Stranded Assets and the Low-carbon Revolution: Myth or Reality?

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See footnotes at end of text.

Stranded assets trigger concerns in policy making, finance and investors' circles. Although they are defined differently (see Caldecott (2017) for an insightful survey), here we consider stranded assets as "fossil fuel supply and generation resources which, at some time prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return (i.e. meet the company's internal rate of return), as a result of changes associated with the transition to a low-carbon economy" (Carbon Tracker, 2017). In this broad perspective, stranded assets include not only oil, gas and coal remaining in the ground in a world that has decided it cannot bear the environmental cost of burning fossil fuels, but also those who have invested in the extractive industry and companies who use fossil fuels, and even consumers.

Are those stranded assets a myth or reality? For the avoidance of doubts, if we want to achieve the Paris Agreement targets, a reality, for sure. Even worse, a revolution. If we follow the actual trends of energy investments, a myth. Let us explain this contradiction.

According to the latest figures, after three years of decline, global energy investments in 2018 have stabilized at around 1.8 trillion dollars. This is what the International Energy Agency (IEA) reports in its World Energy Investment (2019).

Despite the decreasing renewable costs, especially in some regions, the investment activity in low-carbon projects is stagnating. In fact, there is a drop in electricity generation investment (–1%) and renewable energy (–1%), while that in fossil sources (+ 1%) and in particular coal (+ 2%) grows. On the other hand, the capital allocated to energy efficiency measures is unchanged. Bloomberg NEF's figures for clean energy investment in the first half of 2019 show mixed fortunes for the world's major markets. The "big three", i.e., China, the U.S. and Europe, all showed falls,[1] but with the U.S. down 6% at $23.6 billion and Europe down 4% at $22.2 billion compared to 2018, far less than China's 39% setback. Other countries perform better. Japan attracted $8.7 billion of investment, up 3% on 2018, and India $5.9 billion, up 10%, as it continued its drive toward its ambitious target for 175GW of renewable energy by 2022. Brazil saw investment of $1.4 billion, up 19%.

Looking at the future, in the IEA Sustainable Development scenario, low-carbon investments should cover a share of 65% as of 2030, against the current 30%. These trends are not in line either with future energy demand, or, above all, with the decarbonisation path and the sustainability objectives of the Paris Agreement. The same concern is expressed by Alexander Pfeiffer et al. (2018), who consider committed emissions from existing and planned power plants together with asset stranding.

Transportation networks are also an important component of energy assets. Transporting oil and gas is expensive: more than $9 billion to just double the Trans Montain line connecting Canadian deposits from Alberta to the Pacific; in the $50 billion for a complete LNG supply line from Australia to Japan. A large part of these assets may also fail if we do not act with anticipation. The example of gas infrastructure is instructive. In Europe, the network of pipelines is designed to bring imported fossil gas to the centers of consumption. If tomorrow we do not want more fossil gas, we will have to give up pipelines, unless we convert them to biogas transportation. But this choice requires substantial investment and regulatory changes.

Households are not left out because they also hold assets related to the use of fossil energy which they will have to get rid of. For example, in an increasing number of cities, municipalities now impose low emission zones that prohibit the use of thermal vehicles. These zones prefigure more global regulations that will prohibit the access of thermal vehicles to urban centers. Households living in the peripheric areas will still be dependent on thermal vehicles and have to pay the cost of implementing these regulations. Moreover, in the heating sector, many are also dependent on oil-fired boilers, which will also have to be abandoned.

Given the pervasiveness of the stranded capital, its total value is difficult to estimate. The flow of investment in fossil fuels is better known. In total, the IEA calculates that about $1,200 billion will be invested each year to develop the infrastructure to produce and sell fossils. It is probably necessary to add a comparable amount for downstream investments in equipment to use them. On the basis of these assessments, the Agency calculates the financing needs required to accelerate progress towards carbon neutrality by adding investments for the deployment of renewables and energy efficiency and subtracting those that can be saved on fossil fuels. In France, the I4CE (2018) institute uses a similar method to assess the financing needs of the energy transition. With this method, I4CE reaches the conclusion that "to meet the trajectory of the national objectives in terms of climate, 10 to 30 billion Euros of annual investments are still missing".

The limit of this type of calculation is that it only concerns investment flows and neglects the cost of stranded assets, which increases exponentially as the carbon budget contracts.

Nevertheless, something is changing. The European Investment Bank (EIB) has announced in July that it wants to align the granting of its loans with the objectives of the Paris Agreement. For this, in its new energy strategy published on July 26, the EIB declares its intention to stop all fossil fuel financing by the end of 2020. An announcement that is part of the European climate commitment with the sustainable finance plan from March 2018, the climate strategy at the beginning of 2019, and the publication of a classification of activities favorable to the ecological transition last June.

The decision is the result of a consultation process with EIB stakeholders (NGOs, citizens, companies, etc.) set up since January. They are the ones who brought up the need to better take into account global warming in its activity.

The coal phase-out in Germany is also another important example, based on a huge public financial commitment. The rating is so high that it can cast doubt on the financial capacity of the State (and the Länder) German, yet one of the richest in the world. This is why the economist Ottmar Edenhofer and Christoph Schimdt (2018) recommend using “an effective price of CO_2 to secure the exit of coal”. Using this method would reduce the cost of removing coal and reshuffling it differently between stakeholders: in the face of rising CO_2 prices, the issuing companies would have to quickly convert their production tool. With the proceeds of the carbon tax, the State would recover additional resources to support the transition and engage social redistribution policies. The degree of success of the German program will serve as an example beyond its borders. The other coal-producing countries will have to reconvert much younger electric generation units and capacities. The cost of these conversions continues to grow as new thermal capacities are added to the existing ones.

In France, the Loi Energie under discussion will establish an emission cap applicable from 1 January 2022, for fossil fuel-based electricity production facilities located in continental metropolitan France and emitting more than 0.550 tonnes CO_2eq / MWh.[2]

In the future, limiting the piling up of stranded assets tomorrow requires CCS systems likely to prolong the use of fossil fuels without emitting more CO_2. Investment in more efficient transportation and distribution networks, as well as electricity storage, are also useful to limit emissions. Moreover, emerging countries need to be attentive in deciding which resources to develop to avoid carbon lock-in and whether phasing-in renewables could avoid creating stranded assets in the first place.

We believe that investments in fossil fuels are still alive as climate and energy policies do not tackle the issue with consistent decisions. In the absence of sufficient economic or regulatory incentives, the low-carbon revolution could take too long and even become impossible.

Recent research identifies the crucial role of climate policy in avoiding stranded assets. Rozenberg et al. (2019) point out that irrespective of which type of instrument is used, the marginal cost of the climate change policy decomposes as a technical cost— the cost of using clean instead of polluting capital — and a temporary legacy cost that quantifies society’s regret for excessive past irreversible investment in polluting capital. However, a trade-off exists between political feasibility and cost-effectiveness of environmental policies. In a Ramsey model with clean and polluting capital, irreversible investment and a climate constraint, the authors analyze alternative climate policy instruments. They imply different transitions to the same balanced growth path. The optimal carbon price minimizes the discounted social cost of the transition to clean capital, but imposes immediate private costs that disproportionately affect the current owners of polluting capital, in particular in the form of stranded assets. Carbon price avoids stranded assets but, compared to the first best, it still results in a drop of income for the owners of polluting capital when it is implemented. Second-best standards or feebates on clean investment lead to higher total costs but avoid stranded assets, preserve the revenues of vested interests, and smooth abatement costs over individuals and time.

Another dynamic of stranded is shown by Baldwin et al. (2019). In a model of irreversible investments and a carbon tax increasing at a sufficiently high rate, owners of polluting capital cannot divest above the natural depreciation rate and profits become negative at some point of time due to excessive capacity. Irreversibility in investment implies an earlier shift to investment into the clean sector, to avoid later stranding of assets in the dirty energy sector. It therefore reduces emissions in the short term. Irreversibility effects on the demand side ease the impact of a carbon tax in the short-term. In the long-term, returns on this investment will fall, and thus the current investments are only attractive when short-term additional gains are sufficiently high to compensate for future losses

But choosing these regulatory instruments requires strong political commitment. Kalkuhl et al. (2019), in a model incorporating political-economy constraints, show that under rational expectations, a time-consistent policy outcome exists with either a zero carbon tax or a prohibitive carbon tax that leads to zero fossil investments – an “all-or-nothing” policy. Which of the two outcomes (all or nothing) prevails depends on the lobbying power of owners of fixed factors (land and fossil resources) but not on fiscal revenue considerations or on the lobbying power of renewable or fossil energy firms.

Due to multiple renouncements under the pressure of political feasibility, not only because of lobbying by energy firms, but also by citizens affected by regressive policies, our societies are still accumulating capital that will have to be massively divested. Therefore stranded assets are still a myth. The first cost of the energy transition is divestment, which will have multiple economic, social and cultural facets before becoming a reality. When given the right economic incentives, our companies know how to finance additional investments. They know much less well to disinvest. Leaving the logic of "always more" is the true revolution that our society has to make. To reach this ambitious target, a radical change in the orientation of carbon pricing, financing solutions, technology and household behavior is urgently needed.

Footnotes

[1] Within Europe, the situation is heterogeneous. In Europe, Spain was the star performer at $3.7 billion, up 235% on the same period a year earlier, while the Netherlands was 41% lower at $2.2 billion, Germany down 42% at $2.1 billion, the U.K. up 35% at $2.5 billion and France down 75% at $567 million. Sweden saw investment jump 212% to $2.5 billion, and the Ukraine 60% to $1.7 billion.

[2] However, the draft measure leaves open the possibility of continuing to produce electricity from coal after 2022, "for a small number hours".

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