

THE IMPORTANCE OF PROJECT FINANCE IN THE TRANSITION TO LOW-CARBON POWER SYSTEMS – INSIGHTS FROM GERMANY

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Overview

The global investment need into power generation is immense – estimated at \$420bn per year over the next decade by IEA (2016), about 70% of it for renewables. One reason is that while power generation has always been an asset-heavy industry, capital intensity is even higher for most renewable energy sources as compared to fossil fuel-based plants (Schmidt 2014). Thus policy makers in many countries are concerned about the availability and cost of capital for renewable energy plants.

While the ownership structure of new power plants has been generally well studied, much less is known on the financing structures used. Whether project sponsors are public or private, they have to decide between two main alternatives for a new investment: Taking it on their balance sheet (i.e. using corporate finance), or incorporating it into a special entity and using project finance. When using corporate finance, a project sponsor utilizes all assets and cash flows from the existing firm to guarantee the credit provided by lenders. When using project financing, in contrast, sponsors create a new entity (i.e. a special purpose vehicle) to incorporate the project; lenders will then depend on cash flows of the new project alone, with no or very limited claim on sponsor's assets.

Compared to the classical way of corporate finance, using project finance comes with significantly higher transaction cost. Given that the project performance is all a potential lender can rely on, the projected cash flows and cost need to be examined carefully. Bills for technical, commercial and legal advisors can sum up to 5-10% of the total project value (Esty 2004). Hence, traditionally project finance has mainly been used for large, high-risk projects where sponsors need to protect their core firm from a potential project failure.

Recently, however, a surge of project finance could also be observed for less complex, relatively small and low-risk projects in technologies such as wind and solar: Globally, the use of project finance in new renewable energy plants increased from 16% of all projects in 2004 to a remarkable share of 52% in 2015 (FS-UNEP 2016). While country-level data is hardly available, there is some evidence that project finance also plays an important role in well-developed renewables markets such as Germany (CPI 2016; Enzensberger et al. 2003).

A clear understanding on the importance and motivations for project finance in low-risk environments is required for all parties concerned with renewable energy investments: Policy makers striving to design regulation that attracts private investment into low-carbon technology most effectively, project sponsors and financial intermediaries thinking about how to innovate power generation financing, and any scholar dealing with power plant investment decisions. The article therefore addresses the following questions:

- (1) How important is project finance for the transition towards low-carbon energy systems in industrialized, low-risk countries like Germany?
- (2) What are the drivers for a use of project finance in power generation projects in these settings?

Methods

In the first part, the article reviews economic, financial and management theory to distill general rationales for using project finance: Three potential reasons motivated by negative financial synergies with existing business (contamination risk, debt overhang, securitization); three potential reasons motivated by market imperfections (information asymmetry between sponsor and lender, agency conflicts between project owners and contractual parties, agency conflicts between project owners and managers); and two potential reasons motivated by organizational structure considerations (horizontal joint venture, independence of civic projects). For each potential

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reason, we derive project- and sponsor-characteristics that should drive the uptake of project finance, which are then summarized in a stylized economic model and empirically testable hypothesis.

In the second part, the use of project finance is empirically assessed for Germany – a low-risk market with substantial investment into both conventional and renewable power generation capacity over the last years. To this end, a new dataset is created based on the German grid regulator's comprehensive list of 468 new assets (larger than 10 MW) of 9 different technologies linked to the German grid during 2010–2015. The name and type of the legal entity owning the plant at commissioning, as well as further information on sponsor type and project characteristics including financing structure are added from the entities' financial statements as published in the trade register. The first research question is answered based on descriptive analyses of the data; the second research question by a logit regression that allows for specifically evaluating the hypothesis derived from theory.

Results

Preliminary analyses show that project finance has been of great importance for the realization of new power plants during 2010–2015, esp. for smaller projects – ca. 83% of projects that are smaller than 50 MW use it, but only ca. 36% of projects that are larger. Project finance is being used especially for renewable energy, to a lesser extent for hard coal and in only very few cases for natural gas. Project sponsors thereby differ strongly regarding financing structures: Large domestic utilities and industrial companies rarely use project finance (in 23% and 25% of their projects, respectively), while foreign utilities (71%), regional/municipal utilities (55%) and especially independent project developers (95%) heavily rely on it.

Regarding the reasons to use project finance, regression analyses reject the hypothesis that the “contamination risk” argument (using project finance to protect the core firm from project failures) drives the use of project finance in Germany, nor “securitization” or agency conflict considerations. Instead, the “debt overhang” reason (using project finance to grow rapidly beyond what the core balance sheet can handle) is likely the relevant driver in Germany.

Conclusions

We highlight that project finance plays an important role in Germany, especially for renewable energy projects – driven not by classical “contamination risk” considerations, but by the fact that a large number of such projects is being realized by fast-growing players without the possibility to realize projects on their balance sheet. This matters for policy makers: In order to foster investment into (also comparably small) renewable energy projects, it is thus important to create a regulatory and financial market environment which enables project finance at low transaction costs. In contrast, the currently relatively weak balance sheets of incumbent utilities are less a concern regarding investment into renewables.

For scholars dealing with energy investment decisions, an important insight is that in many cases projects are structured without recourse to the sponsor. Consequently, project-specific cost of capital should be taken into account, as compared to the current practice in many studies which use a standard weighted average cost of capital for power utilities. In sum, the article sheds light on an important and previously unstudied aspect of financial structures for power plants, and thereby adds to the growing literature on renewable energy finance.

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