

# PRIVATE FINANCING FOR DECARBONIZATION

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**Abstract:** All of a sudden, the financial system began to frantically grasp the inevitability of the transition to low carbon. In addition to discussing what could be the best interpretation of such a sudden uproar after such a prolonged lack of attention, this paper seeks to identify what the main obstacles to such dynamics are, as well as proposals to resolve the situation. I conclude that private financing of the decarbonization process will be very slow if the incremental institutional innovations suggested by all available official reports are relied on. Even if the alternative—called "positive pricing carbon"—still needs to mature to become more convincing and persuasive, it surely points to a dramatic acceleration towards finding a solution.

**Keywords:** Decarbonization; financing; private financing; carbon pricing; energy transition; transition to low carbon.

## Introduction

For over twenty years, the financial system hesitated regarding the role it would play in the decarbonization process. Suddenly, however, both the public and private sector embarked on a frenetic, labyrinthine search for innovations that would allow them overcome such brutal alienation.

The practical results of this welcome turnaround can only be viewed as preliminary. On the other hand, there are no clear reasons, much less clear responsibilities, for this disparity. And more effective results can only arise if and when timely and appropriate proposals are selected to overcome the obstacles. Only this would accelerate the evolution of the system in the desired direction of sustainable development.

This paper explores four questions that seem crucial to clarifying this immense challenge: 1) What are the evidences that the financial system is assimilating the inevitability of the transition to low carbon?; 2) How to interpret this outburst of attention after such long neglect of the issues involved?; 3) What seem to be the main obstacles confronting a transition?; and 4) Are there good proposals to overcome these obstacles?

## 1. The evolution of "climate financing"

In the context of the Earth Summit, the United Nations Environment Programme (UNEP) decided to establish, in Geneva, a division dedicated to mobilizing the financial sector for

sustainable development. In 1992 the UNEP Finance Initiative (<http://www.unepfi.org/>) took on the mission "to bring about systemic change in finance to support a sustainable world."

To do this, the Initiative endeavored to convince organizations of the financial system to be part of the initiative via adherence to its principles. First, specifically directed to banks or insurance companies, for example, and afterwards unified into a single statement, today signed by more than two hundred entities in forty countries.

Paragraph 1.5 of this statement asserts:

We recognize that the sustainable development agenda is becoming increasingly inter-linked with humanitarian and social issues as the global environment agenda broadens and as climate change brings greater developmental and security challenges. (emphasis mine)

Of course, there is almost always an immense distance between declarations of principles and the actions that would make them effective. And this case was no exception: nothing really relevant can be cited regarding the financial sector's behavior in the two decades that followed the Rio-92 with respect to the main challenge to sustainable development: the climate imbroglio.

This situation has only really begun to change since 2012/2013 when various multilateral articulations simultaneously managed to awaken not just interest, but a surprising "hustle and bustle" in several market players to pursue innovations that would enable private financing in projects designed to reduce greenhouse gases emissions (GHG).

It should be remembered that, in the context of financial sector reforms that followed the big scare of September 2008, and the subsequent start of the G20 summit as the most favorable instance to a global governance of the crisis, there were many political statements, especially from heads of State or governments, but also from leaders of international organizations in favor of a shift towards "green growth" as a possible way out. But, in the absence of convincing and persuasive proposals on this kind of reorientation, the rhetoric of these leaders in favor of sustainability produced, at the best, requests for lengthy studies whose final reports were barely publicized, if at all.

However, this situation surely began to change through the fruitful work of the High-level Advisory Group appointed by UN Secretary-General Ban Ki-moon on February 12, 2010, with twenty participants, including Lawrence H. Summers, Nicholas Stern, George Soros, Christine Lagarde and Caio Koch-Weiser. Anticipating the COP16 negotiations in Cancun in less than nine months, this group presented a 66-page document, known as the *AGF Report*, which became the basic reference for all subsequent elaborations.

The principal message from the AGF was as follows:

The Advisory Group found that raising US\$100 billion per year by 2020 is challenging but feasible.

However, with at least four considerations that could not be more symptomatic:

This funding will come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance.

The Advisory Group emphasized the importance of a carbon price in the range of US\$20-US\$25 per ton of CO2 equivalent in 2020 as a key element of reaching the US\$100 billion per year. The higher the carbon price, the steeper the rise in available revenues and the stronger the mutual reinforcement of abatement potentials and different measures.

There were different perspectives within the Advisory Group on the role of public and private capital flows in meeting the goal of US\$100 billion per year. Some members focused on public financing as the primary source, covering incremental costs and complemented by private flows. Others emphasized that private financing would be the primary source, inter alia, because of the important role that private investments already play in climate-relevant sectors in scaling up technology deployment and catalysing entrepreneurship, and because of its predictability and scalability.

The Advisory Group did not seek an agreed formula on which financing flows should count and which should not count towards the US\$100 billion per year. There were different perspectives within the Advisory Group as to whether and how to measure revenues in terms of gross and net metrics, particularly regarding private and non-concessional flows. (emphasis mine).

In a few words, at the same time as it served to legitimize the challenge taken on in 2009, in the COP15 of Copenhagen, regarding the “US\$100 billion per year by 2020” along with the corresponding creation of the Green Climate Fund (GCF), the AGF Report emphasized the inevitable tension between the roles to be played by public and private financing, as well as the necessity of pricing GEE emissions.<sup>1</sup>

Certainly, it was because of the influence of this report that, right afterwards, two events occurred that perhaps can be seen, jointly, as the watershed moment leading to private finance's process of engagement in decarbonization. In April 2012, the finance Ministers of the G20 constituted a Climate Finance Study Group, the initiative behind the meeting promoted by the US Department of State in Washington DC on April 10-11, 2013, with a very select group of invited guests:

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<sup>1</sup> In September 2011, UN Secretary-General Ban Ki-moon launched Sustainable Energy for All (SE4All) as a global initiative that would mobilize action from all sectors of society in support of three interlinked objectives: i) providing universal access to modern energy services; ii) doubling the global rate of improvement in energy efficiency; and iii) doubling the share of renewable energy in the global energy mix. In December, at COP 20 (Lima), Parties welcomed with appreciation the successful and timely initial resource mobilization process of the GCF that led to the mobilization of USD 10.2 billion to date by contributing Parties, enabling the GCF to start its activities in supporting developing country Parties of the Convention, and making it the largest dedicated climate fund.

The meeting, which was convened and chaired by the US, was attended by representatives from Australia, Canada, Denmark, the EU, France, Germany, Italy, Japan, New Zealand, Norway, Poland, Switzerland, the UK and the US, as well as from development finance institutions and export credit agencies.

This meeting resulted in one of the most important current vectors for private financing of decarbonization: The Global Innovation Lab for Climate Finance (The Lab): <http://climatefinancelab.org/>

The Lab is a global initiative that aims to drive billions of dollars of private investment into climate change mitigation and adaptation projects in developing countries. The Lab supports the identification and piloting of cutting edge climate finance instruments that can drive this investment and unlock new opportunities for action.

Three other important vectors for the private financing of decarbonization are those that The Lab presented as its principle partners: CPI, BNEF e FiRe. However, a mapping of the great vectors should include many others, beginning with at least three more: Climate Bonds Initiative, NCE e GCI.<sup>2</sup>

The immense volume of information, principally new ideas and proposals, being generated only in the context of this sample formed by the seven mentioned entities (The Lab, CPI, BNEF, FiRe, CBI, NCE e GCI) makes it impossible, at this moment, to see clearly which will be the most probable tendencies for private financing of decarbonization.

In fact, this is exactly the problem that seems to have had a strong impact on an ingenious project devoted precisely to taking stock of the situation: UNEP's *Inquiry*. More precisely, "The inquiry into the Design of a Sustainable Financial System" established by UNEP in January 2014.

The final result of this effort can be found in the 106-page report published in October 2015, entitled *The Financial System We Need - Aligning the Financial System with Sustainable Development*. Its authors did not hesitate in describing what has been happening with the financing system as a phenomenon akin to an "incomplete quiet revolution:"

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<sup>2</sup> CPI's mission is to help nations grow while addressing increasingly scarce resources and climate risk. This is a complex challenge in which policy plays a crucial role. BNEF (Bloomberg New Energy Finance) has been contributing to the conversation on the future of energy for more than ten years. Leading journalists from around the world rely on analysis, data and research from BNEF. FiRe, (Finance for Resilience), is an open and action-oriented platform that collects, develops and helps implement powerful ideas to accelerate finance for clean energy, climate, sustainability and green growth. The Climate Bonds Initiative is an international, investor-focused not-for-profit. It's the only organization in the world focusing on mobilizing the \$100 trillion bond market for climate change solutions. NCE, (The New Climate Economy), is the flagship project of The Global Commission on the Economy and Climate. The Commission is a major international initiative to analyse and communicate the economic benefits and costs of acting on climate change. CIGI, (The Centre for International Governance Innovation), is an independent, non-partisan think tank focused on international governance.

The Inquiry's core finding is that a "quiet revolution" is underway, seeking to increase the internalization of sustainable development factors into financial decision-making. The Inquiry found over 100 examples of policy measures across 40 countries encompassing new policies, institutions, regulations and collaborative initiatives targeting each of the main asset pools and actors, as well as the underlying governance of the financial system.

The emerging revolution, however, is incomplete. Developed countries' financial systems are adaptive and highly innovative in some respects, but continue to trend towards greater levels of "financialization", where financial returns increasingly arise from transactions that are disconnected from long-term value creation in the real economy. Despite, and in some respects because of, major regulatory developments in the wake of the financial crisis, financial and capital markets are today delivering even less investment in long-term infrastructure. Instead, they continue to reward highly liquid, leveraged trading over the prospects of greater, but less liquid, longer-term returns (emphasis mine).

Ultimately, it does not seem necessary to go further to demonstrate the very large evidence that the financial system has surrendered to the inevitability of the low carbon transition, the first of the four issues addressed in this text. Much more difficult is the second: the resulting need to interpret this sudden and growing uproar of the last three years after such a profound neglect in the previous two decades.

## **2. Two almost concurrent clashes**

With the crisis of 2007-2009, the financial system came under pressure to abandon the vision until then absolutely dominant: that its sole purpose should be in the incessant expansion of its shareholders' gain. That is, only "to maximize shareholder wealth." Instead, it should at least merge this view with its well-known rival, according to which the system would need to be related to, and accountable to all stakeholders, which obviously requires it to admit to intense government regulation, as well as a substantial commitment to the controversial self-regulation.

The literature about the dispute is vast, as shown by McCarthy and Morling (2015). So it seems essential to at least take into account the serious restriction that was recently revisited by Joel Bakan in *The Cornell International Law Journal*:

The private regulation movement effectively abandons that project, prescribing instead alternatives to public and democratic governance that elevate market values and actors to governing status. The result is to make regulation an "adjunct to the market," in Polyani's words, and thus to create a global economy in which "social relations . . . [are] embedded in the economic system" rather than the "economy . . . embedded in social relations.

The case for private regulation is unconvincing because it depends upon ignoring, thereby making invisible, the real and robust role law plays in enabling and protecting multinational corporations. Bringing that role to light is important not only for revealing the true and disturbing vision underlying private regulation—a

world where public power promotes private interests, while public interests depend on private power for protection—but also for making visible the urgent need and many possibilities for finding better ways forward.

In addition to the path of self-regulation being at the least doubtful—and before reasonable institutional outlets for the clash provoked by the 2007-9 crisis could come into play—at about the same time, a second clash was generated by an important political fact also directly related to global governance.

As already mentioned, already in late 2009, the COP15 in Copenhagen adopted the constitution of the Green Climate Fund (GCF), which was to be designed by an interim committee of forty members, including 15 from core countries, considered "developed," and 25 from peripheral countries, which are tossed into the "mixed bag" of "developing countries."

Thus began join the clash "shareholders vs. stakeholders:" a new pressure in the sense that the financial system also began to have concerns about the sustainability of development; as well as feeling pressure to attend to the vision usually designated by the acronym ESG, which expresses environmental, social and governance concerns in the jargon of those most involved.

In this sense, it is very significant that the first foray of the IPCC on the topic of investment and finance only occurred in 2014, with a specific chapter by the Working Group III in the Assessment Report-5.<sup>3</sup>

This second clash might even have been less "harsh" than the first, but it had an impact on decisive instances of global governance since 2011. For instance: at the request of G20 Finance Ministers, The World Bank Group, in close partnership with the IMF, the OECD and the Regional Development Banks prepared the paper "Mobilizing Climate Finance," published on October 6, 2011.

In comprehensive annual reports to their finance ministers, the G20 Climate Finance Study Group (CFSG / G20)<sup>4</sup> has been stressing that:

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<sup>3</sup> These are the chapter's key findings: a) Scientific literature on investment and finance to address climate change is still very limited and knowledge gaps are substantial; there are no agreed definitions for climate investment and climate finance. b) Total climate finance for mitigation and adaptation is estimated at 343 to 385 billion USD (2010/11/12 USD) per year using a mix of 2010, 2011, and 2012 data, almost evenly being invested in developed and developing countries (*medium confidence*). c) The total climate finance currently flowing to developing countries is estimated to be between 39 to 120 billion USD per year using a mix of 2009, 2010, 2011, and 2012 data (2009/2010/2011/2012 USD) (*medium confidence*). d) Emission patterns that limit temperature increase from pre-industrial level to no more than 2 °C require considerably different patterns of investment. e) Resources to address climate change need to be scaled up considerably over the next few decades both in developed and developing countries (*medium evidence, high agreement*). f) Public revenues can be raised by collecting carbon taxes and by auctioning carbon allowances (*high confidence*). g) Within appropriate enabling environments, the private sector, along with the public sector, can play an important role in financing mitigation (*medium evidence, high agreement*). h) A main barrier to the deployment of low-carbon technologies is a low risk-adjusted rate of return on investment vis-à-vis high-carbon alternatives often resulting in higher cost of capital (*medium evidence, high agreement*).

... a growing number of private financial operators throughout the world are getting involved in order to redirect capital towards a low-GHG emission and resilient growth.

However, in their report of September 2015, this group recognized that:

Lack of knowledge on opportunities for climate-related investments is still a great drawback to potential interested investors.

The logic and psychology driving private finance is very different from the motivations for public finance. For areas where private investments are in the lead, firms will seek opportunities based on the reasonable expectation of profit, which is driven by two fundamental variables: risk and return. Individual firms cannot be told where to invest and will rarely pre-commit long-term resource allocations beyond the boundaries of specific projects. They require flexibility in order to adjust their long-term strategies in step with the constant evolution of market competition. They do not pre-commit in the same manner as governments.

As general arithmetic, **public sector measures will need to decrease their perceived risk**, with the latter forming a particularly pervasive barrier in many sectors and geographies.” (emphasis, in the report).

This seems to summarize "the opera" regarding the current perspectives of private financing for decarbonization projects. It could only be more uncertain if it included the challenge of adaptation plans.

For this reason, it is imperative here to emphasize that all the theories about the financing system converge to explain the murky situation previous to 2012/2013, but they are not sufficient to interpret this recent picture characterized by the almost coincidental two clashes. Moreover, Joakim Sandberg's article of October 2015, "Towards a theory of sustainable finance," demonstrates this with crystalline clarity.<sup>5</sup>

Sandberg central thesis is simple, and relates to the long-term:

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<sup>4</sup> The G20-mandated platform “GreenInvest” has the objective to mobilize private capital, especially from institutional investors, for inclusive green investments. GreenInvest has been launched in June 2015 at the G20 Development Working Group Meeting in Turkey. In 2015 the GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) also launched the global Practitioners’ Dialogue on Climate Investments (PDCI) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). And the Capital Markets Climate Initiative (CMCI) was established by the United Kingdom in 2010 and created a strong public-private partnership to help mobilize and scale up private finance flows for low carbon technologies, solutions and infrastructure in developing economies.

<sup>5</sup> Sandberg is one of the editors of *The Cambridge Handbook of Institutional Investment and Fiduciary Duty*. “A central question in the wake of the crisis has been whether to support external regulations – such as capital reserve requirements, bans on bonus programs, or financial taxation – or more internal solutions – such as an increased focus on social responsibility and ESG factors in financial management. Both options can be problematic without the proper balance between them. External regulations risk being ineffective and unsustainable over the long run without some level of support from the industry. At the same time, financial agents themselves cannot be expected to become “surrogate regulators”, burdened with the task of balancing financial and social obligations in almost every decision”.

The centrality of one particular kind of reform of the financial system: reformation of the fiduciary duties of financial institutions towards their beneficiaries and society.

However, as a matter of fact, fiduciary duties are still seen as antithetical to ESG, primarily because ethically-motivated investing is stereotyped as sacrificing financial returns.

### 3. What are the main obstacles?

For the many authors who collaborated on the chapter about finance in the latest IPCC Report, the major obstacle resides in risks that certainly could be reduced with credit insurance, premiums and concessional finance:

**A main barrier to the deployment of low-carbon technologies is a low risk-adjusted rate of return on investment vis-à-vis high-carbon alternatives often resulting in higher cost of capital** (medium evidence, high agreement). This is true in both developed and developing countries. Dedicated financial instruments to address these barriers exist and include inter alia credit insurance to decrease risk, renewable energy premiums to increase return, and concessional finance to decrease the cost of capital. Governments can also alter the relative rates of return of low-carbon investments in different ways and help to provide an enabling environment (emphasis mine).

Whereas, in the approach of the G20 Climate Finance Study Group, the advance of private financing of decarbonization would depend on possible enhancements in “three new financial instruments” (*sic*): i) green/climate bonds, ii) risk-sharing tools, and iii) GHG emissions pricing approaches.

O CFSG/G20 also mentions—but only in passing—a fourth institutional innovation that would greatly influence the others: the necessity for “new methods to develop more accurate assessments of the risks and opportunities.” And—without emphasis—it adds an even more significant finding:

The application of **GHG emissions pricing** approaches has been considered by some countries, in their domestic circumstances and preferences, as a cost-efficient means of achieving emission reductions and uncovering opportunities for GHG mitigation. **On the other hand, some countries have indicated that GHG emissions pricing would not be an appropriate policy option for implementation in their national circumstances** (emphasis mine).

An even more extensive list of problems had already been elaborated in 2013 by the Private Sector Facility of the Green Climate Fund (GFC), a list that was taken up again and amplified in the recent report, *Canfin-Grandjean*, that was delivered to the President of

France in June 2015.<sup>6</sup> At least two obstacles call particular attention among the dozen mentioned:

Institutional investors in high-income countries have a fiduciary duty vis-à-vis their clients who have entrusted them with the management of their capital. They are therefore obliged to invest prudently to respect this duty. Given the low level of interest rates in high-income countries, several institutional investors express their interest in the opportunity to invest in low-carbon assets in developing countries – even with a relatively low multi-sector average of returns of 2 to 4%. These investors are currently not deterred by the modest returns of low-carbon investment in developing countries, but rather by what they perceive as high risks. These include political, institutional and regulatory instability; technological risk; and country exposure to other external factors. In order to cover those perceived risks, an infrastructure project in the developing world must often generate a higher return than it would in a developed economy. This is a critical barrier to development (emphasis mine).

**The challenge of transforming needs into bankable projects:** in the barriers mentioned so far, there is the assumption that projects are available to finance, whether a low-carbon power plant, or a public transport network. However, many experts point out the lack of projects in developing countries in general, and in particular those aligned with a low-carbon transition. (emphasis mine)

This last observation directly contradicts the perception that seems to be largely dominant among specialists, since, in general, they start from the supposition that the technological revolution that will permit a transition to low carbon is much more advanced than the evolution of the finance system that will enable resulting, and indispensable, investments. Moreover, there is at least one important proposal made by senior officials of the World Bank that emphasizes exactly the opposite: the plethora of decarbonization projects in countries not a part of the Annex 2 of the Kyoto Protocol. Starting from this premise in 2010, Christophe de Gouvello and his colleagues came forth with the idea to constitute a Low-Carbon Development Facility (LCDF):

[...] many low carbon investment projects do not materialize because they have restricted access to financing, even though the projects may offer low or negative GHG abatement costs. In fact, many projects validated under the Clean Development Mechanism (CDM) of the Kyoto Protocol cannot achieve financial closure, even though they are eligible for carbon finance. Carbon finance alone cannot support the full GHG emission abatement potential in non Annex I countries. Therefore,

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<sup>6</sup> The report “proposes to the President of the French Republic paths of action to mobilize increased public and private funding in the fight against climate change. It also forwards proposals on how the French government could advance the ‘innovative climate finance agenda’ in the various international forums in which it participates (G7, G20, IMF, OECD, etc.). It covers the financial instruments identified more than a decade ago as ‘innovative’ (financial transaction tax, carbon market auctions revenues, etc.). It, however, goes further to also look at the means of finding ‘innovative’ ways of using existing tools in the ‘toolboxes’ of both private and public actors to scale-up financial flows for the low-carbon economy.”

removing the Investment financing barrier should be a priority, independent of the evolution of the carbon finance market.

Be that as it may, the obstacles listed are so many that it becomes impossible to point to some degree of convergence among the diagnostics of the four reports cited: GFC 2013, IPCC 2014, CFSG G20 2015, e Canfin/Grandjean 2015. This would seem to impose five observations:

1. There are G20 countries that continue to reject the eventual pricing of costs of GEE emissions, whether because of rights/quota commerce ("cap and trade"), whether for taxation concerns ("carbon tax").
2. There are some that contest the premise that a large number of decarbonization projects already exist whose realization would be coming up against the lack of financing, especially from the private sector.
3. Whether numerous or not, when these projects exist they customarily involve risks that are perceived as far too high, particularly in the case of the more peripheral countries, but also in emergent ones as well as in some of the so-called "developed" countries.
4. The methods available to evaluate risks and opportunities for investment in decarbonization projects seem still precarious.
5. In such circumstances, real stimuli toward the reduction of GEE emissions would depend much more on insurance/guaranties than on subsidies.

#### **4. Are there good proposals for overcoming these obstacles?**

The defining tone of all these reports is to propose incremental innovation, as if prescribing homeopathic treatments for the identified obstacles. These documents contain a large number of suggestions for improving the effectiveness of emission "climate bonds," or to what size insurance / guaranties should be:

Guaranties and insurance can help close the gap between perceived risks and real risks without creating market distortion, as long as an in-depth sectorial work has been performed to design the proper incentives. The development of risk-sharing tools to facilitate investments in mitigation and adaptation should take into account the experience from private capital markets, in particular the risks associated with securitization.

But, besides these reports cited here, there are proposals that aim to go beyond the necessary improvement of existing mechanisms and instruments. That is, they imagine disruptive (or revolutionary) innovations that aim to promote a qualitative leap in the private financing of decarbonization.

Proposals with these ambitions have been discussed mainly in France, even though they have

already attracted the attention of economists from various other countries. Following this momentum, they began to tend to titles such as "Proposals on pricing carbon positive" or "Proposals on positive pricing of carbon and large-scale climate finance."

The basic idea is to create interest in financial intermediation anchored in an active carbon, capable of attracting even the most agnostic agents on the climate issue. To do so, it could suffice that governments define two categories of amounts: a "social value for carbon not emitted" (VSC), and a volume of emissions that would no longer occur. That would be enough to promote a new asset, "climate remediation" or, as it was called, a CRA: "Climate Remediation Asset."

Once this asset existed, central banks could open credit lines equal to the amount of the product of CRAs volume through VSC and its loans could be repaid with "Carbon Certificates" (CC) validated by authority similar to that which already operates the CDM (Clean Development Mechanism), created by the Kyoto Protocol.

Thus, banks could offer more credits to low-carbon investments, which would be only partly refundable in cash, thanks to the CCs. And investment funds could then issue bonds attractive to both institutional investors and to individual savers.

In this model, the main role of central banks would be the transformation of CCs into CRAs, which in turn would become recorded by them as assets along side of gold and foreign exchange. In this way, there no blind injection of liquidity would occur and the increase in carbon stocks would be correlated to a properly controlled production of wealth. Thus, much of the private savings today devoted to speculative investments would be channeled to "climate friendly" financial products with strong guaranties.

The logic of this proposal is to prevent carbon pricing from causing more stress to savings while guiding choices regarding capitalization. After a learning phase, the VSC could be increased much more quickly than would be possible with a possible carbon price formed by markets "cap and trade" and / or "carbon taxes." And with lower transaction costs.

Another major advantage is that this plan would make it unnecessary to apply sanctions to countries that did not comply with the legally binding commitments, since they would already be punished by not having access to the available new financing. Moreover: under this model, governments would gain a great incentive to adopt climate policies, particularly through taxation that would reinforce the attractiveness of investments in low-carbon initiatives.

Strictly speaking, this would be a strategy to arrive, later, at a broad and general pricing of carbon emissions, but without the labor pains that require immediate "carbon tax" and / or complex engineering that required inefficient " cap and trade" markets.

This proposal first surfaced in a 2011 CIRED working-paper (Centre International de Recherches sur l'Environnement et le Développement) by Jean-Charles Hourcade, Baptiste

Perissin Fabert and Julie Rozenberg, published in 2012 in the *International Journal Environmental Agreements: Politics, Law and Economics*, and entitled "Venturing into Uncharted Financial Markets: an Essay on Climate-Friendly Finance." Since then, the central idea has been taken up and discussed by many other scholars of finance and / or the climate issue, including: Michel Aglietta, Vincent Aussilloux, Dipak Dasgupta, Etienne Espagne, Camille Feron, Carlo Jaeger, Romain Morel, and Alfredo Sirkis.

What most distinguishes this proposal from all others, is that it is a monetary innovation that seems extremely appropriate to the objective conditions in the euro zone, in which investments have fallen over 20% since the beginning of the 2007-09 crisis. In this case, the adoption of technological innovations aimed at energy transition to low carbon could engender a solution to take this zone out of almost economic stagnation, and ward off the threat called "secular stagnation."

At a time when central banks are fighting deflation and at the same time, a reluctance to lend for productive investment persists, this quite virtuous monetary innovation could act as an appropriate economic tool toward decarbonization, constituting a sort of new currency that would give a hortatory price signal on carbon not emitted. A strong signal to be given by government for investors to dare to invest despite uncertainties.

One of the main merits of this proposal is to depart radically from the technocratic illusion that the goal would be possible to calculate a "social cost of carbon." In contrast, it provides a political negotiation concerning what can be referred to as the "social and economic value of carbon."

Another merit is that such a plan would complement and reinforce efforts already made by forty countries and over twenty subnational entities in national and local carbon precificações.

The main constraint that can be made to this monetary innovation proposal is that it maintains that guaranties would be provided by national governments. While this does not pose a problem in some European countries such as Germany, the United Kingdom and France, or even outside, as is the case of Japan, it is very doubtful that it can work in the so-called "European South," not to mention the example of the BRIC countries.

This does not, of course, impede such a plan from being deployed by a small group of central banks in stronger countries, subsequently passing on to be gradually imitated by others. Thus, at some point this monetary innovation would eventually join the IMF agenda, which would make its generalization more likely among the nations that emit the most GEE.

Of course, a good shortcut could be the adoption of the proposal by the G20, which brings together nearly forty countries responsible for over 90% of these emissions. However, given its composition, it is more likely that such a proposal of global governance will have a long wait before even being introducing in its Summit agendas.

Some of the participants of this discussion come to hypothesize a "low carbon Bretton Woods" as Alfredo Sirkis explains:

The willing governments offer guaranties for these certificates and eventually use carbon taxation to cover their exposure. This new value, covering up to ten percent of these carbon reduction investments, can become a tipping point for low carbon finance. Along with carbon markets and carbon taxation, positive pricing of carbon reduction will help establish a more stimulating worldwide financial environment for a new era of low carbon economies and a path to net zero emissions in the second half of the century. We need a low carbon Bretton Woods. In fact, a major but not that complicated adjustment in the global financial system, on a globally agreed upon premise: carbon reduction recognized as a convertible unit of value.

If, on the one hand, the idea that at some point an overall adjustment of the financial system will be necessary is correct; on the other, that it would evoke the memory of Bretton Woods is disputable. For various reasons, among which the most important is surely the permanent and inevitable tension—already of seventy years duration—between the democratic multilateralism architected by the 55 countries that created the United Nations in San Francisco in June 1945 and the distorted multilateralism put together a year earlier by the 44 allied nations who participated in the negotiations held at the famous ski resort in the mountains of New Hampshire. This may not be the case with the transformation of GATT into the WTO, but the *modus operandi* of other two offspring of Bretton Woods, the IMF and the Work Bank, continue to cause many problems.

### **By way of conclusion**

This paper addresses four key issues: a) the evidence that the financial system is assimilating the inevitability of the transition to low-carbon; b) an interpretation of the sudden uproar after such long hesitancy or neglect; c) the main obstacles of this dynamic; d) proposals for overcoming these obstacles. So, strictly speaking this is not the place, here, to present a conclusion because the narrative followed very much a *démarche* of analytical description rather than the presentation of an answer to a problem, or the defense of a thesis.

Even so, there are two observations that seem relevant to a possible synthesis of the four questions.

First, it seems to have been clear that the private financing of the decarbonization process will be much slower if it relies on incremental institutional innovations suggested by all of the examined reports. Even if the alternative proposal—mainly formulated by French economists—still needs to mature to become more convincing and persuasive, surely it points to a serious acceleration of this process.

Second, both the proposals for incremental innovations, such as the proposal for a "revolutionary" innovation, would require a serious political investment in greater regulation of the financial system. The difference is that the second is more skeptical about the

evolutionary potential of the ESG perspective, and therefore is a more direct option to the possibility that the agents of this system will be committed to all "stakeholders," even if they remain skittish regarding the idea of an alignment to the sustainable development project stamped in Agenda 2030, accepted in September 2015 by 196 countries.

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