

Financing Investment in Electricity*

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Abstract

Meeting rising global electricity demand requires financing large-scale investment in power generation. Despite producing the same electricity output, renewable and fossil fuel plants are financed very differently: renewables typically rely on “project finance” and Power Purchase Agreements (PPAs) that lock in electricity prices and quantities over the long term. We develop and calibrate an NPV framework that explains these differences by linking production technologies to financing choices under financial frictions. We show how PPAs can help mobilize private funds through a *capital structure channel*. Because renewables have near-zero marginal costs, price certainty under PPAs can significantly reduce cash-flow risk, enabling greater use of bank debt relative to costly equity. This lowers discount rates and increases investment in renewables. In contrast, we show that PPAs are much less attractive for fossil fuel projects with volatile input costs. The framework also highlights a downside of PPAs for renewables: the amplification of macroeconomic shocks, leading to higher investment volatility over the business cycle. We use our framework to explain the slowdown of renewable investment following the 2021-2022 inflationary episode and show that state-dependent investment subsidies indexed to cost shocks can help stabilize private investment.

Keywords: energy investment, renewables, project finance, financial frictions, cost of capital, bank lending, macro-economic risk, inflation

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