11 From the Paris Agreement to the Carbon Convergence

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Introduction: Reducing Climate Inconsistency

The 32-page Paris agreement (and the related decisions) adopted on December 12, 2015, by COP 21 is the result of an undeniable diplomatic success. The French presidency and countries that, like Canada, acted positively during these difficult negotiations played their cards properly under the circumstances.

But from a scientific point of view, Paris is short of what would be needed to really protect humankind against climate change and its worrying consequences. This is the foreseeable paradoxical outcome of the Paris Conference: an unprecedented universal climate agreement that is unable to solve our climate crisis.

The basic reason why diplomacy cannot deliver scientific requirements is that the negotiating parties do not feel that there is, under the current rules, a fair, level playing field. Creating a negotiating framework which may lead to an effective climate agreement requires the institution of a world carbon price. This is what I intend to demonstrate in this chapter, based on the Dion-Laurent proposition (see Dion and Laurent, 2015).

Ideally, COP 21 would have extended to the emerging markets, starting with China and India, the binding commitments agreed in Kyoto 18 years earlier by the developed countries. What took place was exactly the opposite: every country is now effectively out of Annex 1 of the Kyoto Protocol, released from any legal constraints on the nature of their commitments in the fight against climate change, which now amount to voluntary

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contributions ("Intended Nationally Determined Contribution," or INDC) that countries determine on their own and without reference to a common goal.

The Paris agreement gives rise to a new global variable, which we can accurately track over the coming years: the factor of climate inconsistency, which compares objectives and means. At the end of COP 21, this ratio was in the range of 1.35 to 2 (the climate objective chosen, specified in Article 2, lies between 1.5°C and 2°C, whereas the sum of national voluntary contributions pledged to reach this would lead to warming of 2.7°C to 3°C). In a more positive version, the factor of climate lucidity lies between 50% and 74%. The question facing us now is thus: How do we deal with this climate inconsistency by bringing the means deployed into line with the ambitions declared (bringing the climate inconsistency factor to 1 or the climate lucidity factor to 100%)?

The need to put a price on carbon (and thus give it social value), which had been gaining momentum prior to COP 21, as was highlighted from the opening of the summit under the aegis of Angela Merkel and François Hollande, still appeared in the penultimate version of the Paris agreement. It disappeared from the final version (under the combined pressure of Saudi Arabia and Venezuela). Yet there is no doubt that by internalizing the price of carbon, we will put the economy at the service of the climate transition. But it seems at this point that the world's governments have decided to outsource this internalization function to the private sector. It is necessary to quickly take this in hand, both internally and globally.

Climate inconsistency can indeed be reduced in large part by introducing into climate negotiations the goal to develop a robust global carbon-pricing system. The new system would rely on a few simple principles:

• The common climate objective is now officially to limit global warming between 1.5°C and 2°C above preindustrial levels; a global carbon price must therefore aim to meet that objective;

• Whatever one's opinion on the debate regarding the best way to levy a carbon price—tax or emissions trading—various countries have already picked their own path, and trying to get them to fit the same mold would be unrealistic[1];

• Several countries have pledged to meet quantitative reduction targets (pledge-and-review strategy); rather than asking these countries to abandon

those targets in favor of a global carbon price, it would be better to show them that negotiating such a price would be a powerful means to meet—or even exceed—their targets;

• Because the internationally agreed principle of "Common but Differentiated Responsibilities" would make it difficult to set a single price immediately, it would be more realistic to consider a price convergence-based process stretching over a number of years, as proposed by such international bodies as the International Energy Agency; and

• Given that the developed countries have pledged to provide $100 billion yearly to help the most vulnerable countries deal with climate change, global carbon-price negotiations cannot be used to cancel that commitment: on the contrary, they are a good means to meet—or even surpass—the commitment.

Before reviewing those points in more detail, let's see by the numbers why the current climate negotiation system is fundamentally flawed.

The Unflattering Carbon Footprint of Climate Negotiations Thus Far

It is a well-known fact today—at least in academic circles and a significant segment of the international community—that greenhouse gas emissions (responsible for the climate changes observed in the second half of the 20th century and predicted to continue until the end of the 21st century) have increased during the last 25 years. The average annual increase went from 1% between 1990 and 1999 to 3.3% between 2000 and 2009. After a slight decrease during the great recession, greenhouse gas (GHG) emissions began rising again at an annual rate of 2.5%.[2] True, the latest news is surprisingly good: in a March 2015 communiqué, the International Energy Agency (IEA) announced that emissions had decreased in 2014, and for the same year, data released by BP in June 2015 showed a slight increase of 0.5%. On March 16 2016, the IEA announced that for 2015 as well (a second year in a row), global emissions had stabilized (energy-related CO_2 emissions amounted to 32.14 gigatons in 2015 compared with 32.13 in 2014 and 32.87 in 2013).

But that decrease, largely due to China's economic slowdown and reduction in coal consumption, should not be used to distract from the obvious observation that since 1997 and the signing of the Kyoto Protocol, the world's countries have been doing the opposite of what climate science

recommends, causing global emissions to rise by more than 60% since 1990. As highlighted in the latest report of the Intergovernmental Panel on Climate Change (IPCC, 2014), the disconnect between the intensifying climate crisis and stagnating international negotiations has never been wider.

With so much scientific evidence warning us against the catastrophic impact of climate change on human welfare, how can this discrepancy be explained if not by the inefficiency and inefficacy of the current climate negotiation framework?

The thinking today is that the 1997 Kyoto Protocol, which guided these negotiations following the UN Framework Convention on Climate Change (decided at the 1992 Rio Summit), has been a resounding failure. However, that is not the case: in fact, protocol-bound Annex 1 countries[3] did live up to their commitments—albeit only by resorting to a sleight of hand that led us to understand why we must now change the system.

In Kyoto, the most economically developed countries made a first—and supposedly binding—GHG emission reduction commitment, whereas the less developed countries were exempted from such commitments due to their lower development levels and lower GHG emissions. In 1990—the baseline year for calculating emissions—the first-group nations (former Soviet Union members and OECD countries) were deemed responsible for 60% of the total GHG emissions. Under the Kyoto Protocol, these countries committed to reduce their emissions by approximately 5% by 2012, compared with 1990 levels. What is not always known today is that this objective was met. Even better, the latest available data show that the reduction almost reached 10% (even 15% according to some estimates): thus, Annex 1 countries did twice as well as expected but almost entirely because of the collapse of the USSR, which biased outcomes.[4] Although these dubious reductions were taking place, a much more significant increase was rearing its head in the rest of the world. Between the early 1990s and early 2010s, the emission ratio of Annex 1 countries versus exempted countries reversed itself, with the Annex 1 share of emissions going from 60% of global emissions to less than 40% (see table 11.1).

Therefore, the economic vision that informed the Kyoto Protocol is now totally obsolete. The problem that ails the current climate action framework, defined in 1997, is fourfold:

• An efficiency problem: the targets set in 1997 and instruments deployed since then (which are called "flexibility mechanisms" in the Protocol and

Table 11.1
2013 CO_2 Emissions

	Emissions Per Capita	Total*	% of Total
Annex 1	*7.5*	*13.05*	
United States	16.4	5.23	14.5
EU-28	6.8	3.48	9.6
Russia	12.7	1.81	5.0
Japan	9.8	1.25	3.4
Canada	14.3	0.50	1.4
China	7.2	9.98	27.6
India	1.9	2.41	6.7
South Korea	12.5	0.62	1.7
Iran	7.9	0.61	1.7
Saudi Arabia	18.0	0.52	1.4

* Emissions in $GtCO_2$, from fossil energy consumption and cement production.
Source: Global Carbon Project.

include markets in pollution rights) are unable to stem the global GHG emission dynamics;

• A transparency problem: the quantitative, volume-based emission targets approach suffers from result-skewing biases. The baseline date that was chosen (generally 1990) is problematic for former USSR countries, some of which have since joined the European Union (EU). Furthermore, the Kyoto Protocol keeps account of production-based emissions (emissions generated within a given territory) but not consumption-based emissions (emissions from a country's production that are included, as incorporated carbon, in products consumed by other countries); thus, the paradox of a text of which the letter has been complied with while the problem that text was supposed to solve was made worse by "carbon leaks"[5];

• An inclusiveness problem: henceforth, a binding international climate agreement must without fail include all major GHG emitters, including—and especially—emerging economies (starting with China, which is responsible for almost one-third of global emissions, and India, which could well see its still modest emissions increase significantly as the country develops its production and consumption of coal); and

• An incentive problem: volume-based emission reductions are seen by developing countries as a "carbon constraint," an unfair impediment to

their economic development; and during economic crises, quantitative targets may become difficult to accept by developed countries.

Any reform proposal that aims to outgrow the current negotiation system must therefore offer solutions to the four problems. However, as was expected, the Paris agreement operates within the Kyoto framework, the shortcomings of which all countries participating in the negotiations know well but are fearful to challenge given the fragility of the global climate consensus.

The Paris Agreement: Missing the Wrong Targets Softly?

A Legally Weak Agreement

The key factor in achieving an appearance of success at COP 21 was to manage expectations beforehand. That has been the major failure of the 2009 Copenhagen Conference, where negotiators promised a global, legally binding agreement but could not deliver it in the end, causing a huge disappointment. This is why Paris negotiators adopted a flexible position on the legal form of the final text. Contrary to the Kyoto Protocol, the Paris text is an "agreement" instead of a "treaty," meaning that its legal power will be even weaker. As is well known in diplomatic circles, having an international text labeled as an "agreement" is rarely a good sign.

This can indeed be seen as a victory for the US negotiators, who have insisted that a legally binding text—which would require the Republican-controlled Senate's approval—had no chance of being adopted. Although the Obama administration had convinced other parties that it could act on the basis of executive force (the rationale behind the US Environmental Protection Agency's (EPA's) final ruling on cutting emissions from coal-fired plants released in early August 2015), it was hard not to consider climate policy in the United States as conditional, the conditionality being that the legal challenges of the states are overturned by the US Supreme Court. The US Supreme Court decision on February 9, 2016, to freeze EPA rules cutting carbon emissions from power plants until the Washington, DC, circuit court of appeals hears challenges from 29 mainly Republican-led states and dozens of corporations and industry groups has confirmed this fear. The US political polarization, not unrelated to the damaging effect of income inequality, is thus a drag on global climate policy. There are strong reasons to believe that the Trump administration will only exacerbate this political

polarization and move away from a lucid climate policy domestically and globally.

The Stubborn Ambition-Science Gap

At the 2011 Durban Conference (COP 17), the parties acknowledged the gap between their commitments and achieving the 2°C objective. In the preamble of their joint statement, they expressed "grave concern" and promised to "raise the level of ambition" to bridge this gap. At the Lima Conference (COP 20) in December 2014, the parties reiterated[6] the same "grave concern" about "the significant gap between the aggregate effect of Parties' mitigation pledges" and the goal of holding the increase in global average temperature below the 2°C limit. But the ambition-science gap has so far survived all virtuous proclamations.

Climate negotiations have revolved crucially around volumes of carbon emitted: under the Kyoto Protocol, a country's climate performance is assessed in terms of emission reduction targets compared with their 1990 levels, and climate commitments are being framed in terms of emission reductions up to 2030 or 2050.

There are two reasons that this volume-based approach can be insufficient: it does not specify the instruments that are supposed to be used to match the volume targets, and it does not take into account carbon flows, which are emissions resulting not only from national production but also from national consumption. The gap between the two can be quite large: the EU has reduced its GHG emissions by close to 20% in terms of production since 1990 but by only 5% when consumption emissions are considered. A country such as France sees its climate performance since 1990 completely turned upside down when consumption emissions are considered instead of production emissions.

But even if one withholds judgment on the potential efficiency of the volume approach, it appears to fall short on its own ambitions: Climate Action Tracker experts, assessing the announcements and commitments to track their compatibility with the 2°C threshold, conclude that existing and announced measures lead to an increase above 3°C and possibly as high as 3.7°C in global temperatures, much higher, as previously noted, than the objectives of the Paris agreement. The latest IEA assessment indicates that given the INDCs submitted, the path would be "consistent with an average temperature increase of around 2.6°C by 2100 and 3.5°C after 2200"[7]

(the scenario assumes that countries will fulfill their climate commitments, which is doubtful).

The Perils of Commitments without Instruments

The agreement reached by the EU Member States in the fall of 2014 is a good illustration of the limitations of any strategy based on emission reduction targets alone, with no efficient and effective carbon-pricing system. Indeed, the European "climate-energy package" can be considered a baseless pyramid: the GHG emission reduction target of 40% by 2030 is only supported by nonbinding energy efficiency and renewable energy targets, which are not underpinned by a true carbon-pricing reform.

At the basis of the European agreement lies a dysfunctional, derelict carbon-pricing system. The end result is commitments without instruments and "ambitious" emission reduction targets suspended over a sea of ambiguity. The same can be said of most current national commitments that are lacking adequate instruments.

National emission reduction targets must absolutely be accompanied by adequate and coordinated implementation tools, including a trial global carbon price. In other words, negotiators should aim for a "commitments + instruments" strategy up to 2020 rather than a "commitments-only" agreement.

The Need for Climate Justice

In Copenhagen (COP 15) and Cancún (COP 16), the developed countries committed to a contribution of $100 billion per year beginning in 2020 to help developing nations fight—and adapt to—climate change. A fund—the "Green Climate Fund"—has been createdto provide developing countries with the substantial financial and technological assistance they require.

Developing countries take this commitment seriously. They have made it known that no agreement will be possible in Paris without the conclusion of a clear plan for the delivery, through the Green Climate Fund, of the committed $100 billion per year by 2020.

Unfortunately, despite years of ongoing discussion over this agreed-on $100 billion target, nobody knows how much each developed country is supposed to contribute, and the Paris agreement has done little to clarify this question. What we do know, however, is that raising such a sum will

require private-sector contributions. This will not happen in the absence of a fully functional, robust, and comprehensive carbon-pricing system.

Focusing negotiations on a world carbon price in addition to quantitative reductions of emissions can alleviate all four problems. First, it can strengthen the Paris agreement by providing economic incentives so that countries take charge of their climate commitments rather than engage in carbon freeriding. Second, it can serve as a tool for adjusting climate commitments and hence gradually increase the level of ambition of nation-states so that the gap between commitments and science-based requirements can be progressively closed; note that such a tool can also enhance the efficiency of the agreement by controlling carbon flows. Third, it can provide a credible instrumental basis for climate commitments. Fourth, it can provide the source of the $100 billion pledged by developed countries to fight climate change globally.

Building the Carbon Convergence

Governments and businesses are unlikely to realize their climate-change goals if they have no definite assurance that their competitors will play by the same rules. To address this stalemate, we need an international agreement that gives them that assurance, one that changes the rules of the game so they apply to every player. We need to create a system whereby every decision maker, public or private, is responsible for taking into account the true cost of global warming and is secure in the knowledge that the competitors are doing the same.

This explains why more and more experts—including every author of the Symposium on International Climate Negotiations[8]—agree that putting a price on carbon is essential to the success of any serious, comprehensive climate plan. The International Monetary Fund now recommends it,[9] as does the OECD.[10] The World Bank[11] convinced 73 countries, 22 subnational jurisdictions, and more than 1,000 companies and investors to declare their support for a price on carbon. The Global Commission on the Economy and Climate[12] has also pointed out that a carbon price may be beneficial for the economy.

There are opportunities to explore linkages between carbon pricing and the new international climate change agreement[13] to be reached in Paris. But the main challenge facing us is how to evolve from a hodge-podge of

local or national carbon prices to a global, harmonized carbon-pricing system. The IPCC recommends[14] a solution: adopting a "single global carbon price." The price should be high enough to create the necessary incentives to limit global warming to about 2°C. The International Energy Agency (IEA)[15] recommends that the price of one ton of CO_2 be gradually raised by 2040 to $140 for developed countries and $125 for China, Russia, Brazil, and South Africa (in US 2013 dollars). According to the IEA,[16] this goal can be reached without harming economic development.

It is impossible to reach a global carbon price of $125 or $140 per ton of CO_2 without first having negotiated an international agreement that ensures all economic agents that their competitors will play by the same climate rules. Indeed, carbon pricing will not reach the desired level as long as individual countries fear that carbon price setting within their respective jurisdictions will scare away businesses and investors will send them off to countries where carbon dioxide emissions are cheaper or free of charge. The idea is to refocus these international efforts on negotiating a global, harmonized carbon-price signal.

All countries would pledge to introduce, in their respective jurisdictions, a gradually evolving carbon price based on a scientifically validated international standard, in order for the world to keep global warming as close as possible to 2°C over preindustrial levels. Countries may levy this price through carbon taxes or emission quotas. Governments would be free to invest, as they see fit, any revenues accruing from carbon emission levies and the corresponding—and necessary—gradual elimination of fossil energy subsidies.

In keeping with the principle of "Common But Differentiated Responsibility," developed countries would be required to set aside part of their carbon pricing revenues to help developing countries introduce policies to lower their emissions, adapt to climate change impacts, and create carbon sinks (e.g., through reforestation). This requirement would help fund the yet unsourced $100 billion annual injection into the Green Climate Fund that was promised to developing countries for 2020 to help them deal with climate change. That amount could even be increased. The Dion-Laurent plan proposes that the contributions of individual developed countries be set according to the proportion of total developed country emissions that their respective GHG emissions represent. The lower a country's emission level, the lower its share of the financial effort. This would serve as a further

incentive for emission reductions. Other formulas are also conceivable, such as making the contributions proportional to emissions in excess of the global average per capita rate, but the argument will likely be made that the most advanced economies—those that have the best technological capacities—should be the ones helping the others.

This international carbon-pricing agreement would allow countries to levy border taxes on products from countries that have not established a carbon-price signal in accordance with the international standard. That would be a solution of last resort, to be applied after the usual warnings have been issued. In this manner, it will be in each country's interest to comply with the international agreement, levy a carbon price on its own emissions, and use the resulting revenue as it sees fit.

Conclusion: From Climate Science to Climate Justice

Climate negotiations are not only a technical discussion based on scientific data but also a political dialogue ultimately based on ethical criteria.

The fight against climate change must not only be presented as an opportunity for economic development but also as a lever to reduce inequalities in human development between countries and within countries. The case of China shows how the constraint of reducing CO_2 emissions can be a way to limit coal consumption and limit damage on the health of Chinese, unevenly distributed within the Chinese population. The same applies to the limitation of car traffic in France, which represents both a health gain and reduction of CO_2 emissions. This double climate-health dividend must be at the heart of state contributions to the reduction of global CO_2 emissions. Climate justice highlights the equality potential of the fight against climate change at the national and international levels. This is why we need to follow up on the Paris agreement with two sets of criteria: climate science and climate justice must be combined in a single plan. That is precisely why the Dion-Laurent proposition brings together the logic of science-based efficiency and ethics-based justice:

1. Science-based efficiency: a carbon budget set to the 2°C limit leads to the establishment of a differentiated trajectory of gradually converging global pricing of carbon, each country freely determining the mix of instruments used to raise its price; and

2. Ethics-based justice: the proposed carbon-price system addresses inequalities between countries (through modulations and compensations) and within countries (accelerating adaptation of financing).

An international carbon-price agreement would provide the world with an excellent instrument for sustainable development. After decades of international stalemate, carbon emitters would have to acknowledge the obvious social and environmental costs of pollution. Consumers and manufacturers would have an incentive to choose lower carbon-content goods and services and invest in new energy-saving and emission-reducing technologies. Governments and legislators would have the tools to achieve the scientific climate targets they have endorsed.

This plan is necessary—more so than ever—to protect humankind from the threat of a 3°C—or more—global warming. Current initiatives are not without merit, but they are insufficient. Our world leaders must champion what a comprehensive and effective climate/energy policy needs: a worldwide, harmonized carbon price.

Notes

1. In 2015, 40 national entities and 20 local jurisdictions adopted a carbon price according to various modalities. For the details of those measures, see World Bank, 2015, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/08/26/090224b08309a09a/4_0/Rendered/PDF/Carbon0pricing0e0released0late02015.pdf

2. According to the Global Carbon Project (http://www.globalcarbonproject.org/), which records emissions from fossil fuel consumption and cement production.

3. The Kyoto Protocol reinforces the 1992 Convention by committing Annex 1 countries to individual, legally binding greenhouse gas emission reduction or limitation objectives. The individual objectives of Annex 1 countries are listed in Annex B of the Kyoto Protocol, which explains why the term "Annex B countries" is sometimes used instead of "Annex 1 countries."

4. According to UN figures, if emissions of all Annex 1 countries fell by 10.6% between 1990 and 2012 (almost exactly double the 5.2% commitment made in 1997), the so-called transition economies (Russia and its then satellites) emissions were down more than 38%, this reduction being acquired in 1995. Meanwhile, OECD Annex 1 countries (EU 15, United States, Japan, Canada, Australia) have seen their emissions rise by 2%, this increase being as high as 10% before the great recession of 2009. In other words, two recessions explain that the Kyoto target was reached and even surpassed.

5. Although the Protocol-controlled, production-based emissions have decreased since 1990, consumption-based emissions for the same period have increased by 0.5%. In the end, the increase in consumption-based emissions more than balanced the decrease in production-based emissions in Annex 1 countries. Emissions were transferred not reduced.

6. Report of the Ad Hoc Working Group on the Durban Platform for Enhanced Action, *Further Advancing the Durban Platform: Draft Decision -/CP.XX*, by the President (Lima, Peru: Conference of Parties, United Nations Framework Convention on Climate Change, December 2014). Available at: http://unfccc.int/resource/docs/2014/cop20/eng/l14.pdf.

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13. Robert Stavins, "The UN Climate Summit and a Key Issue for the 2015 Paris Agreement," The Energy Collective (September 2014). Available at: http://www.theenergycollective.com/robertstavins/1199961/un-climate-summit-and-key-issue-2015-paris-agreement.

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15. Executive Summary, *World Energy Outlook 2014* (Paris, France: International Energy Agency, 2014). Available at: http://www.iea.org/publications/freepublications/publication/WEO_2014_ES_English_WEB.pdf.

16. Ibid.

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