Policy Brief Agenda 2030
2021/07

Breaking the climate impasse through carbon offsets
by
Riwan Driouich¹, 2 degrees investing initiative

The Agenda 2030 Policy Briefs series mobilizes economists and practitioners to identify an economic and financial reform agenda to achieve the 2030 Agenda at the territorial, national and supranational levels. Contact: thomas.lagoardesegol@kedgebs.com.

1. Introduction

¹ Economist, 2 degrees investing. Email: riwan.driouich@gmail.com
Climate change is an existential threat to human societies. We are on a warming trajectory that could reach +4.8°C in 2100 compared to pre-industrial levels\(^2\). Such levels of warming at the end of the century pose a risk of unprecedented degradation of living conditions on the planet. Avoiding this catastrophic scenario requires a major reduction in greenhouse gas (GHG) emissions, which would put humanity on a climate-sustainable path.

For financial systems, climate disruption poses two major types of risk\(^3\), as identified by Mark Carney, former Governor of the Bank of England, in 2015\(^4\):

- **The physical risk**, induced by the financial losses that will be caused by the consequences of climate disruption (e.g. increased flooding, heat waves, water stress... but also human consequences of such events) if it is not contained.

- **Transition risk**, associated with the financial impacts of implementing low-carbon transition policies, strengthening the competitiveness of low-carbon technologies or changing consumer preferences. Transition risk is directly linked to "stranded assets", i.e. financial assets (loans, bonds, shares, ...) that face a risk of depreciation or conversion into liabilities before they have been made profitable, due to the abandonment of production that emits too much GHG (for example, the ban on producing electricity from coal would lead investors who have financed companies involved in this type of activity to realize a loss on their investments).

Finance is thus at an impasse. The continuation of *business as usual* leads to extreme physical risks, while the decarbonization of the economy poses a potentially high transition risk. This paper proposes an original and preventive "carbon hive-off" mechanism that would temper these two types of risk - and thus contribute to the low-carbon transition - through the following mechanisms:

- **The purchase, by an *ad hoc* mechanism controlled by the public authorities, of stranded assets present on the balance sheets of financial institutions, thus removing the transition risk.** The compartmentalization of stranded assets would facilitate the implementation of ambitious decarbonization policies and would give the State, via the carbon defeasance structure, greater control over the decarbonization of companies with excessive GHG emissions.

- **The raising of new financing, via this mechanism, for the low-carbon transition.** The buyouts made by the bad bank are conditional on the reinvestment of the funds generated in the transition. The structure, which has become a creditor and/or shareholder of GHG emitting companies, can also ease the financial constraints on these companies to increase their transition investments. The aim is to turn the capital currently tied up in activities that contribute to global warming into a source of new financing that contributes to decarbonization.

Carbon offsets would contribute primarily to the attainment of SDG 13 on the fight against climate change. They would also make it possible to manage the potential economic spin-offs of the transition,

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3. *A third risk exists, that of liability. It arises from the potential questioning, in court, of the legal responsibility of a company by parties who would seek compensation from those whom they would hold responsible for the deterioration of their situation, in connection with global warming.*

contributing to the achievement of the target of full and productive employment of MDG 8 "Inclusive growth and decent work".

2. The excess of investments incompatible with the low-carbon transition, compared to the high financing needs of the energy transition, legitimizes the implementation of carbon offsets

Finance must play a central role in the low-carbon transition by providing the capital needed to "green" the economy. However, the mobilization of finance to achieve the transition is limited by the following two factors:

- **The levels of investment required to make the transition are high.** The low-carbon investment gap is glaring. Globally, $6 trillion in annual investments are needed until 2030, of which only about half are being made to date.

- **This doubling of investments in the low-carbon transition must be carried out despite conditions that are structurally unfavorable to them.** Investments in the ecological transition, which are generally characterized by long-term profitability, suffer from financial and accounting structures that are focused on the short term. The risk-return profile of low-carbon investments also remains unattractive. In addition, high levels of private debt, combined with a depressed macroeconomic environment since the 2007-2008 crisis, are leading many companies to favor deleveraging over investment, including "green" investment. The market does not seem to be able to fill the low-carbon investment gap without corrective public action.

The inability to overcome these constraints to make the necessary investments in transition is directly associated with a rise in physical financial risks. However, the implementation of the transition also poses a threat to financial stability:

- **Transition risk is likely to be a systemic risk.** Transition risk goes beyond the risk of heavily devalued assets in the extractive fossil and energy sectors. The cessation of the use

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5 Article 2 of the Paris Agreements emphasizes the need to align financial flows with a low-carbon trajectory. They are available at [https://unfccc.int/sites/default/files/french_paris_agreement.pdf](https://unfccc.int/sites/default/files/french_paris_agreement.pdf).


8 Campiglio, (2015), Beyond carbon pricing: the role of banking and monetary policy in financing the transition to a low-carbon economy, Ecological Economics.


2 Degrees Investing Initiative, (2017), All swans are black in the dark - How the short-term focus of financial analysis does not shed light on long-term risks.

10 Campiglio (2015), op. cit.

11 Koo, (2014), It is private, not public finances that are out of whack, German Economic Review.

12 Systemic financial risk is the risk that a particular event will lead to a chain of failures or difficulties in the financial system, causing a general crisis in its functioning.

13 Already, the fossil reserves valued on the financial markets largely exceed the remaining carbon budget to contain warming to +2°C, while those associated with fossil fuel energy production infrastructures exceed the budget associated with the +1.5°C objective.

Carbon Tracker, (2011), Unburnable carbon - Are the world's financial markets carrying a carbon bubble?

Tong et al, (2019), Committed emissions from existing energy infrastructure jeopardize 1.5°C climate target, Nature.
of fossil fuels can be transmitted to other parts of the real economy based directly or indirectly on the combustion of hydrocarbons (e.g. vehicle production, transport, chemicals, but also trade, tourism, ...)\(^{14}\). 10 to 20,000 billion dollars of losses, at the global level and in the energy and industrial sectors alone, would be associated with compliance with the Paris Agreements\(^{15}\). The transmission chains through the financial system are also a considerable challenge, due to the complexity of the interdependencies between actors.

- **Transition risk is difficult to manage within the traditional frameworks of prudential regulation and financial supervision.** Indeed, the calibration of appropriate prudential measures is commonly based on the precise quantification of financial risks. However, the variety and interweaving of risk transmission chains, the inability to foresee potential technological disruptions or sudden government interventions, and the disruptive and systemic nature of the transition prevent any precise assessment of this type of risk\(^ {16}\).

Financial stability would thus be jeopardized by a transition that is rapid and sustained enough to remain within sustainable climate limits, with potential consequences for the economy and employment. This constitutes an obstacle to the implementation of ambitious actions to reduce GHG emissions. Preventive and anticipatory action, aiming to **avert and manage the risk of transition**, is thus necessary. At the same time, the inability of markets to **make the investments required for the ecological transition** calls for corrective action. Carbon bad banks would help to achieve both objectives. The figure in the Annex shows the proposed scheme below.

### 3. Implementing Carbon Hive-down structures to remove transition risk

A bad bank is an *ad hoc* banking resolution mechanism, usually publicly owned, used to restructure the portfolio of one or more troubled institutions. Implemented by the banking supervisory authorities, such a mechanism aims to buy the "rotten assets" on the balance sheet of ailing financial institutions (e.g. *subprime* loans). This makes it possible to restore sound financial conditions for the beneficiary institution(s) (solvency, access to liquidity) and even to restore the functioning of paralyzed markets. Following the 2008 crisis, the Paulson plan, for example, made it possible to clean up Wall Street by buying tens of billions of dollars of toxic assets from American banks, restoring market confidence. Many European countries have also used this mechanism to offset potential or actual financial instability over the past decade. The "rotten assets" purchased in this way are generally resold by the bad bank once their value has been recovered.

Such mechanisms could inspire an action to prevent the materialization of transition risks aimed at isolating assets stranded as a result of the transition to a low-carbon economy. A Carbon Hive-down would be a public asset management structure, capitalized by a State (or several, in the case of supranational monetary zones for example) and financial institutions. It would issue government-guaranteed debt\(^ {17}\) to buy up stranded assets in the portfolios of participating financial institutions **before** the transition risk materializes (**see steps 1 to 3 of the diagram in the Annex**).

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\(^{16}\) Kalinowski and Chenet, (2020), *The case for a "Whatever it takes" climate strategy*, Veblen Institute

\(^{17}\) Philipponnat, (2020), *Breaking the climate-finance doom loop*, Finance Watch

*The provision of the public guarantee would allow it to benefit from relatively low rates.*
The perimeter of the scheme - i.e. the eligible economic activities, asset classes and financial institutions - must first be decided by the public authorities, based on a substantiated analysis of the transition risk. At the very least, sectors that are clearly incompatible with the low-carbon transition, such as fossil fuel activities (coal, oil, gas), should be included. Debt financing (bonds and loans) and systemic banks should also be eligible. These asset classes and types of financial institutions are indeed vectors of potentially systemic transition risks\(^{18}\). As an example, a carbon hive-off scheme involving the purchase from European financial institutions of securities backed by companies with fossil fuel reserves would amount to approximately 1,000 billion euros\(^{19}\).

Incentive or regulatory mechanisms should be implemented to drive targeted financial institutions to sell their stranded assets to the bad bank. This could be achieved by strengthening the capital requirements associated with investments by banks and investment firms in activities that are likely to be stranded as a result of the low-carbon transition. Specific taxes on such investments can also be implemented to encourage financial institutions to benefit from the hive-off procedure. Finally, it is possible to oblige, by regulation, the targeted institutions to participate in the scheme, as is commonly the case in the framework of hive-off procedures for prudential reasons.

It is possible to implement a sequenced mechanism, aligned with the pace of national transition policies. It could, for example, initially focus on buying back the assets associated with the most emitting activities (e.g. coal) before moving on to those that are less emitting (e.g. oil, then gas). In order to mitigate any moral hazard, the scheme should be limited to the repurchase of securities that were purchased (or loans granted) by the beneficiary institutions before the implementation of the hive-off process.

The benefit of the hive-off procedure, because it removes the transition risk from the beneficiary financial institutions, must be combined with strict regulation of the creation of new stranded assets.

The bad bank, a public body pursuing the general interest, thus becomes a creditor and/or shareholder of companies that contribute significantly to climate change. It can thus guide their transition towards low-carbon models (see section III) and, when necessary, bear the risk of stopping certain carbon-intensive practices. In addition, the removal of the risks of financial instability linked to a too abrupt transition would facilitate and encourage the implementation of ambitious decarbonization policies. This would contribute to the achievement of SDG 13.

4. Directing new financing towards the low-carbon transition

The hive-off procedure can immediately release new flows towards the low-carbon transition, by imposing "green" reinvestment conditions on the purchase of stranded assets. These funds can, for example, be earmarked for the financing of renewable energies or the thermal renovation of buildings (see step 4 of the diagram in the Annex).


\(^{19}\) This figure relates to the estimated exposure (bonds, loans, shares) of European Union financial institutions (banks, pension funds, insurers) to such companies in 2014. It should be compared with the aggregate GDP of the European Union in the same year (approximately 14,000 billion euros). The financing of these buyouts by public debt would have implied an aggregate increase of 7% in relation to GDP. Weyzig et al, (2014), *The price of doing too little too late*, *Green European Foundation*.
Financing the carbon bad bank through long-term bonds (e.g. 50 years) would enable it to contribute to the decarbonization efforts of the companies of which it has become a creditor or shareholder. Many GHG emitting companies can, with heavy investment, decarbonize their production (e.g. energy, transport, car manufacturing). The bad bank can thus renegotiate the terms of the purchased debts (repayment deadlines, interest rates), or defer dividends, in return for new investments to decarbonize production assets. This is made possible by the fact that the bad bank must itself face long repayment deadlines.

This process, in addition to reinforcing "green" investments, makes it possible to limit the dry losses to be borne by the carbon bad bank. Stranded assets are indeed bound to be largely devalued during the transition, which poses a high risk for the bad bank. However, the release of new financial capacities for the construction of new green assets allows companies that are a priori incompatible with the transition to stay afloat, thus limiting the loss of value of their debts and shares. The bad bank thus reduces its risk. This mechanism would benefit from being complemented by other financing in order to generate sufficient decarbonization investments. These could, for example, come from public investment banks that have issued "green risk-free assets" purchased by the financial institutions that have benefited from the hive-off mechanism (see Box).

By directing the funds from the bad bank's purchases to the low-carbon transition and by easing the constraints on "green" investment, the system makes it possible to circumvent the obstacles to financing the transition. It thus contributes directly to the attainment of SDG 13. It also helps to limit the stranding of companies that emit too much GHG, and thus contributes to keeping their employees in employment (SDG 8).

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**Box. A Possible and Relevant Suitability of the Hive-down Mechanism with the Issuance of "Green Risk-Free Assets" (Lagoarde-Segot and Revelli, 2021)**

Lagoarde-Segot and Revelli (2021) recommend, in the second issue of this Policy Brief series, the massive issuance of "environmentally safe assets" (ASRe) by public investment banks. These assets would be sovereign (and therefore risk-free), interest-bearing securities aimed at financing projects with bio-geophysical and/or social impacts.

The funds resulting from the purchase of assets from the hive-off structure could be redirected to the subscription of ASRe, thus providing resources to the public investment banks to make impact investments. A part of them could then be directed towards the decarbonization of the companies whose securities have been bought by the bad bank. This would contribute both to the low-carbon transition and to the reduction of the transition risk carried by the bad bank.

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1 Lagoarde-Segot and Revelli (2021), *The "ecological risk-free asset: a new financial instrument for an ecological reconstruction of the eurozone,* Policy Briefs Agenda 2030.

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5. **A mechanism that can be made neutral or even profitable for public finances**

The mechanism, as presented in the previous section, limits the losses of the bad bank. It thus reduces the risk of "socialization of losses" that could result from the purchase of stranded assets with public
funds. Other measures, commonly implemented in the context of hive-off procedures for prudential reasons, can complement it to avoid any recourse to the taxpayer:\textsuperscript{20}:

- The beneficiary financial actors can contribute, upstream, to the capitalization of the system. A 49% private and 51% public capital would allow a maximum contribution from financial institutions while allowing the State to retain the majority of the capital.
- The buyout price of the assets should include a discount\textsuperscript{21}. However, the discount must be small enough to keep the price attractive (if an incentive scheme is implemented) and to ensure that sound financial conditions are maintained.
- Return clauses\textsuperscript{22} or public shareholdings as well as the levying of a new tax on the profits or transactions of financial institutions can be added to the hive-off program. They would allow the public authorities to capture a share of the future profits of the financial institutions and to dedicate them to the repayment of the debt contracted by the hive-off structure (see stages 5 and 6 of the diagram in the Appendix).

A second interest is to finance the carbon bad bank through long-term bonds. It would allow the system to be financially balanced over the long term, with the State gradually building up a cushion of resources thanks to the mechanisms presented above. By combining them with a relaxation of the financial constraints on the transition of companies whose structure is a creditor or shareholder, the scheme may ultimately prove profitable for public finances.

Finally, the mechanism can rely on the financing capacities of the Central Bank of the monetary zone in question. A privileged access of the bad bank to its refinancing window would enable it to release new resources throughout the buyback program. This appears particularly relevant in the framework of a sequenced mechanism. When possible, the placement of the debt of the carbon hive-off structure directly with the Central Bank, at privileged conditions, would reinforce the financial solidity of the mechanism. A final option, which would require a reinterpretation or even a rewriting of the mandate of many Central Banks, is that of partial or total financing of the carbon bad bank by the monetary authority in debt-free money\textsuperscript{23}.

6. Conclusion

Carbon hive-offs would address transition risk and free up financial space for the emergence of a new low-carbon economy. By extracting stranded assets from the balance sheets of financial institutions, it would free them from their dependence on activities that are incompatible with the transition and place them on a more ecologically virtuous path. The public authorities, guarantor of the general interest, would bear the transition risk and direct the financing of companies that emit too much GHG towards low-carbon production. The "green" conditionality of the purchase of stranded assets would channel new flows towards the transition, thus contributing to fill the gap of low-carbon investments. The

\textsuperscript{20} Medina Cas and Peresa, (2016), What makes a good "bad bank"? The Irish, Spanish and German experience, European Economy Discussion Papers.

\textsuperscript{21} A discount is a reduction applied to the value of an asset. The higher the discount, the lower the purchase price of the asset.

\textsuperscript{22} Return clauses (also known as "claw back" clauses) allow the State to recover, after the implementation of a hive-off procedure, part of the funds committed to the purchase of assets from the beneficiary institutions if their resale price is lower than the purchase price.

\textsuperscript{23} Debt-free money is money that is injected into the economy without being associated with an IOU. It does not give rise to any repayment.
divestment of stranded assets, whose profitability is jeopardized by the low-carbon transition, would thus free up resources for the financing of the latter.

Carbon offsets alone cannot guarantee an effective and smooth transition. On the contrary, they must be part of proactive public policies and ambitious partnerships with economic and industrial players. For example, it is necessary to ensure the development of low-carbon projects using the funds released by the scheme and to provide legal and fiscal incentives for companies to make the necessary investments. The transformation or abandonment of activities that emit too much GHG must also be part of holistic decarbonization strategies, aiming in particular to maintain the jobs of workers in the failed sectors. Carbon offsets would thus be the keystone of concerted and planned transition processes, tempering the risks associated with them and contributing to their financing.
L'État crée la SDC et lui apporte des capitaux. Les institutions financières bénéficiaires (IFS) contribuent également.

La SDC émet des obligations, garanties par l'État.

La SDC rachète, avec contreparties, les actifs échoués que possèdent les IFS. Elle porte ainsi le risque de transition et peut piloter la transformation verte des sociétés émettrices.

Les IFS investissent dans la transition bas-carbone (ou achètent des « actifs sans risque écologiques »).

Des mécanismes garantissent une contribution adéquate des IFS à l'équilibre financier du dispositif (clauses de retours, prises de participation de l'État, taxe spécifique...).

La SDC rembourse sa dette. Idéalement, les mécanismes en étapes 3 et 5 garantissent une capacité de remboursement suffisante.

Dans l'idéal, la SDC bénéficie de financements de la Banque Centrale.

Source: Victoria Duley and author.