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# THE PARIS AGREEMENT: A FREE RIDER CALLED TRUMP[1]

By Christian de Perthuis*

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On the other hand, this withdrawal could be the catalyst for renewed solidarity among the countries remaining in the agreement, leading variously to a rapid strengthening of monitoring and reporting rules, particularly in emerging countries; the extension of carbon pricing, promoted perhaps by a reinvigorated Europe determined to put an end to the disintegration of its $CO_2$ trading system; and an increased financial effort to offset the likely drying up of US contributions.

A paradox of history: this new American turnaround could possibly result in the correction of the weaknesses of an agreement based too exclusively on reliance on mutual trust and the goodwill of its parties.

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# The Paris Agreement: a free rider called Trump[1]

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With the announcement on 1 June 2017 of the withdrawal of the United States from the Paris Agreement, Donald Trump acted in accordance with his strategy of support for fossil energies. The withdrawal in no way facilitates the reorientation of federal energy policy, which will come up against many domestic barriers and economic laws. In the medium term, the risk is that through a contagion effect, other major fossil energy producers will turn away from the agreement, thereby increasing the number of free riders. On the other hand, this withdrawal could be the catalyst for renewed solidarity among the countries remaining in the agreement, leading variously to a rapid strengthening of monitoring and reporting rules, particularly in emerging countries; the extension of carbon pricing, promoted perhaps by a reinvigorated Europe determined to put an end to the disintegration of its $CO_2$ trading system; and an increased financial effort to offset the likely drying up of US contributions. A paradox of history: this new American turnaround could possibly result in the correction of the weaknesses of an agreement based too exclusively on reliance on mutual trust and the goodwill of its parties.

Climate negotiations under the aegis of the United Nations began in 1990 with the publication of the First Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).[i] Since then, awareness of climate risks has grown, and scientific knowledge of the phenomenon has made significant progress thanks to the five IPCC assessment reports. The first impacts of global warming have observed, more than confirming the predictions of climate models. But twenty-five years of negotiations have not yet put an end to the "slow race" (the expression used by Amy Dahan and Stephan Aykut, 2014[ii]) or to the "Waiting Game" (the term used by Jean Tirole and Christian Gollier, 2014[iii]).

The underlying reason is well known. To counter global warming, it is necessary to act on the overall volume of greenhouse gas emissions. Taken individually, each emitter is tempted to delay as long as possible its entry into the cooperative game so as to benefit as a free rider from the early actions taken by the other actors. The weakness of the "one-legged" Kyoto agreement and of the "self-service" Copenhagen Agreement came from leaving the door open to free riders.

The Paris Agreement provides a universal framework for cooperation, but it is based on the goodwill of its signatories. There is scarcely any safety net against the free rider strategy adopted by the planet's second largest emitter with the announcement of its withdrawal. The risk is that other major producers of fossil energy will follow suit, undermining the necessary re-evaluation of emission reduction targets. Conversely, the US decision could lead to a rebound effect, boosting cooperation and enhancing the ambition of the countries remaining in the agreement.

[1] This paper is also appearing in the journal *Economics and Policy of Energy and the Environment*, Bocconi University.

*Back to the basics of the negotiations: the 1992 Convention*

As with the ozone layer, it was scientists who alerted the international community to the risks of global warming: the First IPCC Assessment Report was made public in 1990 and two years later led to the United Nations Framework Convention on Climate Change (UNFCCC).

Adopted in 1992 by more than 120 countries at the Earth Summit in Rio, UNFCCC came into force in March 1994. It has since been ratified by 196 parties, virtually every country in the world. The UN Climate Convention lays the foundations for international cooperation in response to climate change, for which the Paris Agreement will provide a new architecture for its implementation.[iv] The United States, which was one of the first countries to ratify the 1992 Convention, played a leading role in these early stages of climate negotiation.

The supreme body of the Convention, the Conference of the Parties (COP), brings together representatives of all states that have ratified the Convention. In accordance with the mutualist principle of the United Nations, all countries, large or small, have an equivalent voice, with the rule of consensus for all decision-making. With 196 Parties, one can imagine the complexity of the process and the risk of deadlock. The COP meets on an annual basis, generally at the end of the year. The first Conference was held in Berlin in December 1995. The Marrakech meeting, in November 2016, was thus the 22nd COP.

The COP has an operational secretariat which implements the decisions taken and ensures the collection and monitoring of the information that each Party to the Climate Convention undertakes to provide. This component is of great importance: the credibility of any environmental agreement is based on a reliable and independent system of Measurement, Reporting and Verification (MRV) of pollutant sources and each country's commitments.

The Climate Convention not only provides a multilateral framework for discussion between countries and an administrative monitoring organization, it also lays down three principles that must underpin international cooperation in confronting climate risk.

*Three founding principles*

The first principle of the Climate Convention is the recognition by international law of the existence of global warming and its link to anthropogenic emissions of greenhouse gases. By ratifying the Convention, a state recognizes these phenomena in theory, which are documented in more detail in the assessment reports transmitted by the IPCC to decision-makers.

The second principle assigns the international community the ultimate goal of taking action on global warming to prevent "dangerous anthropogenic interference with the climate system". The 1992 Convention is vague as to how this long-term target should be operationalized. At the Copenhagen conference (2009), the target was defined in terms of limiting global warming to 2°C compared to pre-industrial times. It is an ambitious objective, but it has remained abstract because none of the world's governments acts directly on the temperature. Much of the discussion at COP-21 focussed on the level of this objective and how it is expressed in terms of emissions trajectories.

The third principle concerns the "common but differentiated" responsibility with regard to climate change. In ratifying the Convention, each state recognizes that it shares in this collective responsibility. Differentiated responsibility means that not all parties to the

agreement have the same degree of responsibility, depending on their level of development. Differentiation of the degree of responsibility is an equity criterion whose foundations are not really open to discussion. The art of climate negotiations therefore lies in coming to an agreement on what it means in operational terms.

The Climate Convention classifies countries into two groups: industrialized countries and developing countries. The former, at the origin of three-quarters of global greenhouse gas emissions accumulated between 1850 and 1990, bear a preponderant historical responsibility. They are listed in Annex I, which includes the developed countries, as well as Russia, Ukraine and the countries of Eastern Europe. The remaining “non-Annex I” countries do not have the same historical responsibility and the Convention recognizes their right to development as a priority. The division of the world into two groups of countries, already questionable in 1992, is totally out of phase with contemporary reality and seriously hampered climate negotiations up until the adoption of the Paris Agreement, which shifted away from it.

## 25 years of climate negotiations

**1990**: Publication of the First IPCC Assessment Report.

**1992:** Signing of the United Nations Framework Convention on Climate Change (UNFCCC), which came into force in March 1994 and has since been ratified by 196 Parties.

**1995**: Berlin Conference, First Conference of the Parties to the UNFCCC (COP-1).

**1997:** Adoption of the Kyoto Protocol at the 3rd Annual Conference of the Parties (COP-3).

**2005:** - Start of the European Emissions Trading Scheme (EU ETS)
- Entry into force of the Kyoto Protocol following ratification by Russia..

**2007**: Bali Conference (COP-13). The Bali Roadmap sets out a negotiating mandate to reach a post-Kyoto agreement in December 2009.

**2008**: Adoption of the climate and energy package by the EU, committed to "three times twenty" by 2020 (renewable energy, energy efficiency, reduction of GHG emissions).

**2009:** Copenhagen Conference (COP-15), marking a transition to a bottom-up approach.

**2010**: Cancún Conference (COP-16), during which the main elements of the Copenhagen Accord were integrated into the corpus of the Climate Convention.

**2011-2015**: 12th Chinese Five-Year Plan, involving experiments with $CO_2$ trading systems in five municipalities and two provinces, in preparation for a national scheme after 2015.

**2011**: Durban Conference (COP-17), opening a new negotiating process for a universal climate agreement, with the deadline of December 2015.

**2014**: Publication of the IPCC Fifth Assessment Report.

**2015**: Adoption of "The Paris Agreement" (COP-21).

**2016:** - 6 Nov: entry into force of the Paris Agreement
- 7-16 Nov: Marrakech Climate Conference of (COP-22)
- 8 Nov: Donald Trump elected president of the United States

*The one-legged Kyoto agreement: proliferation of free riders*

The first application text of the Climate Convention, the Kyoto Protocol, was adopted at the third Conference of the Parties (COP-3). It introduced two innovations into international life: at a legal level, binding commitments regarding greenhouse gas emissions; and at an economic level, a system for trading allowances between countries, combined with two project mechanisms.

The legally binding nature of the emission commitments was considered at the time to be a major breakthrough. In reality, the binding character of an international treaty is very limited. A country can exit from an agreement such as the Kyoto Protocol simply by notifying the Convention secretariat in writing, thereby freeing it from any obligations after one year, as Canada did in 2011. However, the legal form of the Kyoto Protocol made its ratification by the United States impossible, due to the hostility of the Senate. These commitments concerned only the Annex I countries of the Convention (before the withdrawal from the United States and excluding Turkey), thus giving it a "one-legged" character: these countries accounted for barely half of world emissions in 1997.

Kyoto's second innovation was to link these emissions caps to an international allowances trading system and subsequently to come up with an international carbon price. Though attractive on paper, this system had little concrete impact because of the withdrawal of the United States and the excessive granting of rights to Russia.

Regarding the application of the principle of differentiation of responsibility, developing (non-Annex I) countries are exempt from all emissions reduction commitments and virtually any reporting obligation to the Climate Convention. They can, however, benefit from the Clean Development Mechanism (CDM), which allows the high-income countries to credit emission reductions obtained by projects carried out in countries not subject to the constraint. The large emerging countries (China, India, Korea, etc.), which have, moreover, greatly increased their emissions since the Kyoto Protocol, are the main beneficiaries of the system, which has only marginally benefited the least developed countries.

With hindsight, it is clear that the Kyoto Protocol did not deliver the expected results.[v] Its intrinsic weakness is not to have anticipated the increase in the number of free riders. Because of its one-legged character, the Protocol left the way open for all non-Annex I countries, giving free rein to very large emitters. A contagion effect then totally undermined the reach of the agreement: the United States, following a vote in the Senate, quickly announced that it would not enter into the agreement as long as their main Asian competitors were not subject to comparable commitments.[vi] Australia did the same later, when Russia was acting as a free rider within the treaty through its excessive emission rights, which it was able partly to exploit in the international market via the project mechanisms.

The promoters of the Kyoto Protocol were hoping to correct its one-leggedness by including non-Annex I countries in emission limitation commitments under the Protocol.

*Copenhagen's "self-service" approach: an à la carte menu for free riders*

Convened to establish the rules for the "post-Kyoto" period, Copenhagen (2009) was a diplomatic setback for the European Union, which had been aiming to deepen the Parties' commitments.

This failure, sometimes attributed to the conference's "poor organization", stemmed from a basic issue. The Kyoto architecture was based on "grandfathering", whereby emission rights are allocated on historical grounds. Once these rights are linked to a value through carbon pricing, a high economic rent is accorded to the historical polluters: the United States, Europe, Russia. It consequently becomes impossible to extend the commitments to new emitters, except by changing the distribution of rights rule, something that Europe has never seriously considered. A "super-Kyoto" based on an equal distribution of rights per capita would be welcomed by India, Africa and all the other developing countries. But the high-income countries are opposed to such an architecture, because it would cost them dearly!

Above all, the Copenhagen conference revealed the now considerable weight of the major emerging countries – China, India, Brazil and South Africa –, the initial drafters of the "Copenhagen Agreement", which was discussed with the United States before being submitted to all the parties. The Conference of the Parties "took note" of the agreement, a diplomatic way of saying that it did not adopt it for want of consensus: only 119 out of 196 parties supported the text. The main provisions of Copenhagen were, however, reintroduced in the framework of the Climate Convention at the Cancún Conference (2010).

In addition to the reference to a temperature increase of no more than 2°C as the long-term target, Copenhagen introduced a decentralized method of setting objectives, whereby each country determines its contribution to the common effort. Emerging countries, particularly China, Brazil and India, announced (modest) objectives for reducing their own emissions. This was the first departure from the binary interpretation of the principle of differentiation of responsibility. Was it also the second leg so lacking in the Kyoto Protocol?

Progress remained largely limited to declarations of intent in the absence of agreement on a common MRV system. As in a self-service restaurant, each country could pick and choose what its contribution would be. Emission reduction targets could cover different areas, base years that did not match, and emission inventories drawn up piecemeal. In the absence of binding MRV rules, freed riders can take advantage of the agreement by picking the menu that suits them. Reconciling the decentralized mode of climate cooperation with a rigorous and independent MRV system became one of the stumbling blocks of the negotiations.

The other major component concerned economic and financial instruments. The Kyoto architecture linking countries' commitments to carbon pricing mechanisms was abandoned in favour of a return to a more conventional view of North-South aid: in exchange for commitments on emissions, the emerging countries obtained a promise from the high-income countries to transfer $100 billion annually to developing countries from 2020 in the name of climate justice. This objective was taken up directly in the Paris Agreement.

*The Paris Agreement: a framework for the renewed implementation of the 1992 Convention*

Two years after Copenhagen, the Durban Conference (2011) set a timetable for finding a synthesis between the one-legged Kyoto formula and the Copenhagen self-service arrangement. The negotiators were given four years to reach a universal agreement by the end of 2015. The first three were characterized by a worryingly slow pace of negotiations. The decisive acceleration in the fourth year was induced by the creation of a China/United

States axis promoting a multilateral agreement on a consensual basis, which facilitated the preparatory work of French diplomacy.[vii]

The adoption on 12 December 2015 in plenary session of the 29 articles of the Paris Agreement was a real diplomatic success, ending a long period of stagnation. The legal form of the agreement – an annex to the COP's annual decision process – was chosen to allow the president of the United States to ratify it by decree without going through the Senate, which traditionally is resistant to this type of treaty.[viii] This provision accounts for the speed of the ratification process. To be implemented, agreement needed to be ratified by at least 55 parties representing at least 55% of global emissions, a rule inspired by the Kyoto Protocol, the ratification of which had taken no less than seven years. These conditions were met quickly enough to allow the agreement to come into force on 4 November 2016 – a record time of less than a year, confirming the diplomatic success of the Paris summit.

The agreement is consistent with the bottom-up approach introduced in Copenhagen. It drops all mention of binding targets linked to economic instruments, and instead creates a new framework for the implementation of the Climate Convention. This framework moves away from the binary world set in stone at Kyoto, and adopts a new interpretation of the principle of differentiated responsibilities by systematically referring to the notion of "particular national circumstances". The commitments now concern all the signatory countries, with multiple options, depending on their circumstances. Commitments are no longer presented as a series of emission reduction constraints, a "burden" that has to be shared, but as a set of changes in economic and social structures for adapting to and mitigating climate change. The realignment of financial flows, mentioned in the first articles of the agreement, is likely to facilitate this shift.

At the request of certain island states most threatened by global warming, the long-term goal has been strengthened to between 1.5°C and 2°C warming, with the lower bound to be documented by a special IPCC report. This lower limit would offer better protection against climate risk, but it appears unrealistic to most climatologists. Given the future impact of the stock of greenhouse gases already present in the atmosphere, it is likely that the 1.5°C threshold will be crossed well before the middle of the century.

The agreement does not include quantified emission targets, but aims to reach the global peak "as soon as possible" and to undertake rapid reductions thereafter and achieve carbon neutrality in the second half of the century, with gross residual emissions compensated by $CO_2$ absorption by natural or artificial sinks. This trajectory is inspired by the work of the IPCC Fifth Assessment Report (October 2014), with the omission of the 2050 intermediate targets, which were withdrawn at the request of oil-producing countries.

The global trajectory is not defined between countries or groups of countries in the agreement. Instead the text refers to Nationally Determined Contributions (NDCs), which is one of the agreement's most important innovations. These NDCs concern all signatory parties, which will be encouraged to gradually increase the scale of their contributions. A large majority of countries transmitted a first set of Intended Nationally Determined Contributions (INDCs) to the UNCCD secretariat prior to the conference. These intended contributions were made independently of one another. They therefore reflect the objectives that governments are willing to put on the table in the absence of mechanisms for cooperation.

According to the UNCCD secretariat, full implementation of these intended contributions would lead to global emissions of around 55 billion tonnes of $CO_2$eq by 2030,

10% above current levels and well above the 40 billion tonnes of $CO_2$eq needed to limit the risks of warming to no more than 2°C.

This figure of 55 billion tonnes of $CO_2$eq should be viewed as the baseline to which the implementation of the announced policies would lead. The Paris Agreement is structured so that this baseline resulting from the initial figures provided by countries is established with growing rigour and approaches a trajectory compatible with the long-term targets, thanks to cooperation between the parties.

*Implementation based on trust among the parties and the voluntarism of non-state actors*

The Paris Agreement aims to create a dynamic between the signatories that gradually augments the overall ambition. To this end, it provides for a five-year revision schedule to monitor the progress made in terms of MRV and the introduction of economic and financial instruments.

The strengthening of the MRV will be gradually applied to all parties, with particular flexibility for small island states and the least developed countries, for which the Paris Agreement recognizes a special status. It will result in various reporting obligations, gradually applying to all countries, with no procedures specified in the event of non-application of the common rules by any of the parties.

With regard to NDCs, all parties are required to submit an updated set of contributions to the secretariat by 2018. At that point contributions will cease to be "intended" and will be considered as commitments.[ix] The agreement then provides for a five-year review process on the basis of a preliminary global assessment, the first being scheduled for 2023 for a review of targets in 2025. A ratchet effect prohibits any downward revision of the targets, although no procedures have been set up to deter potential violators.

As regards financial instruments, the Paris Agreement limits itself to formulas that are too general to be binding. The developed countries are expected to maintain and then increase their existing commitments. Emerging countries are implicitly called upon to provide additional resources. The $100 billion pledged in Copenhagen is seen as a lower limit, that will in due course be raised. In addition to the adaptation and mitigation needs of the least developed and island countries, some of the funding will necessarily be earmarked for the facilitation of technology transfers. However, the agreement excludes any financial compensation for "loss and damage" due to climate change.

Finally, Article 6 promotes, on a voluntary basis, cooperative action between parties wishing to raise their climate change mitigation ambitions. Such action may involve technical and regulatory cooperation or economic instruments such as the trading of credits for emission reductions. This part of the agreement paves the way, without explicitly saying so, to various possible formulas for carbon pricing in the world. In particular, it outlines the contours of a project financing mechanism that could succeed the Kyoto Protocol's "Clean Development Mechanism", but with greater reach.

In parallel with traditional climate diplomacy between governments, the Paris Agreement promotes the deployment of multi-stakeholder approaches according to a polycentric logic. It foresees the creation of platforms to record the progress made in this direction and relies extensively on the co-benefits provided by action against climate change in order to motivate all the actors.

From an economic standpoint, the Paris Agreement follows a voluntary "subscription equilibrium" logic, which is known to lead to a suboptimal situation in terms of the provision

of public goods. While it helps mobilize voluntary actors, it does not include provisions to tackle the problem of "freeriders", who may have an interest in delaying as long as possible their entry into the cooperative process promoted by the agreement, with a view to gradually making it more ambitious.[x]

## The new agenda opened up by the Paris Agreement

| | |
|---|---|
| **April 2016** | Opening for signing of the Agreement at the United Nations Secretariat in New York. 55 signatures representing at least 55% of global emissions are required for the entry into force of the Agreement in 2020. |
| **May 2016** | First meeting of the APA (Ad Hoc Working Group on the Paris Agreement), the body responsible for implementing the Paris Agreement. |
| **Nov. 2016** | Entry into force of the Paris Agreement (4 November)<br>COP-22 in Marrakech |
| **2018** | Publication of the IPCC special report on emission trajectories associated with the objective of limiting warming to 1.5 ° C.<br>Facilitation dialogue to increase the scope of national contributions (NDCs). |
| **2021** | Publication of the IPCC Sixth Assessment Report<br>1st five-year submission cycle of Nationally Determined Contributions (NDCs). |
| **2023** | First global stocktake on attainment of the Agreement's objectives. |
| **2025** | Implementation of the new funding target. |
| **2026** | Second five-year submission cycle of Nationally Determined Contributions (NDCs) |
| **2028** | Second global stocktake on attainment of the Agreement's objectives. |

*Multi-stakeholder coalitions, sectoral advances, carbon pricing*

The Paris Agreement unquestionably produced an electric shock that catalysed the mobilization of non-state actors. In many ways, the opportunities are unprecedented. Thanks to technical advances and local experiments, alternative solutions to fossil fuels are proliferating. The accelerated decline in wind and solar power production costs and in the storage of electricity make it easier to deploy renewable energy. New economic sectors are emerging and are counterbalancing the power of traditional lobbies. Alliances are being forged between economic and territorial actors who want to go faster than governments.

The Paris Agreement's emphasis on the co-benefits of action to combat climate change is a lever that works. Awareness of the near-immediate health benefits associated with accelerated climate policies, including the decline in coal, is a key factor in the acceptance by the population in emerging Asian countries. It is this that has led to a dramatic shift in China's energy priorities, producing a massive slow-down in global emissions growth in the mid-2010s. It is also the basis for various coalitions seeking to

deploy solar energy In the least developed countries, so as to provide access to electricity without going through the costly grid investments required by traditional electrification models.

The multilateral basket was also enriched in 2016 by two sectoral agreements promoted by Paris involving closer cooperation: the Kigali amendment to the Montreal Protocol and the decision by the International Civil Aviation Organization (ICAO) on regulation of air transport emissions.

The Kigali amendment was adopted at the 28th Conference of the Parties to the Montreal Protocol. Since 1987, this Protocol has been organizing the withdrawal of industrial gases in the CFC family detrimental to the ozone layer, by encouraging the use of substitutes: HFC gases that do not contribute to destruction of the ozone layer, but do increase the greenhouse effect. The Kigali amendment aims at the total withdrawal of these HFC gases in the coming decades. It has broadened the scope of the Montreal Convention, originally limited to the protection of the ozone layer. This extension underlines the desirability of decompartmentalizing the coordination of the action on global warming promoted by the 1992 Convention, by involving other agencies or treaties within the framework of the United Nations.

The ICAO agreement, which for the first time tackles international transport emissions, is a move in the same direction. At its 39th Session in October 2016, the ICAO Assembly adopted regulations aimed at stabilizing the net emissions from the air sector between 2020 and 2050. According to the traffic forecasts made by experts in the sector, doing so will require introducing a mechanism to allow airlines to meet their obligations through the purchase of offset credits. This use of an offset mechanism is liable to limit the sector's true emissions reduction potential unless the price of carbon rises considerably in international markets.[xi]

Consistently with its bottom-up logic, the Paris Agreement does not link emissions reduction targets to a carbon pricing system. On the other hand, it promotes decentralized carbon pricing initiatives, that since 2013 have expanded to cover slightly more than four billion tonnes of $CO_2$ in 2016. However, the geographical broadening of coverage has been accompanied by a trend toward lower prices for emission allowances traded in the markets, as was the case with the first of these, namely the EU Emissions Trading Scheme for $CO_2$ allowances. In the absence of comprehensive governance that ensures good coordination, each jurisdiction seems more apprehensive about the possible risks of a sudden rise in the price of carbon than those resulting from climate change.[xii]

This shift toward decentralized carbon pricing has not significantly speeded up since the Paris Agreement. The main expansion envisaged concerns the upgrading of seven Chinese municipal and regional pilot schemes to the level of the national market, scheduled for 2017. The operation, the principle of which was accepted before the adoption of the Paris Agreement, could increase the amount of emissions covered by carbon markets worldwide to some 6.5 billion tonnes of $CO_2$ – a full-scale test that could massively redefine the global geography of emission allowances markets.

Given the mixed record of cap-and-trade systems, the more focussed carbon tax experiments seem from time to time to deliver worthwhile results. Hence the renewed interest in taxation schemes which, in the view of some authors, may constitute the cement of more ambitious international agreements.[xiii]

Under the operating rules of the globalized economy, decisions are made according to the values indicated by prices. Yet these prices still only marginally incorporate the cost of climate damage associated with greenhouse gas emissions. In accordance with these rules, major investments have increased the overall amount of oil and natural gas that will be technically feasible and economically viable to extract in the coming decades. To reverse these onerous trends, it is necessary to include the value of the climate in the price scale that guides economic decisions and to do so by pricing carbon.

An international carbon price would also provide a strong economic incentive to discourage free loading[xiv] – a signal that the international community is sorely lacking with regard to the consequences of the US withdrawal announced by Donald Trump on 1 June 2017.[xv]

*When the world's second largest emitter becomes a free rider*

The announcement of American withdrawal fits in with the new federal strategy of supporting the use of all fossil energy sources available in the United States. Elected with the highest margins in fossil-fuel states such as Wyoming and North Dakota, the signals sent by the new president quickly confirmed his campaign pledges. In accordance with the slogan "America First", the federal government quickly removed any mention of climate change in the websites of its various agencies and now seeks to clear the way for the exploitation of domestic fossil resources. The appointment of a convinced climate change sceptic as head of the Environmental Protection Agency will facilitate the dismantling the Obama administration's flagship measure, the Clean Power Plan, aimed at accelerating the decarbonisation of the electricity sector. Federal restrictions on the development of new fossil deposits or their transportation by pipeline have already been lifted.

At the domestic level, this reorientation will come up against many counter powers, and in particular the hostility of the large coastal states, which are often at the forefront of action to combat to global warming and are determined to resist. It will also encounter a number of basic economic laws: the falling cost of renewables, the deployment of which creates American jobs; the limitations of internal outlets, which will not be able to absorb all the gas, oil and coal produced domestically; and the relationship between coal and gas prices, which makes a substantial proportion of the coal industry unprofitable to the advantage of shale gas. The success of the Trump's strategy in fact depends on an increase in exports. External markets exist for US gas, which is highly competitive, and potentially for coal if transport infrastructure projects (railway lines and port terminals) to the Pacific coast are completed, despite the strong local opposition they arouse.

In its current structure, the Paris Agreement has no safeguards against this free rider strategy, which can be implemented just as well by remaining in the Paris Agreement as by denouncing it. On the legal front, the new administration had three options[xvi] : to remain in the Agreement, even if it means revising its NDC in 2018; to withdraw from the Paris Agreement, which takes at least four years in view of the institutional rules; and to repudiate the 1992 Convention,[xvii] which can be done in one year.

In the name of maintaining international cooperation, a former United Nations Secretary-General and a Harvard professor advocate the first option.[xviii] Such a path, however, risked undermining the implementation of the Agreement by creating emulators,

since one freerider can set a precedent for others. It risked transforming the agreement into an arrangement in which everyone can do what they like regardless of what is taking place in the field.

Donald Trump's decision to leave the Agreement has had the merit of clarifying the situation. The US free rider strategy will clearly be situated outside the Agreement, since all the other parties rapidly gave short shrift to the idea of renegotiating the Agreement, as Trump had suggested in his speech. In the short term, this decision will not change much. It merely formalizes a change of direction already evident from actions taken elsewhere. In the medium term, its effects will depend on the reaction of the other parties to the Agreement.

*Contagion effects or rebound effects?*

Due to the absence of safeguards provided for by the Paris agreement in this type of situation, the US withdrawal may create very negative contagion effects. But it could also result in beneficial rebound effects.

Contagion effects are a major risk. To counter global warming, the overall volume of greenhouse gas emissions has to be reduced. Taken individually, each emitter is tempted to delay as long as possible its entry into the cooperative game so as to benefit as a free rider from the early actions taken by the other actors. With Trump, the world's second largest emitter is turned into a free rider. The risk is that the USA may be emulated by other countries with large fossil energy reserves. Oil and gas rent still represents an immense source of revenue which these countries are not willing to give up. Yet it is nonetheless vital that exploitation of fossil fuels ceases soon if we are to escape warming higher than 2°C. To limit the risk of contagion, this group of countries must become involved in negotiations and contribute to global action by weaning themselves from their addiction to fossil fuels.

**$CO_2$ emissions from fossil and industrial sources since 1960 (Billions of tonnes)**

| | China | USA | EU28 | India | Russia | Japan | World |
|---|---|---|---|---|---|---|---|
| 1960 | 0.78 | 2.89 | 2.65 | 0.12 | 0.89 | 0.23 | 9.42 |
| 1970 | 0.77 | 4.33 | 3.94 | 0.20 | 1.45 | 0.77 | 14.86 |
| 1980 | 1.47 | 4.72 | 4.63 | 0.31 | 2.14 | 0.95 | 19.44 |
| 1990 | 2.42 | 5.12 | 4.22 | 0.62 | 2.59 | 1.16 | 22.32 |
| 2000 | 3.62 | 6.00 | 3.90 | 1.03 | 1.51 | 1.28 | 24.88 |
| 2010 | 9.03 | 5.69 | 3.70 | 1.72 | 1.66 | 1.21 | 33.76 |
| 2014 | 10.44 | 5.56 | 3.21 | 2.16 | 1.67 | 1.27 | 36.27 |
| 2015 | 10.36 | 5.42 | 3.25 | 2.28 | 1.62 | 1.24 | 36.29 |

*Source: UNFCCC and Carbon Dioxide Information Analysis Center, U.S. Department of Energy*

*In 2015, global CO2 emissions from fossil fuels stabilized as a result of zero Chinese emissions growth. US emissions have deceased since 2005, due to large substitution of coal by natural gas.*

Conversely, the US withdrawal could trigger the mobilization of the remaining countries in the agreement, similar to what happened in 2001 when America left the Kyoto Protocol. Three types of decision could alter the situation.

A major weakness of the Paris agreement is the absence of common rules on measures and verifications, due to the refusal of the emerging countries to be subject to them. An international disarmament agreement requires that the signatories accept unbiased inventorying of nuclear warheads, launch vehicles, and so on. A climate agreement requires the same transparency in terms of greenhouse gas inventories and reporting. A big step forward would be if the leaders of the emerging countries were to agree to join such a system at the point when the free rider Trump decides to leave it.

To enhance and above all give credibility to the emissions reduction targets, the rules of the game need to be rapidly changed by allocating a cost to $CO_2$ emissions, though carbon pricing. Europe could here take the initiative and regain its leadership position alongside China in international climate diplomacy. To this end, its leaders should as quickly as possible restore the credibility of the European emissions trading system, which is currently in disarray. Under this impetus, they could suggest forming a common economic area with China, Korea and other countries to introduce a carbon price. Such an area would, of course, also be open to the entry of US states, such as California, that currently operate carbon pricing schemes.

The third step is financial. The US withdrawal will negatively impact international climate funding, particularly the Green Fund. At the same time, it exposes the extraordinary weakness of the Paris agreement, which pledges to align financial flows with climate objectives but does not involve any credible commitment on the part of the donors. Following the US defection, international climate funding needs to be secured in the short term and the reorientation of financial flows has to be made credible in the medium term. The various statements by national leaders promising to boost action will be all the more compelling once they reach for their wallets.

If the rebound effects were to outweigh the contagion effects, Trump's decision could, paradoxically, lead to an eventual strengthening of the Paris Agreement. Since the start of the negotiations, US relations with the multilateral climate regime have followed a roller coaster ride. Frequenters of fairgrounds are familiar with how this type of attraction works: the steeper the descent, the faster the rise on the next upward slope!

## NOTES and REFERENCES

[i] The Intergovernmental Panel on Climate Change (IPCC) is a network of scientists created in 1988 under the auspices of the World Meteorological Organization and the United Nations Environment Programme. Its mission is to assess the state of knowledge on climate and to communicate it at regular intervals to decision-makers through global assessment reports. The IPCC may also conduct ad hoc assessments at the request of the Climate Convention secretariat. It is also responsible for validating the calculation methods for greenhouse gas emissions. All IPCC work, including the assessment reports referred to in this article, is available on the website: http://www.ipcc.ch/

[ii] Stefan Aykut, Amy Dayan, *Gouverner le climat? Vingt ans de négociations Internationales*, Presses Universitaires de Science Po, 2014

[iii] Christian Gollier, Jean Tirole, "Negotiating effective institutions against climate Change", *Economics of Energy and Environmental Policy,* 2015-4.

[iv] For a complementary view of the dynamics of trading, see: Christian de Perthuis, Raphaël Trotignon, *Le climat à quel prix? La négociation climatique,* Odile Jacob, 2015. In English, see the comprehensive survey: Joseph E. Aldy & Robert N. Stavins, *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement,* Cambridge University Press, 2010.

[v] See the two evaluation reports carried out in France by the Economic Analysis Board: Roger Guesnerie, *Kyoto et l'économie de l'effet de serre*, Documentation Française, Paris, 2003; Jean Tirole, *Politique climatique, une nouvelle architecture*, Documentation Française, Paris, 2009.

[vi] Resolution by senators Byrd and Hagel, adopted by 95 votes for and none against, 25 July 1997. *105th Congress*, *1st Session*, *Report N°105-54*, *GPO.*

[vii] In November 2014, a year before the Paris conference, Presidents Xi Jinping and Barack Obama signed a bilateral agreement on the climate, enhancing technological cooperation and calling for the adoption of a universal agreement at the Paris COP.

[viii] On the legal aspect of climate negotiation, it is worth looking at: Sandrine Maljean-Dubois & Matthieur Waëmer*, La diplomatie climatique de Rio 1992 à Paris 2015*, Editions Pédone, 2016.

[ix] INDCs *(*Intended Nationally Determined Contributions) will become NDCs (Nationally Determined Contributions).

[x] Olsom M. (1965), *The Logic of Collective Action*, Harvard University Press

[xi] Moreover, the decision to set 2020 as the reference year sends a perverse incentive to operators who have every interest in increasing their emissions between 2016 and 2020. For more details see: Shahbano Soomro*, ICAO's global offset mechanism draws worldwide attention to international aviation emissions*, Policy Brief, Climate Economics Chair, October 2016.

[xii] De Perthuis, C. & R. Trotignon (2014). Governance of CO2 markets: Lessons from the EU ETS, *Energy Policy*, 75, 100-106

[xiii] Weitzman, M.L. (2015), "Internalizing the Climate Externality: Can a Uniform Price Commitment Help?", *Economics of Energy and Environmental Policy* 4.

[xiv] A point fully developed in Nordhaus, W.D., (2013), *The Climate Casino, Risk, Uncertainty and Economics for a Warming World*, Yale University Press.

[xv] On the links between the US agreement and the Paris Agreement de Paris, see the contribution by Jonathan Wiener: Climate Policy in the New US Administration*, Climate Economics Chaier, Policy Brief*, June 2017.

[xvi] Lisa DeMarco & Jonathan McGillivray, *The Elephant in the Room*, IETA Greenhouse Gas Market Report, 2017.

[xvii] And consequently the Paris Agreement, which is merely a text for the application of the Convention (an annex to an annual decision-making of the COP).

[xviii] Ban Ki-Moon & Robert Stavins, *Why the US Should Remain in the Paris Climate Agreement*, Harvard Kennedy School, Viewpoints, April 2017.