

The SAVi Academy

Module 3: Project Finance Modelling An Introduction to Project Finance

What is project finance?

Project finance refers to the financing of projects that involve long design, construction, and operating periods. Financial feasibility is determined based on the predictability and certainty of the future cash flows that can be generated when the design and construction phase is complete, and the project is in operation.

A salient feature in project finance is “non-recourse” financing. Non-recourse signifies that lenders are entitled to repayments derived from the future cash flows of the project and not from other assets that are owned by the project sponsors.

Another feature of project finance is that it often includes syndicated lending. As implied in the term “syndicate,” this is a loan structured under which one or several lenders provide loans to one borrower or even several borrowers under the same loan agreement. The terms of the loans provided by all the lenders are likely to be the same, but related charges or costs can differ from lender to lender. To reduce transaction costs, it is customary that one lender acts as the “agency” to manage the transaction on behalf of the other lenders in the syndicate.

As project finance involves long-term time horizons, it is often used to finance the design, building, and operation of public assets and services.

How did project finance originate and how is it forecasted to grow?

Project finance seems to have its beginnings in ancient Rome when the conquests of explorers and conquerors were financed by the Roman Emperor on the promise of new land, capital, labour, and resources rather than on the costs of the expedition or the track record of its leader. From then on, the maritime voyages of the Dutch, Spanish, Portuguese, French, and British explorers were all based on the principles of project finance or the promise of future cash flows being greater than the capital invested in realizing them.

From the mid-1800s until almost 1970, project finance was also used in the United States, and thereafter in the United Kingdom and Europe, to finance oil exploration. In the 1970s, the deregulation of energy supply and security saw the expanded use of project finance when utilities



were required to purchase electricity on predetermined pricing strategies from independent power producers, who, in turn, raised financing on the predictability and certainty of future revenues.

Since then, project finance has been tested in lower-income economies by donors, development financing institutions, and private sponsors alike. The great demand in developing countries for better public assets and services made them ready markets for contractors and sponsors from industrialized countries. They were ably assisted by their home state export credit agencies, who provided competitive credit enhancement solutions to make the projects more financially viable, despite inherent risks related to sovereign credit rating, currency downgrades, political instability, the lack of legal and governance certainty, etc.

In the industrialized countries, the 1970s and 1980s also saw the expanded use of project finance in additional infrastructure sectors: toll roads, rail networks, public transport, waste collection, airports, public parking, public leisure facilities, water supply, wastewater treatment, and public healthcare.

Project finance thus became the financing strategy for various forms of public–private partnerships (PPPs). In the decades before 2008, PPPs were hailed as the miracle solutions that helped governments provide public infrastructure “off public balance sheets” through contractual arrangements with private sector consortiums. These partnerships were designed on project finance and involved the establishment of special purpose vehicles that would raise debt off public balance sheets. PPPs were structured on the premise that debt obligations would be met by revenues generated by these projects. These revenues were made up of: a) charges paid by the users of the public asset/service, b) availability payments made by public entities for the availability of the public service, or c) a combination of both.

After the financial crisis of 2008—and the subsequent reform of global banking regulations in the form of Basel III; the global, voluntary regulatory framework on bank capital adequacy; stress testing; and market liquidity risk—project financing underwent significant change.

Due in part to the high capital adequacy and liquidity buffers required under Basel III, commercial banks were no longer able to take on the risks of non-recourse financing, especially over longer time frames. Their place was taken by infrastructure funds with expertise in not only complex project finance and syndicated lending, but also in the management of infrastructure projects.

In the same vein, we also saw the rise in sustainable infrastructure finance, with institutional lenders and impact investors seeking opportunities to invest in sustainable infrastructure projects with enhanced performance on environmental, social, and governance attributes.

From around 2010 onwards, global markets also experienced a growing distrust of PPPs. Both the public and private counterparties realized that these arrangements might indeed not be suited for delivering public infrastructure that has the primary mandate of providing affordable and reliable public services to all citizens. Moreover, public counterparties that are required to demonstrate value for money across the asset life cycle were observing the rising costs associated with establishing, negotiating, and servicing PPP contracts. Public audit agencies were also questioning the cost effectiveness of PPPs. In developing countries, PPP projects also began to falter due to poor governance and inadequate due diligence on demand, pricing, revenues, construction costs, and more.

Since 2010, the infrastructure financing under project financing arrangements has thus been fuelled by both public and project sponsors who tend to work directly with public lenders, commercial banks, and developing finance institutions. We have also witnessed an increase in financing through project bonds and green project bonds—bonds where the use of proceeds are targeted to “green” projects. We also see the rise of transitional bonds and sustainability bonds. The proceeds of transitional bonds



are targeted at technologies to help societies transition from fossil fuel-derived energy to renewable energy. Sustainability bonds, on the other hand, are raised to increase lending to projects that have enhanced and pre-defined environmental, social, and governance characteristics.

In 2019, the priority turned to the global infrastructure deficit. The [World Economic Forum](#) reports that global societies face “a USD 15 trillion gap between projected investment and the amount needed to provide adequate global infrastructure by 2040.” According to the second edition of [Project Finance 2019](#), project finance loans in 2018 totalled USD 282.7 billion globally from 871 deals. This marks an increase of 21.7% from 2017, which is the highest volume on record.

The delivery of affordable infrastructure will continue to be a global priority and challenge in the years ahead. As business and political leaders realize the perils of climate change and environmental degradation, designing, building, and financing infrastructure in a manner that is environmentally, socially, and economically sustainable also becomes a priority.

We developed SAVi to help stakeholders using project financing respond to the challenges of sustainable development. The SAVi project finance models are specially designed to incorporate the costs of:

- *Environmental, social, economic, and governance risks*
- *Externalities that arise due to infrastructure development. Some of these externalities—such as employment, increased consumption, increased industrial output, and lowered greenhouse gas emissions—bring important social benefits. Other externalities—such as soil, air, and water pollution; deforestation; climate change; and social unrest—bring increased costs to society and can also impact the future cash flows of the project itself.*

SAVi project finance models help users to identify these costs and incorporate them into the forecasting of future cash flows. Some of these costs can directly change the financial feasibility of infrastructure projects in both the immediate and longer terms.

What is sustainable infrastructure?

The International Institute for Sustainable Development defines sustainable infrastructure as assets that:

- Lower carbon and environmental footprints
- Steward natural ecosystems
- Optimize opportunities to use nature-based solutions
- Move beyond compliance on core labour standards and human rights
- Trigger technological and industrial innovation
- Spur investment in education and R&D
- Increase employment
- Are financially viable
- Crowd in domestic investors and businesses
- Increase foreign direct investment
- Bring value for money for taxpayers and investors.



Stakeholders in project finance transactions

Project finance involves numerous actors and intermediaries. Short descriptions of potential actors are given below.

- **Host governments** raise the demand for the project through public tenders.
- **State-owned enterprises** originate the tenders and serve as public counterparties to the project.
- **Special purpose vehicles** are registered and incorporated companies specially set up to take on project-related debt and oversee the execution of the project. Special purpose vehicles are a fundamental feature of project finance.
- **Project sponsors** provide equity financing and subordinated debt for the project. They can include: a) **public sponsors**, such as state-owned enterprises, municipalities, or cities; b) **industrial sponsors**, which can be public or private enterprises that have expertise on the core business/activities of the project; c) contract sponsors with expertise in building and managing plants and properties in similar sectors; d) financial sponsors, such as private equity and venture capital providers, that have expertise in financing and managing infrastructure projects; and e) **infrastructure funds** that take on subordinated debt and equity and bring project management and sector-specific expertise. The rise of infrastructure funds is a notable feature of infrastructure financing since the 2008 global financial crisis.
- **Engineering and construction companies** design and build the project.
- **Transaction advisers, design and engineering consultants, and accounting professionals** advise on aspects of design and commercial feasibility.
- **Banks or financial institutions act** as the “lead arranger” to the banking syndicate that provides the loans to the special purpose vehicle. Since the 2008 financial crisis, and in part due to Basel III recommendations, development finance is sought through institutional export credit agencies and public investment banks acting as lead arrangers.
- **Banks, financial institutions, and investors** participate in the syndicated loan arrangements. Since the 2008 financial crisis, loan arrangements have become much more sophisticated and complex due to the entrance of a wider group of investors. While the participation of commercial banks may have fallen (due in part to the Basel III requirements), new entrants include infrastructure funds, development finance institutions, public investment funds, export credit agencies, pensions funds, and sovereign wealth funds.
- **Infrastructure funds**, including: a) **greenfield funds** that invest in projects from the design phase onwards and take on design and construction risks and b) **brownfield funds** that seek opportunities in projects where the construction phase is complete.
- **Legal experts** work on the numerous contracts that pertain to performance, risks, and financing.



Fundamental features of project finance

1. The establishment of a “vehicle” company, usually referred to as a special purpose vehicle

A special purpose vehicle requires the registration or incorporation of a separate company that is mandated to bear the project debt and oversee the execution of the project. The project’s sponsors therefore do not have direct responsibility for the debt raised for the project. If the project fails and defaults on the loans provided for its execution, the assets of the project sponsor are not in jeopardy. The special purpose vehicle takes on additional importance given the non-recourse financing feature of project financing.

2. Non-recourse or limited recourse financing

Non-recourse or limited recourse financing is a loan arrangement under which the lender will not require the borrower to guarantee the loan by providing additional collateral. Instead, the loan is provided based on the predictability and certainty of the infrastructure project and the cash flows that the project will generate when it is in operation. The term “recourse” indicates that, in the case of default, the lender can only seize the assets, land, and property of the project that is managed under the special purpose vehicle. The lender has no right to appropriate the non-pledged assets and property of the project sponsors. The special purpose vehicle is hence an important feature of non-recourse financing

In some cases, lending can be structured as recourse loans for the earlier part of the project and then be recovered to non-recourse later on. For example, recourse lending may be provided at the early stages of the projects when engineering and architectural features are nearing completion, and construction is getting underway. This is because the early stages of projects are risky, many aspects remain uncertain, and the project is incurring expenditure, not bringing in cash flow. Lenders are hence hesitant to lend under no-recourse, as they have no tangible capital assets to appropriate if the project fails. As construction moves toward completion and operation, transfer or resale cash flows become more predictable. Most importantly, if pre-established performance and repayment benchmarks are met, the loans can then be converted to non-recourse.

3. Creditors share a greater part of the project risks along with the project sponsors

The design of non-recourse financing and the incorporation of the special purpose vehicle inherently imply that the lenders to a project finance venture take on a higher proportion of project risks than in traditional resource lending.

Some lenders have higher-risk appetites than others. For example, public infrastructure banks and development finance institutions may provide lending at concessional rates and on longer tenures. They may also lend to higher-risk projects with greater uncertainties during the design and construction phase. Commercial banks, on the other hand, due in part to international banking rules, will only lend on shorter tenure to projects that have considerably fewer risks.

Project finance hence requires that lending is structured with the participation of different lenders with different risks appetites. Senior lenders provide lending with the obligation that they are given priority and are repaid first. They face the lowest risk if the project fails and, thus, provide lending with lower interest rates. Subordinated debt providers, on the other hand, are given a lower priority and face higher risks of default if the project fails. In theory, they, hence, provide lending with higher interest rates, commensurate with their risks.



Lending arrangements for infrastructure projects typically involve development financing institutions taking subordinated debt positions at concessional rates, with commercial banks and institutional lenders providing the senior tranches. In recent years, we have also seen the rise of infrastructure funds, providing both debt and equity.

The role of the project sponsors takes on varying significance, based on the characteristics of the project. Sponsors provide equity financing, especially during the early phases of design, due diligence, and construction. They can also be required to provide additional equity if simulations on future project cash flows and macroeconomic conditions remain too uncertain to obtain affordable lending. Sponsors can also be involved in the management of the special purpose vehicle or participate in its governance through board positions. But the non-pledged assets and property of the sponsors are not at risk if the project fails. This feature circles back to the fundamental premise that a project's financial viability is assessed on the strength of its future cash flows as opposed to the track record of the project sponsors.

Project finance indicators calculated by using project finance models

- **Levelized costs:** The average total cost to build and operate an asset over its lifetime divided by the total output/costs of services that the asset produces over the same lifetime. It can also be regarded as the average minimum cost at which the output or services produced by the asset must be sold in order to break even over the lifetime of the project.
- **Gross margin:** An asset's total sales revenue minus its cost of goods sold, divided by total sales revenue, expressed as a percentage.
- **Equity internal rate of return (IRR):** An indicator of the profitability prospects of a potential investment. The IRR is the discount rate that makes the net present value of all cash flows from a particular project equal to zero. Cash flows net of financing gives us the equity IRR.
- **Debt service coverage ratio (DSCR):** A measure of the cash flow available to pay current debt obligations. The ratio states net operating income as a multiple of debt obligations due within one year, including interest and principal.
- **Loan life coverage ratio (LLCR):** A financial ratio used to estimate the ability of the borrowing company to repay an outstanding loan. It is calculated by dividing the NPV of the cash flow available for debt repayment by the amount of senior debt outstanding.
- **Equity net present value (NPV):** The difference between the present value of cash inflows net of financing costs and the present value of cash outflows. It is used to analyze the profitability of a projected investment or project.

The SAVi project finance model provides for incorporating the costs of environmental, social, economic, and governance risks and externalities into forecasts of future cash flows. We have therefore introduced the SAVi-IRR, the SAVi NPV, the SAVi DSCR, and the SAVi LLCR to demonstrate the extent to which these risks and externalities can affect financial feasibility.