CLIMATE POLICY INITIATIVE

Renewable Energy Financing and Climate Policy Effectiveness

CPI Analysis Framework (Working Paper)

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8|July|2011

Descriptors

Sector	Electricity / Energy
Region	Global
Keywords	Financing, investment, renewable energy, framework
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About CPI

Climate Policy Initiative (CPI) is a policy effectiveness analysis and advisory organization whose mission is to assess, diagnose, and support the efforts of key governments around the world to achieve low-carbon growth.

CPI is headquartered in San Francisco and has offices around the world, which are affiliated with distinguished research institutions. Offices include: CPI at Tsinghua, affiliated with the School of Public Policy and Management at Tsinghua University; CPI Berlin, affiliated with the Department for Energy, Transportation, and the Environment at DIW Berlin; CPI Rio, affiliated with Pontifical Catholic University of Rio (PUC-Rio); and CPI Venice, affiliated with Fondazione Eni Enrico Mattei (FEEM). CPI is an independent, not-for-profit organization that receives long-term funding from George Soros.

Executive Summary

According to the International Energy Agency (IEA), $6 trillion will need to be invested in renewable electricity and biofuels over the next 25 years just to meet current emissions reduction commitments. Policies will play a significant role in driving this investment. CPI's Renewable Energy Finance project assesses the impact of policy on the availability and mix of investment in renewable energy.

Finance and investment link policies and policy effectiveness outcomes. Policy impacts the cost, availability, requirements, and structure of finance. In turn, these factors can influence whether and how policies achieve their objectives.

Policy → Finance → Effectiveness Outcomes

This paper provides an initial framework for understanding the link between policies, finance, and policy effectiveness outcomes. This framework has three main components:

1. **Understanding finance provides a useful tool for diagnosing why some policies are more effective than others.**

   The effectiveness of policy – e.g. deployment of renewable energy, cost-effectiveness, distribution of risks, costs and benefits, innovation outcomes, and policy stability – can often be explained by whether investment is available, who invests, and whether investors' requirements are met.

2. **Policy affects the investment environment in three ways: it influences the allocation of costs and revenues, the allocation of risks, and the business practices and technology choices of investors and project developers.**

   These impacts can change the behavior of investors by modifying the risks and returns they face as well as the information and processes they use in investment decisions.

3. **Different investor types – debt, equity, mezzanine finance, and venture capital – have specialized investment criteria and differ in their response to policy. The effects of policy also change across the stages of project development, construction, and operations.**

   While all investors make decisions based on an assessment of risks and returns, the types of risks and the magnitude of returns that investors seek vary significantly across investor classes. Each investor class evaluates a different set of metrics in investment decisions. The risk profile, amount of investment, and types of investor change as a project moves from initial development, through construction, to operations.

CPI Renewable Energy Financing Case Studies

CPI plans to apply this framework to case studies of specific projects, focusing on the impacts of policy on 1) financial structure – i.e. the types of investor involved in particular projects and their investment requirements, 2) the risks involved in specific projects, and 3) the contractual details that are used to allocate project risks and rewards. The case studies should allow for real-world testing of hypotheses about impacts of policy on the financing process, and reveal general lessons for policy effectiveness. CPI plans to publish the results of our first case studies in late 2011.

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1 Why is financing important in understanding policy effectiveness?

CPI's core mission is to assess the effectiveness of current and past climate policies, diagnose why certain policies are more or less effective, and draw lessons for future action. Examining finance provides a useful diagnostic tool for understanding policy effectiveness along several dimensions. Table 1 illustrates the link between finance and policy effectiveness through examples.

Deployment or mitigation outcomes

Without some form of financing or investment – by government or by private actors – policy objectives that involve building or upgrading infrastructure (and supporting institutions) cannot be achieved. Policies differ in their ability to motivate financing and investment to achieve their goals. Financing outcomes help explain the performance of policies in deploying renewable energy, replacing carbon-intensive energy sources with low-carbon sources, and mitigating carbon emissions.

Cost-effectiveness

Policy influences which types of investors are attracted to low-carbon investments. The availability and mix of investment impact the cost of capital. The cost of capital for low-carbon investments, in turn, contributes to the overall cost of achieving policy objectives.

Risk-adjusted cost-effectiveness

Policy also influences the allocation of risk and incentivizes the reduction or absorption of risk by private actors. Financing outcomes will reflect the allocation of risk, and the cost of capital will include a risk premium associated with general investment risk, technology-specific risk, as well as risk generated by policy.

Innovation outcomes

Financing for research, development, and commercialization of new technologies has specific challenges, including increased risk and an inability to capture positive spillovers – the unexpected benefits that innovation creates for society, rather than private actors. Scale-up of demonstrated technology faces the "valley of death," an investment gap at a critical stage of technology development. How policy addresses these challenges influences innovation, technology cost reduction, and commercialization outcomes.

Distributional effects

Policy influences who pays – i.e. taxpayers, consumers, shareholders, or other stakeholders – to achieve policy objectives. Financing can aid or distort the distributional effects of policy, which can affect the costs and risks associated with policy implementation.

Policy stability

The alignment of investor incentives, policy goals, and public interest can impact the stability of support policies. Policies may lose political support when investors are able to extract economic rents at the expense of consumers or government. Policies that lead to mature, competitive markets with long-term benefits might be more politically sustainable.

Table 1 - Examples of finance as a diagnostic tool

Dimension of policy effectiveness	Examples	Potential analytic focus
Deployment or mitigation outcomes	• Feed-in tariffs in Germany, Spain, and Italy have motivated substantial private investment due to good project economics and low revenue risks. These countries lead Europe in the addition of renewable capacity. • China now leads the world in new renewable capacity additions, driven by government mandates and fixed tariffs for wind. Many projects are financed using low-cost debt provided by state-owned enterprises.	• Strategic interests of key investors • Rate of return / reward available for investment • Levels of investment risk • Investor familiarity with technology
Cost-effectiveness	• The predictable cash flows generated by feed-in tariffs in Europe have attracted banks and debt investors to renewable energy projects. Low-cost debt and increased leverage reduce the cost of capital and contribute to lower overall costs of deployment.	• Involvement of investors with low cost of capital • Investor incentives to reduce project costs
Risk-adjusted cost-effectiveness	• The US DOE loan guarantee program provides leverage and low-cost debt to innovative energy projects. The government socializes some project risks, reflecting the public benefits of projects. Transferring risks to taxpayers and enabling equity returns allows projects to move forward that might not without a loan guarantee. • The UK's Renewable Obligation policy involves uncertainty around the price of Renewable Obligation Credits. This uncertainty translates into a higher cost of capital.	• Mitigation or transfer of risks among stakeholders • Extent to which risks are borne by those best-suited to manage risk • Extent to which risk-takers are exposed to downside of risk • Risk premium in cost of capital
Innovation outcomes	• The Danish government has encouraged financing for the commercialization of offshore wind through both feed-in tariffs and tendering schemes.	• Investor ability to capture spillover benefits of innovation • Investor clarity around risks, rewards, and market for new technology • Investor incentives to fill critical investment gaps
Distributional effects	• Tax incentives for renewable energy in the US have provided returns to "tax equity" investors, large companies with sufficient tax liability to capture incentives. The commercial banks and insurers that invest "tax equity" take few project risks beyond the risk that tax incentives will be removed. However, they can achieve returns comparable to project developers, who often take greater risk.	• Opportunity for rent-seeking among investors • Distribution of risks and returns across investors
Policy stability	• Policies that allow for generous investor returns can lead to oversubscription, as experienced by Spanish feed-in tariffs. When policy costs exceed expectations, policies can lose support.	• Incentive alignment with policy goals and public interest • Investor trust in regulators and the political environment

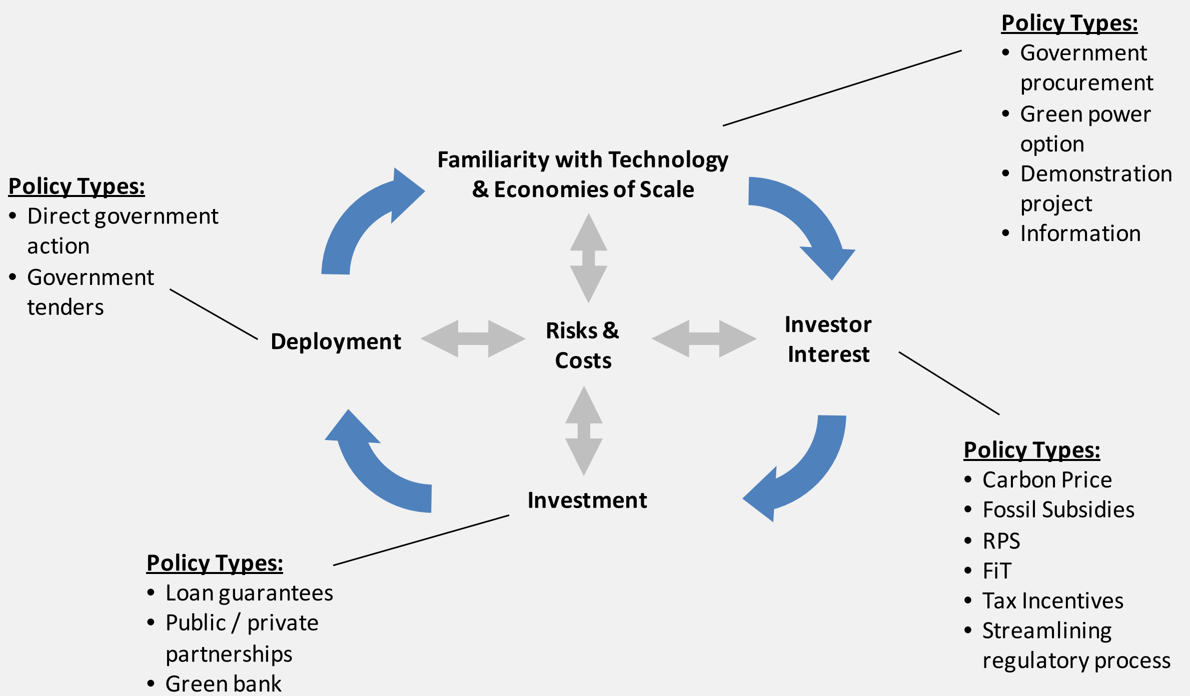
The remainder of this paper explains how policies influence 1) the investment environment more generally, and 2) which classes of investor are involved in renewable energy, their requirements, and the structure and timing of their investments.

Box 1 □ Additional roles of finance: technology commercialization and transition to low-carbon economy

Financing is necessary for technology commercialization and for the transition to a low-carbon economy. These roles are implicit in the various dimensions of policy effectiveness discussed in Table 1 and are discussed specifically below.

Financing plays a key role in enabling a virtuous cycle of investment and deployment of new technologies

The availability of financing is a gatekeeper for the commercialization and wide-spread deployment of a new technology. New technologies can remain trapped in a vicious cycle, in which scale-up and deployment do not attract financing because of high costs or risks, but costs and risks will not decline without economies of scale and technological learning. Often, policy aims to break this pattern and create a virtuous cycle by shifting risks or rewards and catalyzing the deployment of new technologies. The financing process can be important in determining the effectiveness of various policy regimes in converting the vicious cycle to the virtuous cycle.



A combination of public and private financing is required for the transformation to a low-carbon economy

Both public and private sector investment play an important role in addressing climate change. For instance, the UNFCCC (2007) estimates that additional investment on the order of 0.3-0.5 percent of global GDP (1.1-1.7 percent of global investment) will be required to stabilize emissions at recent levels.

86 percent of this investment is expected to come from private sector sources, while development assistance in emerging economies, carbon markets, and other sources of finance will play major roles as well. Future investment in renewable energy sources accounts for a significant portion of needed investments. This investment is critical in moving countries from carbon-intensive development to a low-carbon growth path.

2 How does policy affect the investment environment?

Policies influence the distribution of costs and revenues from building new infrastructure among stakeholders. Further, policies influence the allocation of risks. Finally, policies encourage changes in business practices and technology choices. While these effects are often the explicit goals of policy, they sometimes reflect unintended policy consequences. This section explores these effects in more detail. Analysis of these effects can help explain the ways that finance and investment respond to policy.

Allocation of costs and revenues

Renewable energy technologies are generally characterized by high up-front investment costs, which must be recovered over the lifetime of a project. Without accounting for the negative externalities of carbon-intensive energy, renewables often cost more than conventional energy. Renewable energy policy typically aims to make renewable technologies competitive with market alternatives and/or internalize unpriced externalities associated with conventional projects. Taxpayers or consumers often pay for the difference in cost between renewable technologies and conventional energy technologies.

The difference in cost between renewable energy and conventional energy varies between projects and is not known by investors and other stakeholders in advance with much precision. When policies provide too much support, they risk supplying economic rents to project developers, resulting in the oversubscription of policies, economic inefficiencies, and political concerns. When policies provide too little support, it becomes difficult to motivate private finance because equity returns are low and increased default risk discourages debt investors.

Allocation of risks

Renewable energy technologies involve a number of risks, some of which are influenced by policy. Standard & Poor's and Moody's identify several general categories of project-level risks that impact investors:[1]

- The **contractual foundation** of a project – which includes offtake agreements, engineering, procurement and construction agreements, loan agreements, guarantees, and more – provides much of the basis for a project's business model. The extent to which these contracts protect the project from adverse external conditions, and the ways in which these contracts distribute project

[1] These risk categories are largely consistent across practitioners and researchers. For instance, Hamilton (2006) describes a very similar set of risks that investors use to evaluate renewable energy projects.

returns among investors and others impact the allocation of risks. Some renewable energy technologies have less-developed supply chains and, as a result, rely on less credit-worthy counterparties for supply, construction, and/or maintenance. Contracts with these stakeholders can carry greater counterparty risk than they might for more mature technologies.

- **Technology, construction, and operations risks** depend on the operational track record of technologies, engineering and design concerns, the planning and permitting processes for a project, and the construction, operations, and maintenance concerns of the project. Many renewable energy technologies have limited operating track records, and contractors may be less experienced with new technologies. For these reasons, renewable energy technologies often have greater levels of technology and technical project risk.

- **Resource intermittency** is a particularly important risk for renewable technologies like wind and solar. Uncertainty about when a project will be able to produce and sell energy translates into uncertainty around cash flows available to repay investors. Resource risk is not unique to renewable energy, however, and the conventional energy industry has evolved mechanisms for managing or mitigating fuel supply risks.

- A project's **competitive position relative to the market** is an important consideration for any energy or infrastructure investment. Renewable energy projects have higher overall costs, and typically rely on above-market offtake prices, supported by policy and offtake agreements. Additionally, the price of commodities like power, natural gas, oil, and coal impact the cost of conventional energy, and change the competitive position of renewable energy projects.

- The energy sector as a whole faces **policy and regulatory risk** – i.e. uncertainty about future regulations. The business case for renewable energy typically depends on the presence of support policies, so changes in these policies affect investors in renewable energy projects. Investors' perceptions of policy and regulatory risk can vary depending on regulatory trust and past experience with support policies.

- In emerging economies, the investment environment is characterized by several additional risks. These risks apply to investment in these economies more generally, not only to renewable energy. Currency stability and uncertainty in monetary policy lead to **sovereign risk**. In addition, the **enforceability of contracts and property rights** depends on the nature of legal and political institutions and rule of law. Finally, **political instability** contributes to greater uncertainty.

Policy can affect how these risks are allocated among investors, by creating incentives for investors to absorb or transfer particular risks, or by transferring risks to government or consumers. Policy and regulatory risks are generally created or mitigated by the design and implementation of policy.

Different stakeholders are better equipped to mitigate and manage different types of risk. Private investors with commodity price risk exposure might use renewable investments to protect themselves from unexpected price changes. Technology manufacturers and engineering, procurement, and construction (EPC) contractors might be best equipped to mitigate technology risk.

The allocation of risk can lead to perverse incentives or moral hazard. For example, allowing project developers to exclude broader system costs – e.g. the need for additional transmission or balancing services created by the project – from their assessment of a project could encourage projects that increase systemic risk. The consequences of this risk-taking might be borne by taxpayers, consumers, or system operators.

Government or consumers might bear some project risks, reflecting the public benefits – e.g. environmental quality, system reliability, or economic growth – of a project. However, a transfer of risk to the public, accompanied by an increase in private returns, may lead to investment decisions that are not consistent with policy objectives or public interests.

As risks are reallocated, investors weigh a new set of risks against their potential gains, leading to different investment decisions. For instance, transferring revenue risk away from developers makes an investment with the same potential return more attractive.

Changes in business practices and technology choices

Policies influence the business practices of various stakeholders – from specific processes and metrics used to evaluate renewable energy projects, to strategic concerns or market structure.

If a policy environment drives a low success rate for project development, for instance, developers adopt a higher 'hurdle rate' – the required rate of return they use in screening potential projects – to compensate for the lower likelihood of success. Business practices might also change to meet regulatory requirements. Green certificates require utilities to provide a certain percentage of energy from renewable sources, which can drive them to adopt new processes for evaluating infrastructure investments and procuring power.

Renewable energy technologies vary greatly in stage of technological maturity, technology costs, and risk profile. Policy influences which technologies are chosen by developers of new renewable energy projects. Many policies favor certain technologies in an effort to drive their commercialization. For instance, feed-in tariffs for photovoltaics in Germany, Spain, and Italy have attracted significant investment to photovoltaic projects. Similarly, multipliers for green certificates, where renewable energy generated by one technology counts "more" towards meeting renewable energy obligations, encourage utilities to build and procure more power from that type of technology.

3 How does policy impact financial structure and the financing process?

The effects of policy are key considerations in the decision-making process of investors involved in renewable energy. Further, policy impacts are felt differently across the stages of project development, construction, and operation. This section describes how policy influences which classes of investor are involved in renewable energy, their requirements, and the structure and timing of their investments. This discussion is largely based on private sector actors that operate in regulatory environments where policy targets their incentives.

Investor decision-making process

O'Brian and Usher (2004) explain the basic investor decision-making process as follows:

> *Financiers make lending and investment decisions based on their estimation of both the risks and returns of a project. In considering a project, a financier will usually prepare a risk/return profile [...] The analysis involves assessing each individual risk and the means to mitigate its potential impact on the project. Assessing the returns involves verifying the cost and revenue projections and then comparing the financials of the project with the cost of financing to be used.*

> *A lender will specifically focus on the ability of the borrower (or, in the case of project finance, the project) to make loan repayments. An equity investor, who shares in the upside of the project, will base his decision on an estimation of the risk-adjusted return of the project, which […] means deciding whether the project falls above or below the investors risk/return yield curve. (O'Brian and Usher 2004)*

Investment decisions are also guided by higher-level strategic concerns (e.g. concerns about existing energy supply sources motivating investment in renewables), the need to comply with regulatory requirements (e.g. Renewable Portfolio Standards in some US states and elsewhere, which require utilities to provide a certain amount of energy from renewable sources), as well as established practice and institutional capacity.

Investor classes involved in financing renewable energy

A range of financial instruments are used to provide capital to renewable energy projects. These financial instruments include multiple types of debt, equity, mezzanine finance, and venture capital. The appendix to this paper describes each of these finance types in more detail. The return requirements of these investors, as well as the mix of finance types used, ultimately determine a project's cost of capital.

Debt investors bear the least risk and expect the lowest returns. They generally do not invest in projects that use unproven technologies and often require contractual arrangements that protect them from technology-related delays or underperformance. Similarly, debt investors are wary of policy and regulatory risk resulting from the dependence of cash flows on policy support. Debt investors usually earn a specified coupon rate, or a specified margin above a benchmark interest rate.[2]

Debt investors are particularly concerned with the default risk of their investment. Providers of debt conduct rigorous assessments of project risks, scenarios in which the borrower would default on their debt, and the likelihood of those scenarios. The assessment of default risk determines whether project debt is "investment grade" – an important consideration for many institutional investors.

The debt service coverage ratio – cash flows available for debt service divided by debt service payments – is an important metric in assessing default risk. Lenders to wind projects look at the debt service coverage ratio under a variety of wind resource scenarios. For example, they might require that low wind conditions with a 10 percent chance of occurring allow a project to generate sufficient cash flows to cover 1.2-1.4 times the amount of debt payments. Certain contractual conditions may be used to maintain adequate debt service coverage, like cash sweeps[3] or sculpted amortization schedules.[4]

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[2] When a debt instrument carries a fixed interest rate, this is typically referred to as the "coupon rate." When a debt instrument specifies a margin rather than a fixed rate, the margin is usually measured in basis points above an interbank rate, such as LIBOR or EURIBOR.

[3] Cash sweeps capture cash flows that would not be used to service debt for advance repayment of debt principal and interest. This contractual clause is designed to protect debt investors from unexpectedly low project cash flows. Cash sweeps reduce the amount of project cash flow available for project equity investors.

[4] Sculpted amortization allows debt service payment amounts to vary with cash flows, in order to account for variation in cash flows across seasons. This is another way of protecting debt investors from low

Mezzanine investors have a variety of investment objectives. They might require the predictability of returns offered by debt-like instruments while tolerating more default risk than debt if it affords them a higher rate of return. They might prefer equity with a capped return in exchange for limited exposure to equity risks.

Tax equity is a mezzanine investment instrument generated by the structure of tax incentives for renewable energy in the US. Tax equity investors realize returns primarily based on 1) tax credits for investment in or production of renewable energy and 2) tax benefits derived from the accelerated depreciation of a project's capital cost. Tax equity investors must have sufficient tax liability to absorb these tax benefits. Tax equity investors are protected from many of a project's cash flow and revenue risks, but because their return relies entirely on tax and depreciation policy, they are exposed to regulatory risk, should tax and depreciation policy change.

Balance sheet equity investors are typically large utilities that finance new projects entirely from their own capital. By providing all of the capital required to build a project, they also take on most or all of the project risks. Balance sheet investors generally look at the internal rate of return (IRR) or the return on equity (ROE) of a project as a metric of profitability. This IRR is usually compared with the company's cost of capital, as well as a "hurdle rate" designated for a particular type of project, given its risk profile.

Project finance equity investors take an ownership stake in their projects, often coupled with other equity partners, mezzanine investors, and/or debt. In project finance arrangements, equity investors bear the majority of project risks and are compensated with higher potential returns. Equity investors, who are typically also the developers of projects, can use leverage to increase their rate of return. However, increased leverage also concentrates project risks with a smaller amount of capital. Because project developers have control over many aspects of a project, they may be better suited to manage or mitigate project risks.

When equity is invested alongside debt, the metric of interest is usually a "levered IRR," the rate of return after debt is serviced. Equity investors evaluate the rate of return they receive given the risks they absorb. In this sense, equity investors are most interested in the risk-adjusted rate of return on their investment.

Venture capital investments tend to bear the highest risk and expect the highest return. Venture investors tend to make relatively small investments in many early-stage companies, with an expectation that some will grow significantly while others will fail. Some venture investors assess the IRR or ROE of their investments while others evaluate the number of times their investment is multiplied by the time they plan to exit the investment. The "multiple of money" metric allows investors to determine how much they have covered potential losses in their portfolio. The timing and type of investor exit is a common concern for venture capital investors.

Venture capital investors in renewable energy typically back start-up project developers and technology providers. They seek to gain from the commercialization of new technologies or the success of new

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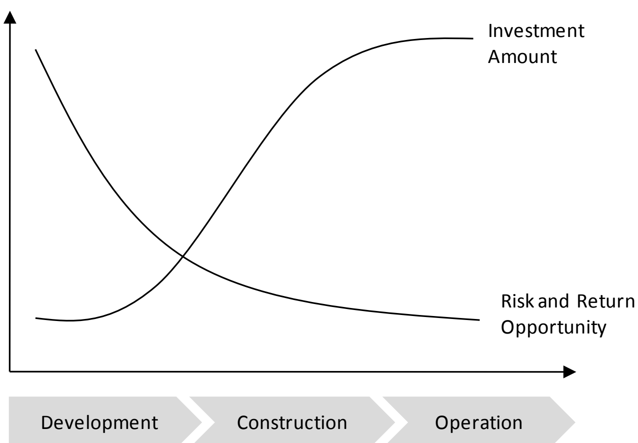
project cash flows by capturing additional payments when cash flows are high. Sometimes amortization schedules are sculpted to maintain a constant debt service coverage ratio.

business models. Venture capital investors will exit their investment when the start-up is acquired or raises new funds in publicly traded markets.

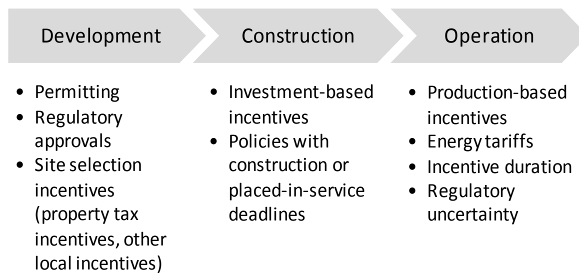
Project stages

Risks, returns, and policy impacts vary across the stages of a project. A project typically has the most risk at the beginning, with the risk of failure often greater than the probability of success. Over time, the project gains more certainty and reduces risks. Investment follows the inverse path. The beginning of a project requires a relatively low level of investment, which increases substantially as the project is built and remains high through operation.

Risk and Invested Capital across Project Stages



Applicable Policies across Project Stages



Development of a project typically involves site selection, assessment of resource availability, establishing a legal framework for the project, and securing necessary contracts and regulatory approvals. Policies that affect the permitting and regulatory approval of new renewable energy plants are particularly important at this stage.

Because development focuses on planning rather than building the physical asset, the capital requirements at this stage are comparatively low. The project developer usually provides capital for the development stage. This developer is sometimes a start-up development company backed by venture capital, private equity, or strategic investors. Other times, larger utilities finance project development "on balance sheet," backed by utilities' corporate financing. On occasion, outside equity investors and lenders will provide additional capital to support project development.

Construction of a project involves building the physical asset. This process involves a significant expansion of a project's capital requirements to cover construction costs. When the project developer is a utility with a strong balance sheet, this investment may be coming directly from the utility. Smaller development companies will seek construction debt or outside equity at this stage. With sufficient technology, construction, and supply guarantees, they may seek long-term permanent financing for the project.

Many policies apply to the construction stage of a project. In the US, the 1603 Cash Grant program provides grant capital to projects, conditional on a material amount of construction being completed by a certain cutoff date. In addition, construction lenders need to know that their debt can be refinanced at the end of construction, and permanent financing depends in part on policies that support revenues during operation, such as feed-in tariffs and renewable energy certificates.

For the **operation** stage, earlier financing arrangements are refinanced into more permanent structures. For example, a project might be refinanced with long-term project debt, acquired by a different company, or sold to a new investor who then leases the project back to the original developer. The choice of permanent financial structure depends on the unique characteristics of the project, its developer, and other investors.

The total amount invested in a project during operation remains high, but as the project begins generating energy and revenue, investments can begin to be repaid. Typically, debt principal and interest payments – debt service – have the first claim on cash flows generated by a project, followed by mezzanine investors and equity investors.

Most production-based incentives impact project revenues during operations, increasing the cash flows available to service debt and provide returns to mezzanine and equity investors. The duration of incentives and their alignment with the debt repayment term are also important considerations for debt investors.

4 What are CPI's plans for policy effectiveness work involving finance?

CPI will continue to develop and refine a framework for understanding policy effectiveness through the lens of financing for renewable energy. This framework will be informed by conversations with a range of stakeholders. Policymakers will help CPI identify key policy questions that involve financing for renewable energy. Private sector actors will provide insight into how renewable energy projects are financed and how policy impacts investor decision-making at a project level. CPI's renewable finance work will also draw on existing in-house expertise in the institutions, instruments, and mechanisms associated with multilateral climate finance.

CPI has produced a short project description that outlines the scope of our work and some key motivating questions. This project description is supported by an initial fact-gathering exercise, which shows existing investment flows by technology, investor class, and region. While investment in renewable energy has increased substantially in recent years, the quantity and mix of investments differ from what will be required to meet climate objectives.

CPI plans to undertake case studies of specific projects, covering a range of technologies at different levels of maturity, across several key geographies, and involving a variety of investor classes. These case studies will reveal specific impacts of policy on: 1) financial structure – i.e. the types of investor involved in particular projects and their investment requirements; 2) the risks involved in specific projects; and 3) the contractual details that are used to allocate project risks and rewards. The case studies will also allow for real-world testing of hypotheses about the impacts of policy on the financing process and the derivation of general lessons for policy effectiveness.

Finally, CPI will examine specific policies to uncover how specific attributes and design features of policy impact financing outcomes for renewable energy. Specific policy evaluations will apply the framework from this paper to evaluate how financing outcomes relate to the effectiveness of those policies.

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Appendix: Description of Investment Types

		Description	Key Metrics
Debt Investments	***Bonds / Notes***	• Sold through an agent to an investor or a set of investors. • Sometimes rated by a credit agency and publicly traded. • Often privately placed with institutional investors who hold the bond until maturity. • Depending on a credit rating or assessment, bonds can be classified as 'investment-grade' (low level of default risk), or 'junk bonds' (high risk of default). • Key concern of investors is the probability of default.	• Coupon rate – interest rate at issuance • Margin – spread above benchmark rate • DSCR – measure of ability to cover principal and interest repayments • Tenor – length of repayment period
Debt Investments	***Loans / Credit Facilities***	• Provided by a bank, development bank, government, or other entity. • Key concern of lenders is the probability of default. • Lenders undertake varying levels of risk assessment, but loans are unlikely to be formally rated by credit rating agencies and are not commonly publicly traded.	• Margin – spread above benchmark rate • DSCR – measure of ability to cover principal and interest repayments • Tenor – length of repayment period
Equity Investments	***Project Finance Equity***	• Ownership share coupled with project debt or other forms of project financing. • Usually provided by the project developer, sometimes with other equity investors.	• Levered internal rate of return (IRR) or return on equity (ROE) to measure project returns after debt service • Timing of cash flows
Equity Investments	***Balance Sheet Financing***	• Ownership by a larger company; listed as an asset on the company's balance sheet. • Company uses corporate financing to build the project, and decisions about capital allocation are made inside the company.	• Unlevered project internal rate of return (IRR) • Project net present value (NPV) at corporate cost of capital • Timing of cash flows
Venture and Private Equity	***Venture Capital***	• Ownership share with high return expectations and a high tolerance for risk. • Group of venture investors can join together in a 'funding round,' combining their investments to offer a higher amount of capital.	• Internal rate of return (IRR) • Multiple on money • Timing of returns; timing of investment exit
Venture and Private Equity	***Private Equity***	• Risk and return expectations tailored to institution or individual. • Typically longer time frame than most equity. • Investor may be heavily involved in developing strategy and restructuring a company to meet its goals.	• Internal rate of return (IRR) • Timing of returns; timing of investment exit

		Description	Key Metrics
Mezzanine Investments	***Tax Equity***	• US phenomenon that relies on tax incentive support policies. • Allows projects to take advantage of tax incentives when project developers do not have sufficient profits and tax liability. • Tax equity investors take a majority ownership share in a project that lasts for the duration of tax benefits. • The project sponsor or other equity investor will take the majority share after tax benefits end. • Most commonly used for onshore wind projects that take advantage of the US production tax credit (PTC) and accelerated depreciation.	• Tax equity investor IRR • Ability to absorb tax credits
Mezzanine Investments	***Passive Equity***	• Project ownership where certain risks are hedged or transferred to other investors. • Allows passive equity investor to have a stable but limited return on their investment and to take a passive management role.	
Mezzanine Investments	***Preferred Equity***	• Equity investment that typically bears a guaranteed rate of return. • Preferred equity investors have recourse to a project's cash flows or assets before other equity investors, and usually some risks are transferred to other investors or hedged.	
Mezzanine Investments	***Convertible Debt***	• Debt with the right to conversion into equity share under certain conditions. • Convertible debt investors have the stable returns of debt investors and potential to access higher, riskier returns of equity investors.	

Sources:
UNEP 2009, "Private Financing for Renewable Energy: A Guide for Policymakers," December 2009.
O'Brian, Usher, 2004, "Mobilising Finance for Renewable Energies," January 2004.
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