5 of 6 in the series

Financing the Transitions the World Needs: Towards a New Paradigm for Carbon Markets

Chapter 5: Carbon Credits for the Energy Transition

TRANSITION FINANCE
Ensuring Sustainability

About the Author

David Antonioli is a strategic advisor who specializes in harnessing the power of markets to solve critical environmental issues and support sustainable development.

David has worked on climate change for the last 30 years and most recently served as CEO of Verra until stepping down last June. David's experience includes working in the private sector as a project developer (EcoSecurities) and as a government official (USAID in Mexico).

His company, Transition Finance, supports clients in the design of financial instruments to support the green transition.

The company's website can be found at **www.tranfin.com**

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Summary of Previous Chapters

Throughout this report, I am setting out the case that the carbon market needs to be redesigned in a way that the limited finance it provides can serve as a catalyst that enables the long-term transition of sectors of the global economy. While Chapter 1 framed carbon finance as a potential tool to ensure such transitions, Chapter 2 proposed a new way of thinking about additionality, with a view to adapting this important concept so that the market can channel the financing it provides towards innovations that can eventually stand on their own. Chapter 3 discussed how to ensure the green transition for projects that will need ongoing support once the carbon finance that sustains them in the early stages comes to an end, including government regulation over time. Chapter 4 applied the transitional paradigm to natural climate solutions (NCS), making the case that in order to enable the green transition for the agriculture, forestry and other land use (AFOLU) sector, the carbon market needs to break down the siloes that currently prevent carbon from being applied at a landscape level.

Comparing Apples and Oranges

Large-scale, grid-connected renewable energy projects have been a staple of carbon markets ever since the CDM approved these projects for crediting. For a long time, carbon finance helped support new and emerging technologies such as wind and solar. Even though the exact contribution of carbon markets to lowering the costs of these technologies is hard to determine with absolute certainty, carbon finance did channel millions of dollars to these new technologies, thereby playing an important role in their evolution.

Despite the apparent success of carbon markets in supporting the renewable energy revolution, the electricity sector as a whole has not yet undergone the type of transition needed to enable full-scale deployment of renewables. This is due to the fact that, for the most part, the additionality of renewable energy projects has been assessed with the original project-based approach enshrined in the additionality tool, which as set out in previous chapters, can miss important parts of the analysis.

In the case of renewable energy projects, the additionality tool essentially requires the comparison of internal rates of return between renewables and fossil-fired facilities on a “within the fence” basis. This means that the comparison stops at the edge the power generating facility, which means that it misses two critical parts of the puzzle.

- **Access to the grid.** Many renewable energy projects are much less likely to have a direct connection to the grid when compared to fossil-fired facilities. This is because renewable energy projects, especially large-scale solar and wind, tend to be located in remote areas. Fossil-fired facilities, by contrast, are generally built close to the grid. In other words, the costs to connect a renewable energy project to the grid is likely significantly higher than the costs faced by most fossil-fired facilities.

- **Storage.** In order to fully and properly compare a renewable energy facility to a fossil-fired facility, it is critical to take into account the need for and deployment of storage capacity given the intermittent nature of most renewables.

In a nutshell, the current construct in respect of additionality forces us to compare apples and oranges.

Positive Tipping Points for Renewables

An alternative and perhaps better way to think about crediting renewable energy projects could be to consider the need for upgrading and expanding electricity grids, to include adding sufficient storage capacity, and including those costs in the underlying financing. Normally the expansion of the grid tends to fall to a government authority, many of which are strapped for cash and are therefore unable to make the kinds of investments needed.

Previous chapters of this report have argued that carbon finance can be called on to make the early, necessary investments that can lead the green transition of particular sectors of the global economy. There is no reason this cannot be done for the electricity sector, especially considering the effectiveness with which carbon markets channeled critical finance in this sector in the past. Going forward, for example, renewable energy projects could be charged a fee that would be used to build the grid and develop needed storage capacity. The exact details would need to be worked out, but the fee could, for instance, be based on each megawatt (MW) of installed capacity, to generate early capital, and be supplemented once generation begins on a per megawatt hour (MWh) basis. Such a structure would provide confidence to other sources of capital willing to invest in this endeavor.

This approach could lend itself well to the development of a Positive Tipping Point (PTP) for the electricity sector. As with the PTPs discussed in Chapter 2, it would represent the point at which new renewable energy projects would not be able to generate carbon credits, noting too that until the PTP is reached projects generating carbon credits would be required to pay the fee. One key difference, though, is that a PTP for the electricity sector would be based on a determination that the grid has been sufficiently built out and there is enough storage capacity so that future renewable energy projects can readily connect to the grid and deliver their power. In other words, a PTP for the electricity sector would not depend on the ability of renewable energy projects to stand on their own; they can already do that. Instead, the PTP would reflect the investment needed to build out the grid to the point where other renewable energy projects could readily connect to the grid.

Identifying such a PTP would require detailed analysis on a country-by-country (or even regional) basis, and would be based on readily available information (e.g., projections of electricity demand, maps of renewable energy potential). Once the specific grid infrastructure needed to enable the full-scale transition towards renewables has been determined, one could then credit renewable energy projects until the threshold is met, thereby enabling new renewable energy projects to connect without carbon finance.

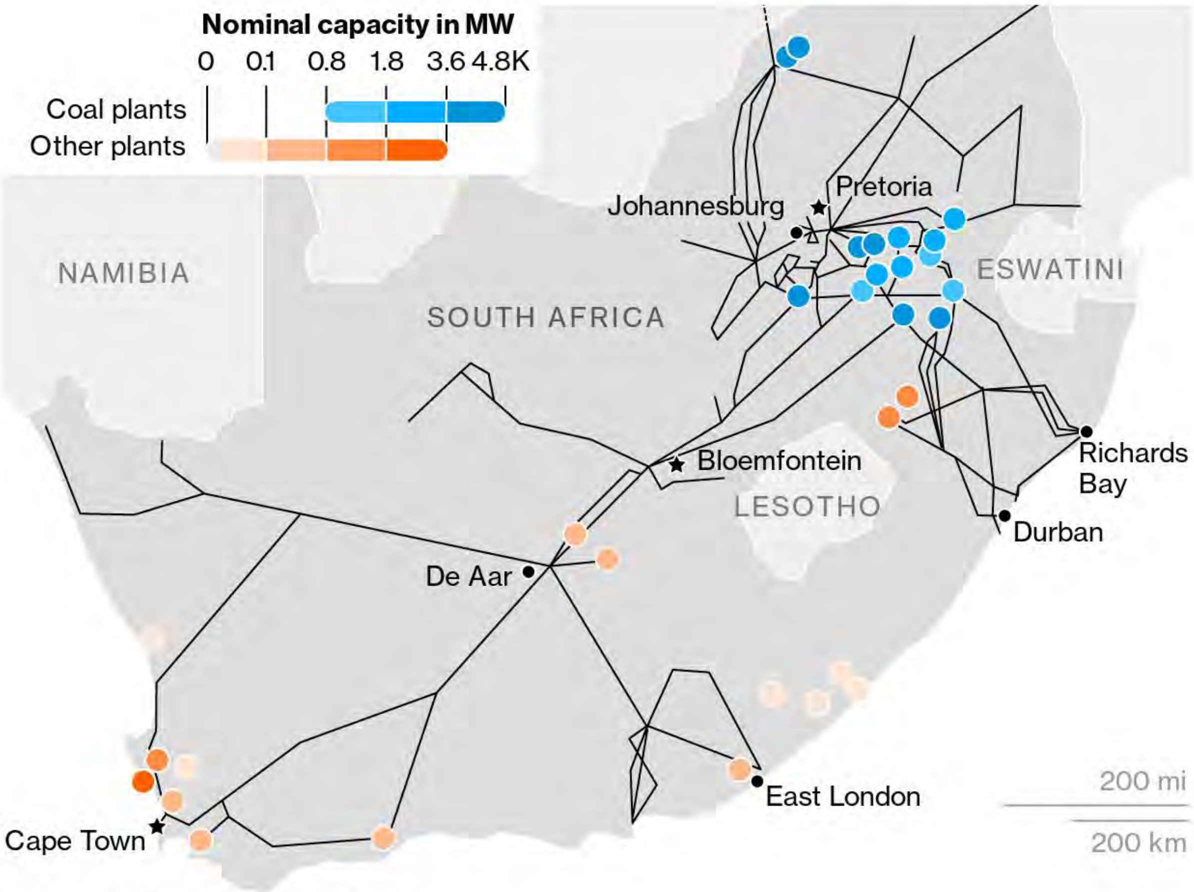
A key element of relying on a PTP for the electricity sector would be the need to ensure that the fee is appropriately set. Specifically, the fee would need to be sufficiently high both to enable the needed build out of the grid and to address any concerns around additionality. A low fee that is readily payable would not ensure integrity. If high enough, though, the fee could channel finance to the part of the system where it is most needed and end up facilitating the much needed energy transition.

South Africa as a Case Study

South Africa serves as a good example of what a PTP applied to the electricity sector could look like. According to Bloomberg, Eskom plans to more than triple the power lines compared to what it has built in the last 10 years.[1] This is due to the fact that South Africa's grid was built out from the coal-rich deposits in the northeast of the country, and eventually spread to other urban centers (Figure 4 below).

FIGURE 4. SOUTH AFRICA'S ELECTRICITY GRID

Energy from Eskom's plants—located mostly in the coal-rich northeast—travels via long transmission lines to reach the rest of South Africa.

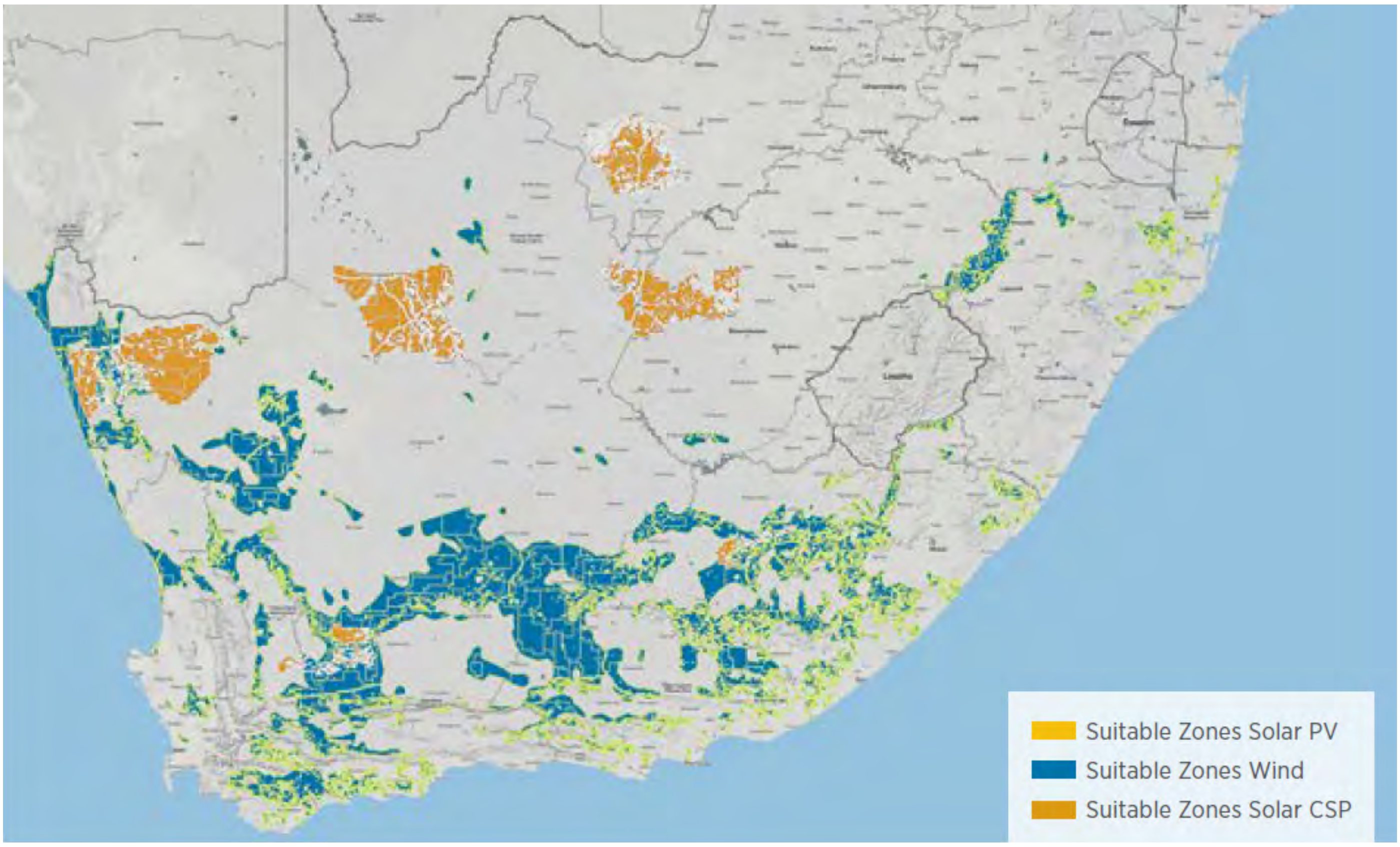


Sources: Eskom; Bloomberg data. Note: Other plants include: hydro (6), gas turbine (4), pumped storage (3), wind (2) and nuclear (1).

1 https://www.bloomberg.com/news/articles/2024-03-15/can-south-africa-s-eskom-meet-funding-challenge-for-electricity-grid-upgrade

South Africa's grid, however, does not extend sufficiently to areas with large potential for renewables, like the sunny Kalahari desert that borders both Botswana (to the north) and Namibia (to the west), nor the wind rich areas in the south and southwest of the country (Figure 5 below).

FIGURE 5. RENEWABLE ENERGY ZONES IN SOUTH AFRICA



Disclaimer: This map is provided for illlustration purposes only. Boundaries and names shown on this map do not imply an official endorsement or acceptance by IRENA.

Source: Wu et al. (2015) and MapRE database

If we were to assume that the 300 percent growth of South Africa's grid reflects the threshold at which more renewables could readily get developed because a transmission line is relatively nearby for all future projects, then carbon finance could be called on to help build this critical infrastructure. Specifically, projects that face the additional costs of financing the expansion of the grid (by paying the fee described above) could be approved to generate and sell carbon credits, and all such projects would be approved until the grid expansion is complete.

As suggested above, relying on a PTP for the electricity sector would create a positive list approach to additionality, which would in turn obviate the need to prepare long documents with detailed justifications. Instead, projects would simply have to demonstrate they meet a set of eligibility criteria to be approved/registered (e.g., Does the project's location require extensive investment in grid expansion? Can the project provide evidence that it has paid the pre-determined fee to support the expansion of the grid?).

New renewable energy projects that are contributing to the expansion and modernization of the grid through the sale of carbon credits could introduce a new source of finance to this important challenge. Indeed, it is not clear where the estimated $21 billion needed for the modernization of South Africa's grid is going to come from given that Eskom has amassed a significant debt that required a bailout by the National Treasury which limits the utility's ability to take on additional loans.[2]

What is particularly interesting in the case of South Africa is that it has at its disposal a large potential source of domestic financing for this national challenge – its own domestic carbon tax, some of which can be paid by retiring approved carbon credits. The credits that are currently allowed for compliance under the program by South Africa (i.e., Gold Standard and Verra's Verified Carbon Standard) no longer approve such projects in non-least developed countries.[3] However, these programs could be revised, or a new program such as the Global Carbon Council which does accept renewables could be accepted, provided the requirements include the expansion of the grid and the deployment of storage capacity. In short, carbon markets, with their capacity to provide early-stage, nimble financing from the private sector could serve as a catalyst for the broader transformation of South Africa's electricity system, provided that the system is designed with the end in mind.

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2 https://www.bloomberg.com/news/articles/2024-03-15/can-south-africa-s-eskom-meet-funding-challenge-for-electricity-grid-upgrade

3 Carbon credits issued by the UN's Clean Development Mechanism are also allowed, but that frameworks is undergoing a transition towards the new mechanism under Article 6.4 of the Paris Agreement, which means investors may not be willing to make investments until those rules are clearer.

Renewables Revisited?

I do think that we should reconsider how carbon markets can support the energy transition, particularly in the context of crediting large-scale renewable energy projects. The greening of the electricity sector is one of the critical challenges the world faces, and it is a sector where carbon finance has demonstrated it can work incredibly well, filling in important gaps. Of course, it will be critical that the next generation of renewable energy carbon credits include in the financing equation the costs necessary to modernize the grid and provide the back-up power needed to ensure the long-term transition of the electricity sector.

As outlined above, carbon finance could be designed to achieve a broader objective and, over time, measure progress against that target. In the case of renewables in South Africa, it would be great to be able to showcase how carbon is helping to achieve a doubling and eventually a tripling of the grid. Surely there would be debate around whether the target is the right one, including whether it will be sufficient to ensure the transition. However, this would shift the debate towards achieving that broader objective instead of getting mired in debates about whether a particular project is additional or not.

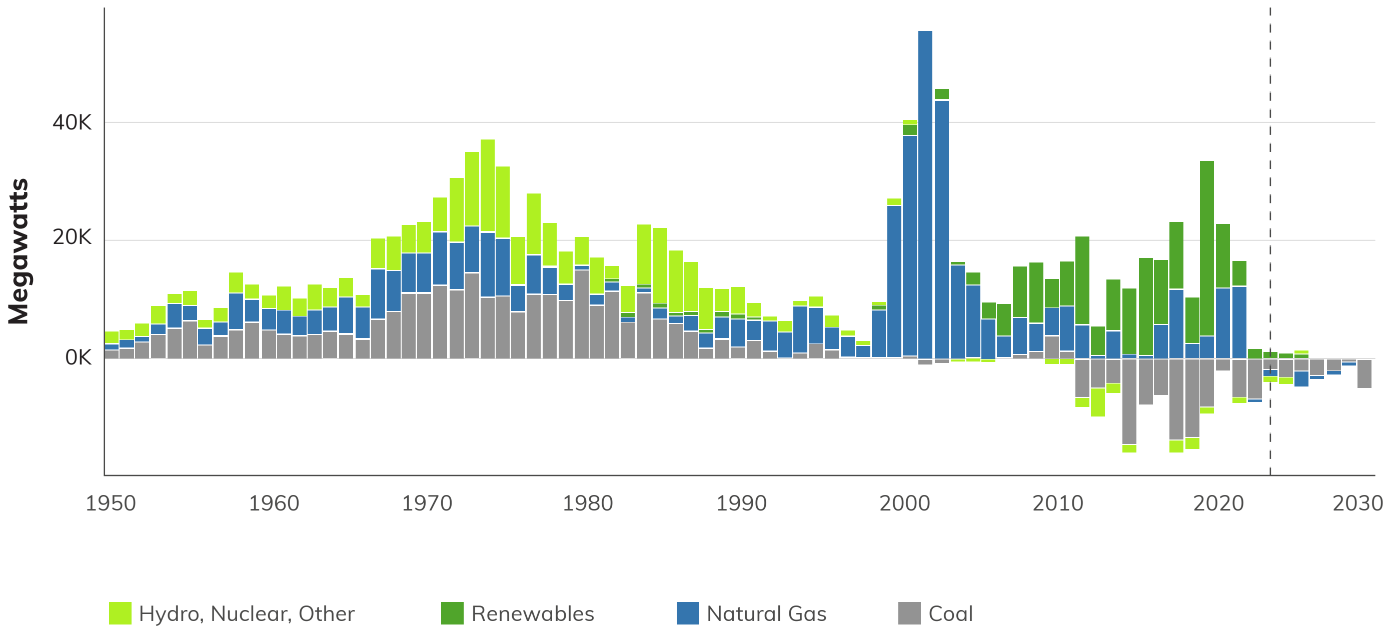
The power sector also offers a unique opportunity to marry project-based interventions with jurisdictional efforts such as those being developed by the Energy Transition Accelerator. Given the critical importance of greening the power sector, it is imperative that we both leverage the strengths and the weaknesses of jurisdictional and project-based approaches. In the case of renewables, for example, governments, are best placed to define the scope of the grid expansion and create the proper enabling environment. Private sector project developers, on the other hand, tend to be more nimble and effective at securing finance and making things happen on the ground.

Jurisdictional and project-based interventions are also likely to tap into different pools of capital. For example, jurisdictional efforts will be able to access concessionary finance available through donor governments and multilateral development banks. The private sector, for its part, should be able to access risk capital, and its ability to do so should be enhanced if government is a partner in the endeavor.

In the end, the benefits of early investment in renewable energy projects that contribute to the modernization of the grid will not stop at the projects that generated carbon credits. The more substantial benefit of that early finance would be that it could promote the transformation of an entire sector by expanding the grid and thereby enabling future renewable energy projects to readily connect to the grid.

In the United States this transition is underway, even though there continue to be tremendous challenges to building out the grid. Nevertheless, Figure 6 below illustrates how renewables have come to dominate the construction of new electricity generating power plants in the US and what new additions could look like in other countries where the grid has been modernized sufficiently to accommodate these kinds of projects.

FIGURE 6. NEW POWER PLANTS IN THE US



Sources: U.S. EIA, University of Wyoming. Analysis by Resources and Communities Research Group at Montana State University and Headwaters Economics

To conclude, the infrastructure built through the development of renewable energy projects supported by carbon finance and designed around achieving a PTP would end up facilitating further emission reductions beyond those initial projects. In other words, every MWh that these renewable energy projects generate would be helping to lay the foundation so that future projects can readily connect to the grid. That transformation, and the resulting impacts, are worth keeping in mind as we continue to refine the role of carbon markets and think about a greater and more enduring objective.

Future Chapters

Chapter 6 (Net Zero Not Enough) and the Conclusion will be published 9 July 2024.

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