363.3	496.0	719.3	1,055.8
hydroelectric dams	325.1	395.0	585.7	817.6
nuclear plants	9.9	15.0	30.5	51.6
mineral coal	6.1	13.0	15.6	31.4
natural gas	13.9	58.4	61.5	92.1
biomass (sugar cane)	0	1.1	14.6	33.5
wind plants	0.09	3.6	5.0	10.3
urban waste	0	0	1.0	6.8
other sources	8.2	9.9	5.4	12.5
AUTONOMOUS PRODUCTION	39.8	39.9	65.7	97.8

Source: Adapted from PNE 2030 (Brazil 2007:250).

PNE 2030 tries to deal with the difficulties in the implementation of hydroelectric plants through the expansion of coal generation and nuclear power plants (Brazil 2007:235), although it also predicts an increase of the so-called "alternative" sources.

The plan includes the following goals in order to increase the participation of alternative sources in Brazilian electric matrix, between 2015 and 2030:

– PCHs: development of about half the potential currently known, adding 6,000 MW;

– biomass plants: development of the potential indicated by specific studies on sugarcane, adding 4,750 MW;

– urban waste: energy use of half of urban waste produced by the 300 largest Brazilian cities (about 40% of the national volume), involving 1,300 MW;

– wind energy plants: installation of a capacity equivalent to the first phase of Program for Fostering Alternative Sources of Electric Energy (in Portuguese "Programa de Incentivo às Fontes Alternativas de Energia Elétrica" – Proinfa), which amounts to 3,300 MW (Brazil 2007:223).

Despite the concern of PNE 2030 with the diversification of energy and electric matrices, the analysis of the plan highlights the existence of some path dependence (North 1993, Pierson 2004) in the prioritized options. In other words, past choices make difficult the orientation of public policies for paths different from those already trodden.

Some passages of the plan take for granted that alternative sources are difficult to implement, even if evidences provided in the document itself somewhat contradict this finding. An example is the average investment cost assumed for wind generation of 1,200 US$/kW, certainly higher than the cost of natural gas (750 US$/kW), but the same as PCHs and much lower than the nuclear power plants (2,200 US$/kW). (Brazil 2007:211-218). However, wind power is presented as a costly alternative, a problem that is partly true because the plants do not work at full capacity (Brazil 2007:177), but that has been overcome in practice. Besides, one must consider that the operational cost of wind power plants is very low, close to zero. As shown in the following section, the predictions of PNE 2030 related to wind generation have been clearly underestimated.

There is also evidence, in the proposals included in the PNE 2030, of difficulties in changing ways. As mentioned above, the plan presupposes the goal of gains of only 5% in energy efficiency considering its time horizon. Another example are the planned investments in electricity for the period 2005-2030: of the projected total of US$ 168 billion, US$ 117 billion are for large hydroelectric plants and only US$ 22 billion for alternative sources, an amount close to the US$ 17 billion earmarked for conventional thermoelectric units (Brazil 2007:264).

The Ten-Year Energy Expansion Plan (in Portuguese "Plano Decenal de Expansão de Energia" – PDE) covering the period 2014-2024 (Brazil 2015c) and also prepared by EPE/MME, is somewhat of an improvement compared to PNE 2030.

The plan maintains the historical option for large hydroelectric plants, since it presupposes the use of São Luiz do Tapajós plant at its full capacity of 8,024MW, which, together with the completion of Belo Monte, with its 11,233MW, will account for 68% of the hydroelectric expansion (Brazil 2015b:22). It is worth mentioning that this new plant is likely to face strong opposition from different civil society groups, as it has occurred and still occurs with Belo Monte. Overall, PDE assumes a decrease in hydroelectric generation, ranging from 67.6% in 2014 to 56.7% in 2024 (Brasil 2015b:25)[6].

PDE affirms that other renewable energy sources (e.g., wind, biomass, solar and PCHs) will increase at an average rate of 10% per year, especially because of the strong expansion of wind power capacity (expected to reach 24 GW in 2024). Regarding wind energy, in fact, the PDE recognizes a reality that has surpassed government planning. Besides, the solar power capacity is expected to reach 7 GW in 2024, with a share equivalent to 3.3% of the total installed power capacity. The plan affirms that the share of renewables in the generation capacity will increase from 16% in early 2015 to 27% in December 2024. (Brazil 2015:24b). The increase in this perspective meets the 2015 iNDC.

The investment related to new power plants to be employed amounts to US$ 62 billion and reflects the following expansion profile: 33% in hydroelectric plants, 59% in other renewable (small hydro, wind and biomass) and 8% in thermoelectric plants (Brazil 2015c:119). These PDE numbers must be taken as a rough estimate, due to the severe fiscal crisis that the country is currently undergoing.

The next section will present a more detailed analysis on wind energy.

6 Not included PCHs, which amount 4.1% in 2014 and 3.8% in 2024 (Brazil 2015b:25).

4. The advances in wind generation

There are currently 360 wind power plants operating in Brazil, with an installed capacity of 8.98 GW. The Wind Energy Brazilian Association estimates that these plants are responsible for the reduction of 15,505,224 tonnes per year of CO2 from the atmosphere (ABEEólica 2016).

Due to the difficulties associated with the implantation of large hydroelectric projects and, more recently, the perspective of recurrent hydric crisis, it becomes mandatory to diversify Brazilian electric matrix. In this context, wind energy has been taking up space in the country, showing rapid growth in recent years.

The wind generation in Brazil had an initial impulse brought about by Proinfa, established by Law 10,438/2002 and regulated by Decree 4,541/2002. About 3,300 MW of installed capacity were allocated, encompassing wind, biomass and PCHs. Wind projects amounted to 1,423 MW. The purchase of energy occurred through twenty years contracts signed with the government. At current values, wind energy was contracted by R$ 370/MWh; prices paid for the other sources (PCHs and biomass) were around R$ 200/MWh, in contrast to conventional hydroelectric energy, which was bought at the price of R$100/MWh in the same period (Gannoum 2014:58).

This reality has changed a lot since 2009. The projects of wind generation have achieved very competitive prices. Figure 2 shows the history of the wind power prices in Brazil since Proinfa, in updated values.

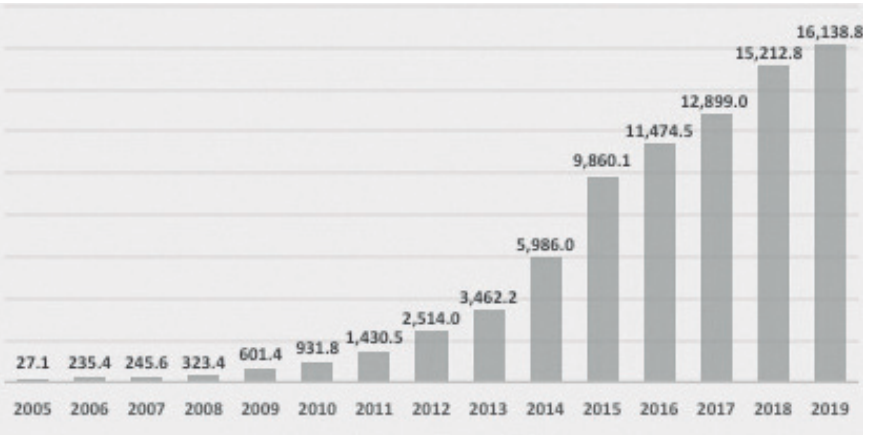
Figure 2. Wind energy prices – Proinfa and public energy auctions 2009-2014

Updated values for Nov. 2014 (in R$/MWh)

Source: Gannoum (2014:59).

From 2009 to 2014, in thirteen public energy auctions in which the wind industry has participated, about 14 GW of new wind power projects were contracted. They will increase the installed capacity in Brazil to more than 16 GW in 2019, as shown in Figure 3.

Figure 3. Wind energy: growth of installed capacity



Growth of installed capacity (MW)

Source: adapted from Gannoum (2014:62).

The above figure demonstrates that PNE 2030 has failed to foresee the potential of wind generation in the country. It has also failed to foresee the results in the medium term of government initiatives that were ongoing, especially the Proinfa. The wind power is currently the second most competitive source of electricity in Brazil, with its MWh costing slightly higher than that generated by large hydroelectric plants[7] (Gannoum 2014:60). Photovoltaic systems also show a tendency to a price decline in Brazil (Galdino 2012), but far behind the current competitiveness of wind generation.

Although the implementation of Proinfa projects has faced many challenges, one must recognize that the program has contributed to the consolidation and competitiveness of the national wind manufacturing and supply chain. Brazil currently has ten wind turbine factories, nine tower factories and four blade factories, beyond a network of subcomponents factories (Gannoum 2014:61).

Brazilian winds benefit from many favourable conditions for an efficient generation of electricity, especially in the Northeast. In this region, the wind has few changes in direction during the year, a condition that contributes to optimal performance of the turbines (Gannoum 2014:63). Moreover, at the time of low flow of the San Francisco river, wind conditions are excellent, ensuring seasonal complementarity with the hydroelectric dams and adequate supply throughout the year. In this reality, one should question PNE 2030's affirmation that Northeast would be the most appropriate region of Brazil for the installation of new nuclear power plants[8] (Brasil 2007:226). In one way or another, an alternative local source of energy for the region shall become more and more critical, as the effects of climate change on the hydroelectric potential becomes more and more severe, because of severe draughts. Although the impact on the national integrated system is not that significant, it is dramatic at the local level: in the worst scenarios, the average potential of generation can be reduced to 30% of its current levels (Tiezzi 2015).

There are other regions possessing significant wind energy potential besides Northeast. The state of Rio Grande do Sul is the third with more installed capacity in wind power, next to the states of Rio Grande do Norte and Ceará (Portal Brasil 2015).

Since 2013, bids for wind energy contracting include as a condition for the energy purchase the assurance of the connection to the transmission network. Thus, the idea is to address mismatch problems between the operating schedules of power generation plants and transmission lines.

7 At current values, the price of energy from the dams of Belo Monte and Rio Madeira is R$ 101.98/MWh, from St. Antonio dam R$ 117.17/MWh and from Jirau dam R$ 103.11 (Gannoum 2014:60).

8 That affirmation becomes even more debatable when one notices that the region has also an extraordinary potential for solar energy generation, comparable to that of the best regions in the world (like the deserts of Sudan or of Mojave, United States): up to 6,100 Wh/m² of incident solar radiation. Its solar energy potential is also less vulnerable than that of other renewable sources to the effects of climate change (Bahia 2015).

Information on the wind potential throughout the national territory has been available for years. The Brazilian Wind Energy Potential Atlas provides information to enable decision-makers in identifying areas suitable for aeolian-electric usages[9]. There are also specific studies for the Federation units.

As mentioned earlier, the federal government has been adjusting gradually its perspective on the so-called alternative sources in recent years. PDE estimates that, in 2024, the Brazilian wind system will account for 11.6% of all electricity generated in the country (Brazil 2015b). With a relevant role like this, wind ought not to be qualified as an "alternative" source anymore.

The advances in terms of wind generation should encourage similar efforts in renewable sources other than hydropower, so that the country can effectively fulfill the commitments included in the 2015 iNDC.

5. Challenges and legislative proposals

The iNDC presented by the Brazilian government in 2015 innovated little over obligations that were already set out by domestic primary or secondary legislation. Still, there are complex challenges that arise for the implementation of the established commitments.

Historically, Brazil faces difficulties to put environmental law into practice and to ensure its enforcement. When the application of these rules involves not only environmental government agencies, but also energy and transport policy subsystems, among others, the difficulties are even greater. In fact, several public policies, under the responsibility of the three levels of Brazilian federation, are related to the commitments included in the iNDC. The complexity of this picture increases even more, in a context of fiscal and political crisis as experienced currently in the country.

The same government that last year presented Brazilian iNDC to mitigate climate change to the world has been sending internally, to say the least, many mixed signals to the productive sector and to the society as a whole. In 2015, for instance, it cut off from its multi-year investment plan for 2016-2019 (in Portuguese "Plano Plurianual" – PPA) the inclusion of the expansion of solar and wind energy generation. It has been heavily subsidizing oil and motor industries, and investing heavily in new investment projects of doubtful impact like pre-salt oil extraction and large hydroelectric power

9 Available at: http://www.cresesb.cepel.br/index.php?section=publicacoes&task=livro&cid=1. Accessed: 18 March 2016.

units, offering abundant and subsidized credit to a few of the economic player with the highest political influence (Abranches 2016).

The challenges in this field, then, have more to do with the integration and implementation of public policies, than to the approval of new legislation. Anyway, there are proposals being discussed in Congress that, directly or indirectly, seek to ensure higher effectiveness to the National Policy on Climate Change. Among these processes, two in progress at the House of Representatives should be highlighted:

1. Bill of Law (in Portuguese "Projeto de Lei" – PL) n. 3,280/2015, amending Law 12.187/2009, in order to ensure that Brazilian energy matrix has at least 40% of renewable energy generation, being: 66% from hydropower; 23% from wind, solar and biomass sources; and 16% from ethanol and other sources derived from sugarcane. It determines the restoration of at least 12 million hectares of degraded areas in the national biomes, and the recovery of at least 15 million hectares of degraded pastures. Finally, it states that, to achieve the objectives of the National Policy on Climate Change, the country will, as a voluntary national commitment, take actions to mitigate GHG emissions in order to reduce 37.25% of its projected emissions by 2025, and 43% of its projected emissions by 2030. These targets require adjustments with respect to 2015 iNDC 2015, but the general idea is that Law 12,187/2009 becomes clearer and more precise with regard to environmental protection.

2. PL n. 2.117/2011 (and attached propositions), which provides for the creation of the Integrated Energy Development Plan and the Alternative Energy Fund. The proposed plan aims to: coordinate action of the Union, States, Federal District and municipalities, with the participation of the private sector, to foster the production of biogas, biodiesel and electricity from renewable energy sources, as well as to improve efficiency in the use of various forms of energy; encourage the creation of jobs and income in the production of renewable energy; and create conditions for biofuel production by family farmers. In addition, this bill of law creates the Alternative Energy Fund, with the aim to finance programs and projects within the Integrated Energy Development Plan.

The authors of this paper believe that the debate to improve these legislative proposals is relevant for the implementation of the commitments assumed by the country in the international negotiations on climate change.

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Polarization no longer sets the tone in climate negotiations

Ricardo Abramovay[1]

Polarization no longer sets the tone in climate negotiations

1. Introduction

The mere fact that the Paris Agreement has been so widely celebrated as a great success and a historic landmark sets the COP21 apart from the twenty climate conferences that preceded it. Imagining that the commemoration merely stems from generalized complacency, lack of information, absence of a critical spirit, or worse, the petty interests of opinion makers would be to completely ignore the massive, uncontrollable dynamics of this kind of event. Paris was no siren song to enchant mariners anxious for good news, only to find themselves enraptured, but sinking. Apart from its organizers, a vast set of civil society, corporate and scientific organizations claim credit for its success and that suggests the importance of what was negotiated and approved there.

Before presenting the respective decisions in the next item and then its two major challenges, a warning is necessary: neither the COP21 nor any other kind of diplomatic agreement obtained in the coming years will have magic powers to impose obligations, behaviors or decisions on countries that will result in reduction of emissions. It is worth remembering what **Michael Jacobs**[2] has underscored – diplomats and the governments they represent do not emit greenhouse gases. What is at stake is a set of structural changes that involves the very way in which contemporary societies make use of their material, energy and biotic resources. In other words, reversing the upward trend of global warming calls for profound transformations in production and consumption patterns, in the way we obtain energy, and in regard to food, mobility, shelter, clothing, communication and all the other goods and services that fill the basket of our current consumption.

That transformation presupposes that we address two central issues regarding which it would be unrealistic to expect that the Paris Agreement could offer a ready-made solution. The first has to do with inequality in the occupation of the global carbon

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2 https://www.youtube.com/watch?v=Fdjjownd8hc&feature=youtu.be&a

space. China and, above all, India claim the right to offer access to electricity to hundreds of millions of their people and doing that today is cheaper on the basis of fossil fuels than of any other alternative. Average per capita consumption of energy in India 2014 was a mere 7% of that North America's (Saran, 2015:20).

At the same time, China and India are among the countries that have accelerated the participation of modern renewable energies in their energy matrices. In 2015, China alone **invested in modern renewable energy as much as the United States and Europe together**[3] There is recent evidence that **it will achieve its Paris commitment goals before the stipulated date**[4]. In India's case the enigma lies in the financing mechanisms that enabled the country to install the equivalent of six Itaipu hydroelectric plants in solar energy in just six years and another four Itaipu's in wind energy (Saran: 2015:19).

Nevertheless, China and India's energy matrices continue to be dependent on fossil fuels and, despite their present achievements and ambitious plans for the future, only highly exceptional conditions could bring about any radical reduction in that dependence in the next twenty or thirty years. Paris does not guarantee anything, but the agreement has contributed towards bringing about such conditions.

That leads to the second issue on which the de-carbonization of the global economy depends: the rhythm is determined less by global agreements (although it is not indifferent to them because failure to achieve the goals always leads to diplomatic embarrassment and pressure from the civil societies of the countries in question) but more by the relations between the prices of fossil fuels and those of their alternatives, as well as on the financing needed to make the transition feasible. In that sense, the contemporary situation is paradoxical: **the price of a barrel of crude oil has dropped by more than 70% since June 2014**[5]. That is largely due to the efforts of OPEC to squeeze the North American supply out of the market, given its spectacular increase in the wake of technological progress in the exploitation of shale formations. **Covert et al**[6] show that the technological progress is intense and embraces, in a generalized manner, the extraction of both crude oil and gas. Against that background, the performance of investors (especially institutional investors like pension funds) is one of the key variables that determine the direction of the struggle against climate change.

2. The full half of the glass

The Paris Conference introduced two novelties that will inevitably become part of the

3 http://www.telegraph.co.uk/finance/economics/11958916/Paris-climate-deal-to-ignite-a-90-trillion-energy-revolution.html

4 http://www.climatechangenews.com/2016/02/24/china-will-far-surpass-2020-climate-target-says-top-envoy/?utm_source=Daily+Carbon+Briefing&utm_campaign=56f498bef3-cb_daily&utm_medium=email&utm_term=0_876aab4fd7-56f498bef3-303442305

5 http://www.nytimes.com/interactive/2016/business/energy-environment/oil-prices.html?_r=0

6 https://www.aeaweb.org/articles.php?doi=10.1257/jep.30.1.117

negotiations and processes it has set in motion. The first is the wish (not formulated as a decision but present in the preamble to the document as an effort to be made) to see that the temperature increase does not go beyond 1.5º. Considering that emissions from the time of the industrial revolution until today, even if they were abruptly halted now, will bring about a rise of 1.3º in the average global temperature because of the accumulated volumes of greenhouse gases in the atmosphere, then that aspiration in the preamble seems somewhat unrealistic. Nevertheless, it is there in the agreement and as such it constitutes an additional element of pressure to be included in the process of accompanying the execution of the agreement.

The second novelty is the proposal of zero net emissions during the second half of the 21st century. The fact that today 80% of the energy used in the world comes from fossil fuels gives an idea of how ambitious that proposal is. It seems to be true that the energy and carbon intensity of the global economy is falling; in 2014 the global Gross World Product grew by 3.3% but energy sector emissions only increased by 0.5% (PwC, 2015). That reduction, however, is at a rate far inferior to what is needed to avoid a global temperature increase of less than two degrees by 2100. At current emission levels the global carbon budget (how much can be emitted without going beyond a two degree rise in the average global temperature) will have been exhausted by 2036, according to global consultants PwC.

It is in this aspect that the COP21 achieved most: for the first time each country elaborated and publicized its goals regarding de-carbonization of its economy in the form of an INDC. The thesis referring to the historical responsibilities of the developed countries that have dominated (and blocked) the climate negotiations from the start (Abramovay, 2014) has not been abandoned, as we shall see below, but it no longer sets the tone of them. Several developing countries have clearly distinguished their intended unilateral actions from those that will require help from outside. That is a break with the bipolarity intrinsic to the Kyoto Protocol and situates the developing countries in the position of no longer being just the victims of global warming, those most affected by extreme events (which they certainly are), but as central protagonists in the quest for a solution.

It is not that the publicized goals will set the global society on the road to a 2º maximum temperature rise. Article 17 of the Agreement recognizes how distant they are from that objective. However, far from being innocuous expressions, the goals and the recognition of their insufficiency are imbued with two important virtues. First, there is a significant inflection in what the emissions curve would be without them – bad with the goals but worse without them. Second, the Durban Conference

had decided that these goals would be established in 2015 and would come into force only in 2020 or when a set of countries responsible for at least 55% of global emissions had formally presented their objectives. Given that adherence to the Agreement involved 188 of the 195 participants (practically representing all global emissions) that anticipation must be considered highly beneficial.

The more so because, in the five-yearly revision of the goals (provided for in paragraphs 23 and 24 of the Agreement), the countries will have to expand their commitments. Given that greenhouse gas emissions are at least partially connected to atmospheric pollution, that stimulates social pressure in favor of de-carbonization. In the 24 hours before the authorities had it taken off the air, one hundred million people watched the movie **Under the Dome**[7] (showing the devastating effects on health and the environment of different forms of pollution in China); the Chinese Minister of Health compared it to Rachel Carson's Silent Spring. In some metropolitan regions of India, pollution is even worse than in Beijing. Increasing emissions at the cost of people's quality of life is being tolerated less and less, even in the bigger developing countries.

All the above factors (together with the recognition of the need to create mechanisms to face the immediate consequences of climate change in the world's poorer countries referred to in sub-headings 48 to 52 of the Agreement as 'Loss and Damage') show that the Paris Conference managed to go far beyond what had originally seemed to be the height of its ambition – achieving a mere common denominator between China and the United States. Obviously for that to happen, the initiative of a considerable set of corporate leaderships and organizations was crucial, as we shall see below.

3. From the carbon budget to leadership in renewable energy

In June 2010, the Indian government organized a seminar with an emblematic title, "**Global Carbon Budgets and Equity in Climate Change**"[8], that embodied the guiding spirit of the Cancun Conference at which its annals were distributed. The presentation made by the then Minister of the Environment summed up very well the orientation prevailing in government and among many Indian researchers and technical experts: "the concept of equitable access to atmospheric space must now become the primary focus of climate negotiations". The papers presented at the seminar showed that India had only occupied a minuscule portion of the global carbon space when the calculation was made on a per capita basis and compared to the

7 http://www.theguardian.com/film/2015/mar/09/chinese-pollution-documentary-under-the-dome-taken-offline-government

8 http://envfor.nic.in/sites/default/files/tiss-conference-cc-2010.pdf

emissions of developed countries, even when taking the 1970s or the beginning of the 1990s as the base. At the same time there was an urgent need to provide energy to millions of people. Any alternative to the use of carbon would be economically unfeasible. That was what gave rise to the climate negotiations' overriding objective of expanding India's greenhouse gas emission possibilities (and that of other countries with precarious degrees of electrification); something that would only be possible if developed countries, not only reduced their emissions but, above all, paid for any amounts that exceeded their allocated carbon budgets. Those payments could be transformed into the basis for technical cooperation directed at the de-carbonization of developing countries.

The idea that the central issue in the negotiations revolves around the dispute as to who has the right to occupy the remaining carbon space (given the available carbon budget linked to avoiding warming of more than two degrees) can also be found in the papers of the Chinese Academy of Social Sciences, particularly in texts produced by the team headed by **Jihaua Pan** (Pan and Chen, 2010). Furthermore, that point of view is also close to that of another document distributed in Cancun by the **German Consultative Council on Global Warming**[9]. Those documents, coming from India, China and Germany, clearly reveal the environment in which negotiations took place just six years ago dominated by a confrontation whose only apparent solution was an abrupt (and almost impossible) reduction in emissions on the part of the richer countries in order to make way for the economic growth of the poorer ones.

During the five years separating the Cancun conference from the Paris conference, the objective conditions on which those arguments of "climate justice" were based had become transformed in an impressive manner. The deciding factor can be found in the learning curve associated to modern renewable energy (above all wind and solar) which has led to an impressive increase in generating power and a correlative drop in the price of energy from those sources. Admittedly, during the Paris Conference, Narendra Modi still insisted on the climate justice concept and reiterated India's claim to special treatment in the light of the magnitude of the abject poverty there. After all, as Saran (2015:25) points out, India's average per capita carbon consumption is only 20% of USA's and 34% of the OECD average in spite of the recent (and ongoing) decline of the presence of carbon in the developed world's energy matrix.

What has changed, however, in regard to what prevailed up to 2010, is that India wants to become a leading country in the global green transition within the next few years while at the same time continuing to depend on carbon (Saran, 2015). India is the country that is expected to grow most in the global economy and there is no way

9 http://www.wbgu.de/fileadmin/templates/dateien/veroeffentlichungen/sondergutachten/sn2009/wbgu_sn2009_en.pdf

that growth can dispense with the country's current dependence in regard to coal. Nevertheless, today India is the world's third largest producer of solar energy and fourth in wind energy. From 2002 to 2015 its renewable energy supply increased six fold from 2% to 13% of its electricity matrix, as shown in the goals document that India submitted to the Paris Conference[10]. Obviously that is still very little in the face of the absolute impact of its emissions but the rhythm of growth is accelerating and the goal is to achieve 40% participation of renewable energy by 2040 (Saran, 2015).

In China's case the change has been even more radical: the country has not only become the world's biggest emitter, but its per capita emissions went up from **2.3 tons[11] in 2000 to 7.2 tons in 2014**[12] which is more than various European countries, although less than half the North American figures. That tremendously weakens the argument for continuing to emit in the name of providing access to decent living standards, including electricity supply, to the very poor. Accelerating de-carbonization has become a national goal approved by the Chinese Communist Party Congress and that is responsible for the fact that China is committed to no longer increasing emissions after 2030 by which time it plans to have installed generating capacity of 200 GW from wind energy and 100 GW from solar energy. But the rhythm of the Chinese has surpassed the forecasts. In 2015, **the country installed more than half of all the new wind-sourced energy worldwide**[13] The change in the energy matrix is so great that, according **Jeremy Legget's estimate**[14], it is quite likely that China already achieved peak emissions in 2014, sixteen years sooner than was determined in its NDC. He shows that in 2015 China registered drops in comparison with the preceding year of 3.7% in coal consumption, 5.6% in the energy intensity of its economy and a decline of 30% in coal imports. At the same time, the connection of solar energy to the grid expanded by 73% (reaching 43GW installed) and of wind energy by 33.5% (reaching 129 GW installed) and that was just from 2014 to 2015.

In the United States, **64% of all that was installed in 2015 to generate electricity used renewable sources**[15], and wind energy registered the greatest growth. There was also expressive growth in **electricity storage capacity with a 35% reduction in the price of batteries**[16]. Curiously, that progress was achieved at the very moment when the United States became the world's number one oil and gas producer[15]

That progress is all the more impressive because the rhythm of implementation of modern renewable means of energy generation has surpassed all the forecasts made in recent years. In 2009, for example, **the International Energy Agency forecast that within six years the world would have 20GW of solar-sourced electricity**

10 http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf

11 http://data.worldbank.org/country/china

12 http://www.globalcarbonproject.org/carbonbudget/

13 http://www.theguardian.com/environment/2016/feb/11/china-overtakes-eu-to-become-global-wind-power-leader?CMP=twt_a-environment_b-gdneco

14 http://www.theguardian.com/environment/2016/feb/11/china-overtakes-eu-to-become-global-wind-power-leader?CMP=twt_a-environment_b-gdneco

15 http://www.renewableenergyworld.com/articles/2016/02/renewables-provides-two-thirds-of-new-us-generating-capacity-in-2015-3-500-times-more-than-coal.html?cmpid=renewablesolar0262016

16 http://www.theguardian.com/environment/2016/feb/04/from-liquid-air-to-supercapacitators-energy-

available[16]. Today the total is well over 180 GW, mainly achieved through scientific and technological advancement that has enhanced the generating capacity of wind turbines and improved the various modalities of transforming solar energy into electricity.

4. Science, technology and finance

However significant those transformations might seem, they still do not constitute a trajectory that increases the possibility of not going beyond a two degree increase in the average global temperature. In that sense, the warning issued by the **Global Apollo Program**[17] is of fundamental importance: to consolidate this progress all that is needed is "for clean energy to become cheaper than that based on coal, oil and gas". That calls for two political measures regarding which the COP21 could hardly have been more timid. The first consists of the short-term elimination of fossil fuel subsidies which the **International Monetary Fund**[18] estimates to be the dizzying sum of US$ 5 trillion. Obviously that alone is not enough, especially bearing in mind the new exploration and exploitation techniques that have been moving ahead the date for oil and gas production to peak, whether it be through hydraulic fracturing ('fracking' used to obtain gas from shale) or in the exploration of deep water oil deposits (Heck and Rogers, 2014). Science and technology are behind the great change in fossil fuel geopolitics which has turned the USA into the number one global producer. In contrast, investments in renewable sources research are still very timid. Even in the biggest renewable energy companies, research and development do not go beyond 2% of the turnover as against 5% in electronics and 15% in the pharmaceuticals industry. If the technological progress stemming from scientific research is not intensified then there is a tremendous risk that modern renewable energies will not advance at a rate compatible with the terms of the Paris Agreement. That is why the Apollo Program created a consortium whose participants commit themselves to investing 0.02% of the GNP in their respective countries in research directed at expanding the participation of modern renewable forms in their energy matrix. Those investments will be monitored year by year by a committee of experts which will identify the main bottlenecks and propose strategies to overcome them. The duration of the commitment is ten years and it is hoped that by 2025 the progress will have been such that the technical superiority of the modern renewable sources will enable them to assert themselves in the market.

Obviously all those government efforts require a mobilization of private investors. Since the Rio+20, at least, the coordinated corporate efforts against climate change

storage-is-finally-poised-for-a-breakthrough?utm_source=Daily+Carbon+Briefing&utm_campaign=410f7994f7-cb_daily&utm_medium=email&utm_term=0_876aab4fd7-410f7994f7-303442305

17 http://www.bloomberg.com/news/articles/2015-06-10/u-s-ousts-russia-as-world-s-top-oil-gas-producer-in-bp-report

18 http://www.telegraph.co.uk/finance/economics/11958916/Paris-climate-deal-to-ignite-a-90-trillion-energy-revolution.html

have been growing. At the Paris Conference those efforts materialized in the form of the **Breakthrough Energy Coalition**[19], which brings together names like Bill Gates, Mark Zukergerg, Ratan Tata, George Soros, Richard Branson and Jeff Bezos around a fund to stimulate scientific and technological research into renewable energy sources. That movement has now vigorously aroused the financial world itself. Since 2014, the participants of the Montreal Climate Pledge have committed themselves to measuring and publicizing the carbon footprints of their investments. In addition to the financial branch of the UN Environment Programme (UNEP-FI) 120 institutional investors controlling no less than US$ 10 trillion participate in the initiative. **Climate Bonds Initiative**[20] is a private initiative directed at stimulating investments in de-carbonizing the global economy and it already has US$ 600 billion in investments.

In regard to financing, it is worth mentioning the impressive impact of the movement that pressures private actors to de-carbonize their investment portfolios. The Divest Movement has already reached more than 500 institutions responsible for **US$ 3.4 trillion**[21] in investments among them some big banks and the Rockefeller Brothers Foundation.

5. Conclusion

These examples show the force of two questions that are decisive for institutional investors: what will the price of carbon be in view of the innumerable initiatives trying to establish it locally and globally? Nobody doubts that emitting greenhouse gases is going to be the object of some kind of charge. What Paris did not make clear (and indeed, it does not depend on that kind of conference) was what the price will be and what will be the most important ways of charging for it. The second question seeks to know whether the scientific and technological progress will indeed enable the renewable energies to become cheaper than those based on fossil sources.

In short, the COP21 Agreement mirrors a recent evolution that it was largely impossible to have imagined just five or six years ago whereby science and technology, big investors and the pressure of civil society all indicate the possibility that a low carbon economy may yet become the basic feature that future generations will associate to the 21st century.

19 http://cep.lse.ac.uk/pubs/download/special/GlobalApollo_Programme_Report.pdf

20 https://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf

21 http://www.breakthroughenergycoalition.com/en/index.html

22 http://www.climatebonds.net/2015/07/report-launch-climate-aligned-bonds-universe-5977bn-2015-opportunities-climate-focused

23 http://gofossilfree.org/in-the-space-of-just-10-weeks/

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José Eli da Veiga[1]

A Parisian Siren Song

As the first-ever universal global climate accord, the Paris Agreement may be seen as the bridge leading from today's global warming and to something like carbon emissions neutrality before the end of the century. Mainly because it points to a transition from the political outline etched out in the Kyoto Protocol toward new rules that may favor, from 2020, an increasingly polycentric and flexible governance mode. However, this undeniable progress was undercut by the complete inertia of the tragic economic arrangement created by the Protocol, which did nothing to contribute to the necessary acceleration of the transition to a descarbonized energy matrix.

To address this hybrid nature of the results of COP 21 - results that tend to entone a kind a siren song - this text is organized into four topics. The first discusses the reasons for the strong ineffectiveness of the climate regime, which is often attributed only to the Kyoto Protocol, but that largely precedes Kyoto. The second summarizes the best current views on global governance to explain political developments and contrast them. And the two other topics explain the negative part of the practical consequences of the Paris Agreement.

1. Effectiveness

There is no better way to characterize the failure of the climate regime than compare it to what can be presented as its antithesis: the enviable effectiveness of the ozone regime. They represent two international cooperation instruments on deeply similar environmental problems, but with concrete results that differ in almost all aspects.

Of the long list of institutional contrasts that can be singled out, two seem crucial to an analysis of the situation that opens up with the Paris Agreement, obtained at the end of 2015 in COP 21. On the one hand, the formative processes behind two conventions: the UNFCCC (The United Nations Framework Convention on Climate Change), in June 1992, and the Vienna Convention on the Ozone Layer Protection

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in March 1985. On the other, the actual impact of its two main protocols: the Kyoto Protocol of December 1997, and the Montreal Protocol in September 1987[2].

The system of protection of the ozone layer did not begin multilateral. It was carefully built in progressive plurilateral negotiations that basically involved the most concerned nations, the producers of Chlorofluorocarbons, commonly known as CFCs, and some consumers where public opinion was more alarmed at one of the main effects of the layer's depletion: skin cancer[3].

In stark contrast, the climate regime, having always been multilateral, included a vast majority of "harmless" countries with insignificant volumes of greenhouse gas emissions (GHG). Worse, the text of its convention was also prepared in a hurry so it could be adopted at the Rio-92 Conference[4].

Conceived in fifteen months, the UNFCCC was only acclaimed by the 172 governments participating in the Rio-92 because it upheld favorable news to the global South's claim against the North, imported from other arenas, particularly commerce: the so trendy "principle of common, but differentiated, responsibilities." This principle covertly contradicted the 24th Principle of the Stockholm Declaration of 1972, according to which all countries should take care of, and on an equal footing, international issues relating to protection of the environment.

In ethical terms, national responsibilities could only be proportionate to emissions from the consumption of each country's population, in accordance with their different capabilities for technological innovation for the transition to a low-carbon economy. Instead, there was a perverse choice of a political criteria of differentiation: only the countries that were pioneering nations in the industrialization process were to be held accountable. They found themselves penalized for having been at the forefront of innovation with fossil fuels, having produced much of their emissions at a time when not even the scientific community knew the seriousness of global warming.

After such a strange distribution of the burden, a minimum of coherence should have restricted the subsequent negotiations at a plurilateral level, with exclusive participation of the nations that were left with the burden of decarbonization. But besides the recurring phenomenon of institutional inertia, the two sides preferred to pretend that this problem did not exist: some with the intention of gaining time and others to conserve what was a good arena in which to bargain for requirements of a compensatory nature.

That is how the Berlin Mandate, coming from the first COP (in 1995), and particularly the Kyoto Protocol, which came from the second in 1997, set up a scenario in terms of

2 In 2003, former United Nations Secretary-General Kofi Annan stated: "Perhaps the single most successful international agreement to date has been the Montreal Protocol." This assessment is available on the UN site dedicated to the international day of the preservation of the ozone layer, September 16: http://www.un.org/en/events/ozoneday/background.shtml

3 On September 16, 1987, representatives of only 24 nations plus the Commission of the European Community, signed the Montreal Protocol, now ratified by all United Nations members, as well as Niue, the Cook Islands, the Holy See, and the European Union.

4 Preliminary understandings were only addressed by the UN General Assembly on Christmas eve 1990, and the resulting committee that drafted the proposed convention worked full steam ahead between February of 1990 and May of 1992.

the regime that could not have been more aberrant, because among the great number of poor countries, with negligible aggregate impact of carbon emissions, there were "emerging" countries that showed a potential to more than counterbalance pro-climate actions that were to be adopted by northern countries, but who negotiated under the cover of G77 + China, as if they were not significant emitters of greenhouse gases.

It was precisely this possibility of fraud that was behind the US Senate's veto on July 25, 1997. A previous ban that got the rare vote of 95 to zero! So, the approval of the Kyoto Protocol a few months later can only be seen as a historic pyrrhic victory, for it was well understood the Clinton administration could not even contemplate sending the protocol signed by Al Gore for ratification.

However, nothing could be more anomalous in terms of its dealings with the ozone regime, for the same Senate had approved almost unanimously a resolution in support of the Reagan administration's request that the United States sign, three months after the meeting, the Montreal Protocol[5].Moreover: unlike Kyoto, the Montreal protocol was flexible, open to constant incremental changes whenever new consensuses were obtained[6].

2. Global Governance

Besides demonstrating the low effectiveness of the climate regime, the comparisons made here are also important for the understanding of the broader aspects of global governance.

Since the end of last century it became increasingly clear that the governance of such a complex problem as global warming cannot be of the "top-down" nature, limited solely to agreements between national governments. To manage the common good, policies adopted only on a global scale are not able to generate sufficient trust among citizens and companies, so necessary for collective action to be comprehensive and transparent. This is only possible with polycentric initiatives at various levels under the active supervision of local, regional and national actors.

From this perspective, the trump card is the stimulus to experimental efforts at various levels that lead to the development of methods for assessing the costs and benefits of specific strategies, as well as making it possible to compare them with the results obtained in others.

5 On June 5, 1987 the Senate passed (by a vote of 80-2) a resolution urging President Reagan "to strongly endorse the United States' original position...continue to seek aggressively...an immediate freeze...a prompt automatic reduction of not less than fifty percent...and virtual elimination of (ozone depleting) chemicals."

6 The most pertinent bibliographical references on this topic are Benedick (1991) e Sunstein (2007).

The responsibility can be taken more effectively in small and medium-sized governance units that are linked together in monitoring information networks at all levels. It is absurd to wait for big negotiated solutions on a global level if they do not already come supported by national, regional, local and sectoral efforts that allow them to really function.

A polycentric approach encourages experimentation by multiple actors, as well as the development of assessment methods for specific costs and benefits of strategies adopted in certain contexts after comparing them to the results obtained in others. Instead of only a global effort, it would be much better to consciously adopt a polycentric approach to achieve benefits at multiple ranges and simultaneously encourage experimentation and learning regarding the various policies adopted at the multiple ranges.

That is why two new modes of governance began to emerge: the "orchestrated" and the "experimentalist." "Orchestrated" modes are initiatives to broaden and / or deepen governance through the incorporation of new actors, but under the auspices of existing international organizations, which generally belong to the foundational standard for the period 1944-71. On the other hand, "experimentalists" are plans or arrangements highlighted by a triple originality: open participation of a wide range of entities (public or private); no formal hierarchy within the arrangements; and close consultation in decision-making and executive processes.

While in the foundational standard and orchestrated mode precise rules are fixed, binding and final, which correspond to alleged certainties, in the experimentalist mode norms and interim goals prevail, subject to regular review procedures based on "peer review," which reflects the awareness of the transitory nature and limits of all forecasts. One of the most typical examples is precisely the ozone regime.

In this sense, the great virtue of the Paris Agreement was to initiate a process in which the climate regime can stop being so orchestrated, allowing it to veer toward the experimentalist mode[7].

3. The scientific and technological challenge

One should not forget, however, that the decarbonization process is barely crawling in leading countries, and will only begin to walk and spread across the globe when the use of renewable energy becomes economically advantageous. This depends on essential technological innovations, which, in turn, depend on reasonable incentives.

7 Many authors deal with this topic, among them: Elinor Ostrom, Robert Keohane, Charles Sabel and David Held. See Keohane & Victor (2015) for an excellent synthesis of this huge literature.

This is so obvious, that it authorizes one to assume that after 23 years of grueling global climate negotiations, the world would already have prioritized research efforts to this end.

Now, it might seem unbelievable, but this is a totally false assumption. The US$ 6 billion of public funds that are being used in the search for innovations in renewable energies account for a mere 1.8% of the budget that the government intended to RD&D (research, development and demonstration). Worse: since the 1980s, as a whole, the participation of energy research in the global RD&D budget plummeted from 11% to 4%.

The situation is no different in the private sector. Even among companies that invest most in solar and wind power, only 2% of sales value has gone to technological innovation, a figure that should be compared to 5% in the consumer electronics sector and 15% in pharmaceuticals.

To sour this balance further, add into this the fact that US$ 101 billion mobilized to encourage the adoption of renewable energy does not reach a fifth of the abominable subsidies that continue to directly promote the use of fossil fuels: US$ 550 billion. And it is better not even to make such a comparison with the data published by the IMF, since, if indirect effects are included, these subsidies reach an unimaginable $ 5.3 trillion, more than 6% of global GDP.

It is highly significant, therefore, that after 23 years of global climate governance, it was not feasible to obtain an elementary dual commitment in COP 21: for the end of subsidies to fossil fuels; and in favor of carbon pricing, the signal that would accelerate the search for descarbonizing innovations.

A serious development linked to this impotence in the Paris Agreement reveals that giving priority to scientific and technological research to encourage the still very nascent energy transition process will depend even more on public initiatives (governmental or philanthropic). This, in essentially three of the most decisive areas of transition: renewables; storage; and transmission infrastructure. Fortunately, the picture is not so calamitous in three others crucial areas: energy efficiency; CCS (carbon capture and storage); and nuclear fusion.

Hence, the strategic importance of the Global Apollo Program (GAP), whose goal is to make a new energy base generated by renewable sources become cheaper than additional (new) coal facilities, between 2020 and 2025. More precisely, this to occur in 2020 in the sunniest parts of the world, and worldwide from 2025[8].

The idea is to form a consortium of national governments willing to autonomously

8 GAP information is accessible at: http://www.globalapolloprogram.org/

allocate, over the next decade, an average of 0.02% of their GDP for research into renewables, storage and transmission infrastructure—a program that will be an advanced, expanded and coordinated internationally version of many national initiatives. To be well conducted, it should emulate the success obtained by the private sector with semiconductors thanks to the ITRS (International Technology Roadmap for Semiconductors). And the Roadmap Committee that will coordinate the GAP will be in Paris, in the International Energy Agency itself.

Even if the stipulated deadline is not realistic, it is easy to see that if you were to count on the support of many major nations, this program might soon make the Paris Agreement obsolete. This would be a relatively easy task with regard to photovoltaic panels (PV), as prices are already falling 17% for each doubling of cumulative capacity. The main challenge, of course, will turn around the CSP (concentrated solar power), because its viability is dependent on two other serious bottlenecks— storage and transmission infrastructure — for which the GAP lists the seven most promising ways.

And of course all this can occur with even more speed if GHG emissions are no longer free.

4. Carbon Pricing

In the forty national and twenty subnational jurisdictions where one pays to emit, the prices of a ton of carbon dioxide equivalent (tCO2e) range from less than a dollar, as in Mexico or Poland, to more than $ 120 in Sweden. And only 12% of global emissions are now affected by the two mechanisms of formation of these prices: ETS (emissions trading systems) to buy and sell emission rights, and carbon taxes. The latter especially in societies more aware that they could never fulfill the assumed mitigation targets only with ETS.

This scenario suggests that the essential acceleration of the decarbonization process cannot be dependent solely on the geographic expansion and eventual harmonization of this arrangement based on more taxes to compensate inept markets. Therefore, we must pay attention to suggestions that wish to go beyond conforming to proliferating current arrangements. Innovations aimed at a qualitative leap, such as the "carbon positive pricing proposal[9]."

The goal of positive pricing for carbon is to generate interest in financial intermediation anchored in active carbon able to attract even the most agnostic

9 Discussed in Moving the Trillions, organized by Alfredo Sirkis: http://www.zeeli.pro.br/4915

agents regarding the climate issue. To do so, this would require national political pacts that define two amounts: a "social value of carbon not emitted" and the volume of emissions that would no longer occur. Enough to enable a new asset, Climate Remediation Asset, whose acronym is "CRA."

Once this asset exists, central banks could open credit lines equal to the volume of CRAs by the "social value of carbon not emitted" and its loans could be repaid with "Carbon Certificates" (CC), validated by authority similar to the authority that already operates the CDM, the Clean Development Mechanism.

Thus, banks could give much more credit to low-carbon investments, which would be only partially repayable in cash, thanks to the CCs. With this, very attractive bonds could be issued for both institutional investors and to individual savers. In this scheme, the main role of central banks would be the transformation of CCs into CRAs, which in turn would become recorded as assets for them along with gold and foreign exchange. There would be, therefore, no blind injection of liquidity increasing carbon stocks correlated to a properly controlled production of wealth. Much of the private savings today devoted to speculative investments could then be channeled to "climate friendly" financial products that offered a strong warranty.

The logic of the proposal is to prevent carbon pricing from causing more stress to economies, simultaneously directing choices relating to capitalization. After a learning phase, the "social value of carbon not emitted" could be increased much more quickly than would be possible with carbon prices formed by the current ETS type markets (cap and trade) and / or carbon taxes. Moreover: with the advantage of involving much lower transaction costs.

This novelty would also make unnecessary the application of sanctions against countries that did not comply with any legally binding commitments because they would already be punished by the impossibility of access to the new financing available. And many governments would start to see this proposal as a great incentive to adopt climate policies, particularly through incentives that reinforce the attractiveness of investments in low-carbon initiatives.

Strictly speaking, this would be a strategy to arrive later to a broad, general and unrestricted pricing of carbon emissions, but without the strong labor pains required by an immediate carbon tax and / or complicated re-engineering of ineffective ETS markets.

What distinguishes this proposal from all others the most is that it is a monetary innovation that seems extremely appropriate to the current objective conditions in the

euro zone, where investments fell more than 20% since the beginning of the 2007-2009 crisis. The adoption of technological innovations aimed at energy transition to low-carbon could engender a solution that can take this bloc out of its virtual stagnation, scaring away the ghost of the dreaded "secular stagnation."

In an environment in which central banks fight deflation and where the reluctance to lend for productive investment still pertains, this potentially virtuous monetary innovation could well serve as an adequate economic tool toward decarbonization. At bottom, it would signify a new kind of currency that could give an incentivizing price signal on carbon not emitted. A strong signal from the governments to dare investors to invest, despite the uncertainties. And one way to prevent the Paris Agreement from turning into a mere siren song.

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