Burning assets for a sustainable future – Climate finance and divestment from stranded assets in the context of the NDC’s and the Sustainable Development Goals

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Overview

A full decarbonisation of the energy sector consistent with “a global temperature rise this century well below 2 degrees Celsius and […] to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels” will require a rapid transition to low- and no-carbon energy sources (UNFCCC 2015, a.k.a. "the Paris Agreement", IEA 2016). Given the decades-long technical lifetime of powerplants and crude oil refineries, this shift will inevitably cause a lot of assets being stranded due to high carbon taxes or other environmental policy measures; the financial impact for their owners critically hinges on the short-term ambition of the transition pathways (Bertram, Johnson et al. 2015, Johnson, Krey et al. 2015). Coal power plants without carbon capture and sequestration (CCS) will be the most heavily affected class of assets, because coal has the highest greenhouse gas emissions per unit of energy and will therefore be first to be scaled back or decommissioned entirely. Previous studies identified increased energy intensity, life time extension instead of new investment, grandfathering, and retrofitting existing plants with CCS as suitable policies to reduce the financial losses to asset owners, though some measures incur a trade-off between the financial stahes and the effectiveness of climate change mitigation.

Alas, the question of divestment from fossil-based power generation and other carbon-intensive energy sources has a second important aspect along the dimensions of the UN Sustainable Development Goals (SDG). They form a much broader list of issues compared to the Paris Agreement, incuding goals like improving health for all humankind, improving food security, reducing economic inequality, and many other aspects. It is clear that some of these goals have synergies with environmental policy objectives, while other measures will require trade-off by policy makers between competing objectives (Stechow , Minx et al. 2016).

In the present work, we aim to determine the trade-offs and synergies with regard to the divestment and the financial losses for stranded assets across short-to-medium term climate policy measures with specific aspects of the SDGs (2° Investing Initiative 2015). While reducing coal-fuelled power generation has clear co-benefits between climate (reducing greenhouse gases) and public health (reducing small particle emissions and local pollutants), the story is less clear-cut along other dimensions. Finally, we aim to quantify the investment needs for new assets in the energy sector (renewable energy sources, e-mobility, etc.) and contrast it with the expected financial write-downs from early retirement of stranded assets and divestment.

Methods

We use a set of scenarios developed within the Horizon 2020 project CD-LINKS (http://www.cd-links.org), which combines different short-term policy ambition levels derived from the Nationally Determined Contributions (NDCs, the mitigation goals pledged by countries as part of the Paris Agreement) with different long-term global emission budget constraints in line with different yardsticks for mitigating climate change and global warming.

These scenarios and a number of sensitivity runs are implemented using the global Integrated Assessment Model (IAM) MESSAGE-GLOBIOM (Krey, Havlik et al. 2016, Fricko, Havlik et al. 2017). This framework combines MESSAGE, a technical-engineering optimization model of the global energy system, with the land-use model GLOBIOM that provides MESSAGE with information on land use and its implications, including the availability and cost of bioenergy, and availability and cost of emission mitigation in the AFOLU (Agriculture, Forestry and Other Land Use) and a stylized macro-economic model to describe the feedback between price changes and demand for energy services. The data set comprises all energy sectors, a detailed representation of technologies, all major greenhouse gases and pollutants, and a number of other important drivers of the energy system. The stylized climate model MAGICC is used to ex-post translate model results into long-term atmospheric trajectories (Rogelj, Meinshausen et al. 2012).

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