Global experience in catalysing renewable energy* finance and investment

This *online* compendium considers global experiences in the design and implementation of various financing mechanisms that have been used to encourage and catalyse renewable energy investment.

The examples consider different financial instruments, including elements within their design, that could be applied to India's bourgeoning renewable energy market.

The cases consider how each financing mechanism has been configured and applied. While the specific examples may not apply directly to the Indian context, they provide practical insights to financing strategies that can be tailored to other market needs.

Emphasis is placed on how the interventions have helped to improve access to finance, mitigate investment risk and increase the opportunities to scale-up private capital for renewable energy projects.

This compendium is by no means an exhaustive list of vehicles that can support the scale-up of finance for renewable energy projects.

It does, however, provide insights to five financial instruments that have been used to increase the flow of capital to renewable energy projects: from small-scale household solutions and early-market technologies to partnerships with financial institutions and issuance of asset-backed securities.

These examples could be applied in a similar manner – or differently, depending on the investment size, risk and anticipated investor profile – to increase the availability, affordability and attractiveness of clean energy finance in India.

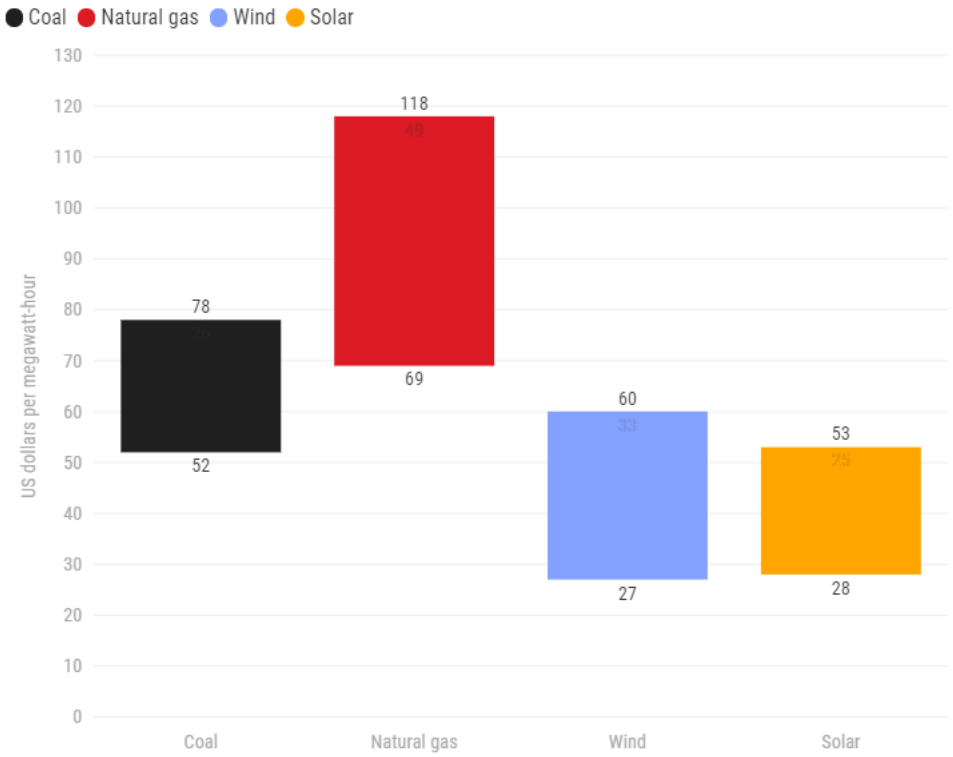
In addition, a number of studies considering the tools and strategies to catalyse renewable energy finance are mentioned in the following examples. Links to these reports, along with additional complementary information, have been provided throughout.

**Note: renewable energy refers only to renewable power (electricity) throughout this study.*

Renewable energy finance and investment in India

Energy policy in India over the past decade has focused on creating enabling conditions to deliver renewable energy technologies onto market and to bring down their costs.

The result has been a spectacular drop in prices for renewable energy solutions like solar photovoltaic (PV) and on-shore wind, where the cost of renewables in India is now less expensive than new coal-fired power and even much of existing coal-fired generation (TERI, 2019).

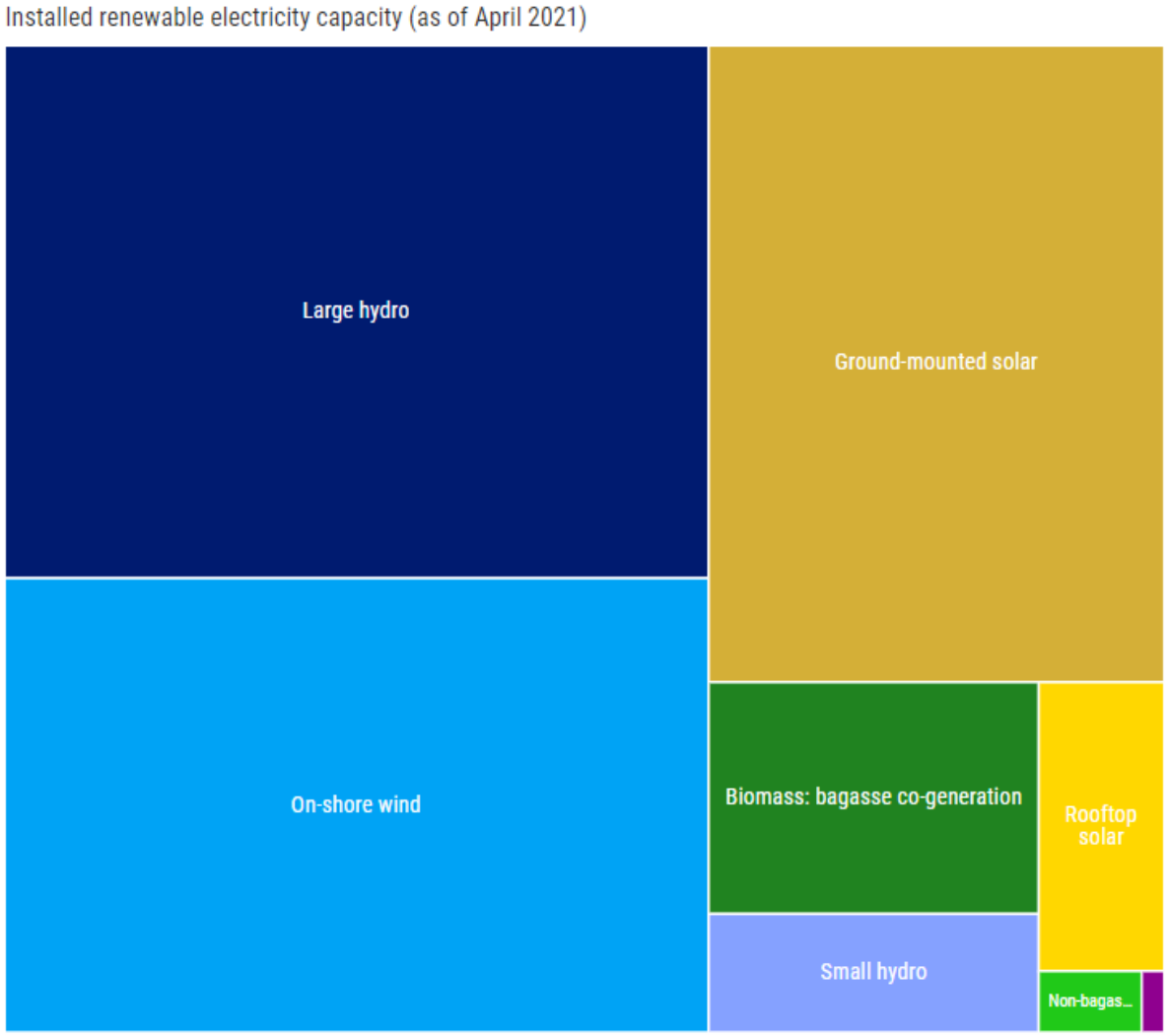


Source: Atin Jain, Bloomberg NEF (2018)

Current state of progress

India has seen impressive growth in renewable electricity additions over the last decade, with more than 94 gigawatts (GW) of grid-connected renewable electricity capacity (excluding large hydro) installed as of April 2021 (Invest India, 2021).

When accounting for large hydro (around 46 GW), recently considered as renewable by the Government, total installed renewable energy sources in India account for over 36% of generation capacity (MoP, 2021).



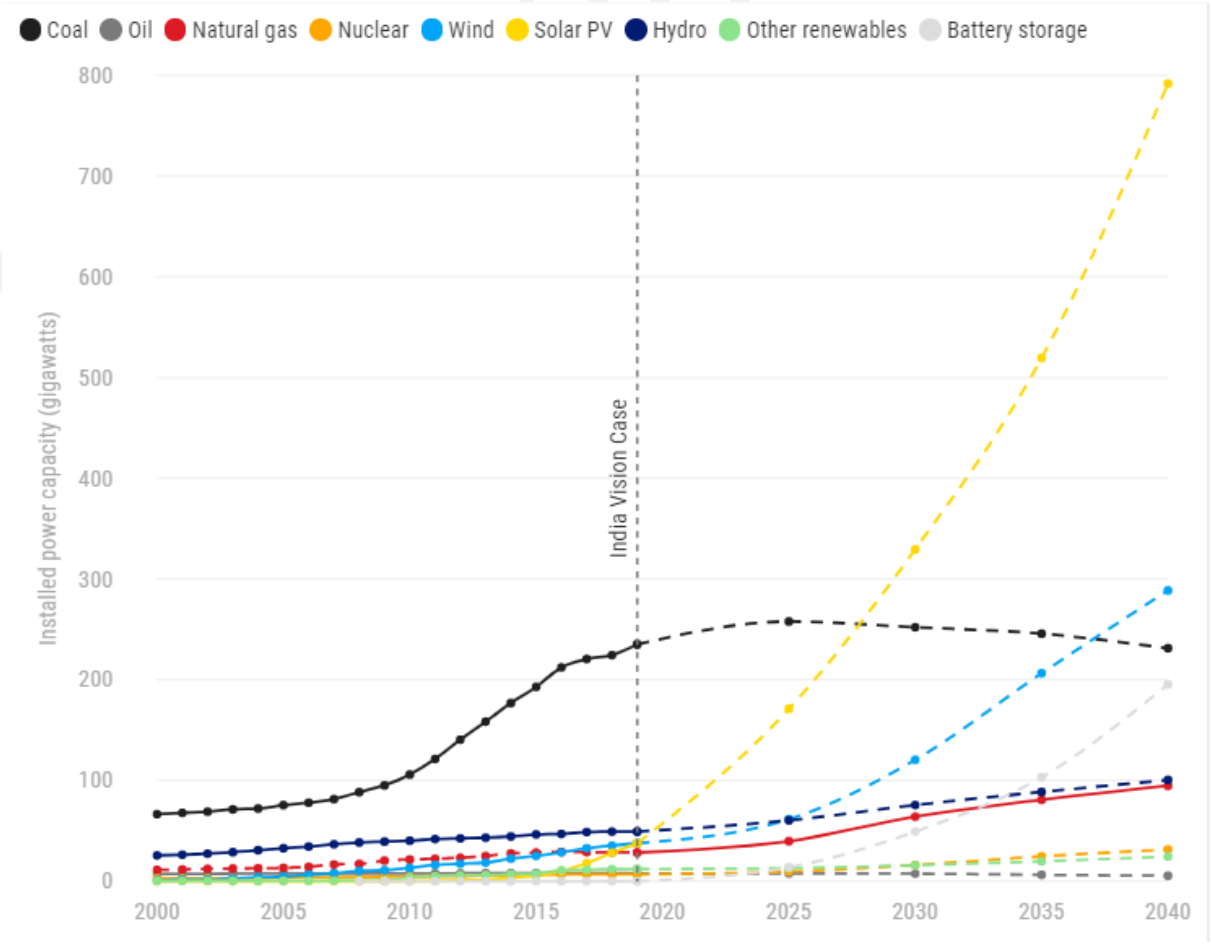
Sources: MNRE, 2021; MoP, 2021

Renewable energy ambitions

The Government of India has set ambitious targets of 227 GW of renewable power capacity (excluding large hydro) by 2022 (ET Energy, 2019).

In 2019, Prime Minister Modi announced further ambitions to achieve 450 GW by 2030 (India Today, 2019).

Achieving these ambitions requires steep growth in capacity additions – as well as the underlying investment – over the coming decade and beyond (NRDC-CEEW-IREDA, 2020).



Source: IEA, 2021

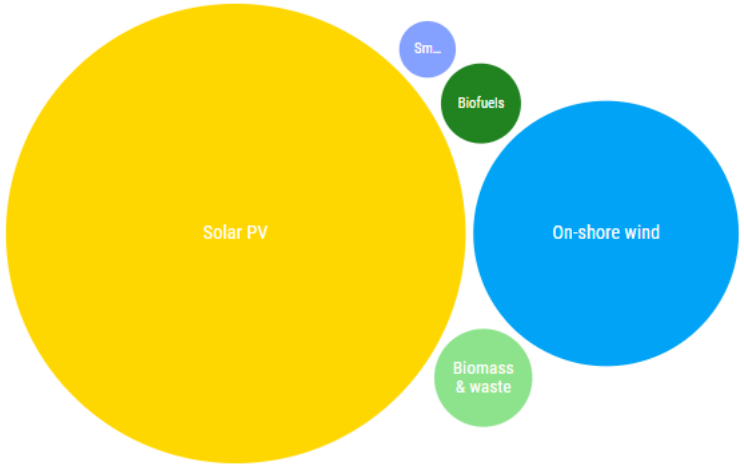
Implications for investment

As much as USD 300 billion, or about USD 30-33 billion per year, is needed over the coming decade to finance India's 2030 targets (GoI, 2019; CEEW, 2019).

By comparison, renewable energy investment over the last five years was around USD 6-10 billion per annum on average (NRDC-CEEW-IREDA, 2018).

Scaling up this investment level is feasible, but it will require new channels beyond domestic financiers, who provide the bulk of renewable energy finance today and who realistically cannot double or triple their current lending levels to those projects (NRDC-CEEW-IREDA, 2018).

Renewable energy capacity investment in 2019, excluding large hydro (USD billion)



Source: Frankfurt School-UNEP Centre/BNEF, 2020

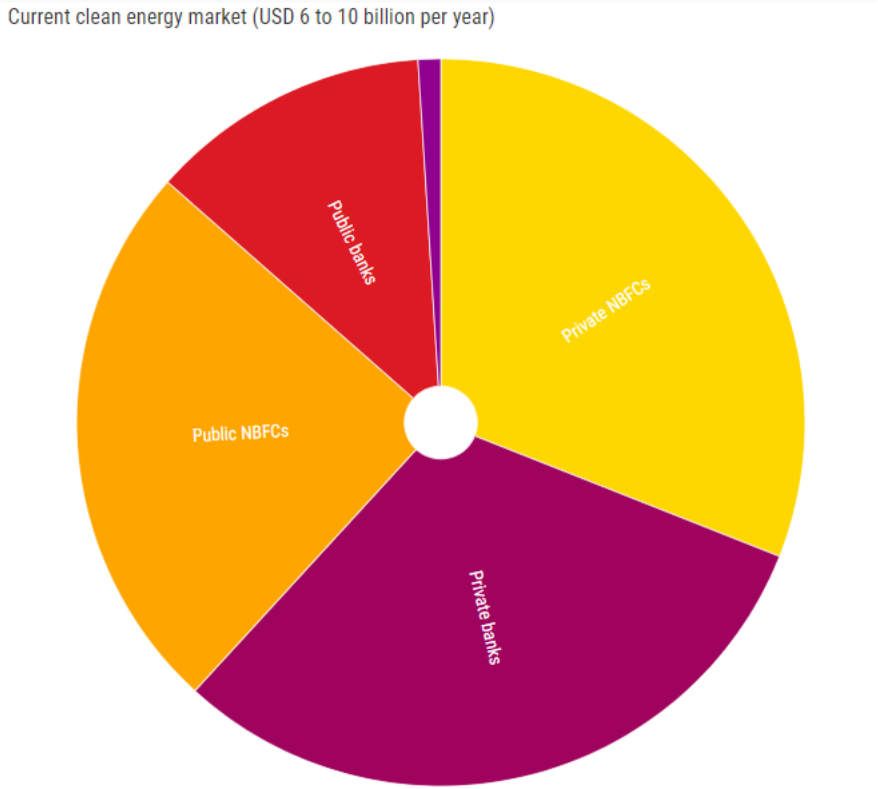
Note: Large hydro additions, not shown here, were only 140 MW in 2019, against targets of 840 MW (MoP, 2020). In early 2021, the Union Cabinet approved an investment of around USD 723 million for a 850 MW hydropower plant on the Chenab river (Mercom, 2021).

Renewable energy finance today

Renewable energy financing in India is provided primarily through term loans by domestic financial institutions (CBI, 2019). Their lending capacity for long-lived assets like renewables is limited, due to power sector credit exposure ceilings (*generally 15-20%*) and bank liability profiles (IEA-CEEW, 2019). Microfinance institutions (MFIs), such as BFIL and SEWA, are similarly constrained by credit exposure limits.

In late 2020, the Reserve Bank of India (RBI) doubled the loan limit to Rs 30 crore (about USD 4 million) for individual renewable energy projects as priority sector lending. However, this may still not address limits with large-scale renewable lending (Business Standard, 2020).

Banks and non-banking financial companies (NBFCs) such PFC, REC, IIFCL and IREDA also face the problem of rising stressed assets, which constrains their ability to extend fresh credit. While this issue pre-dates Covid-19 (Kaur, 2019), it has since been exacerbated by the global health pandemic (Dutt, 2021; Economic Times, 2021).



Source: NRDC-CEEW-IREDA, 2018

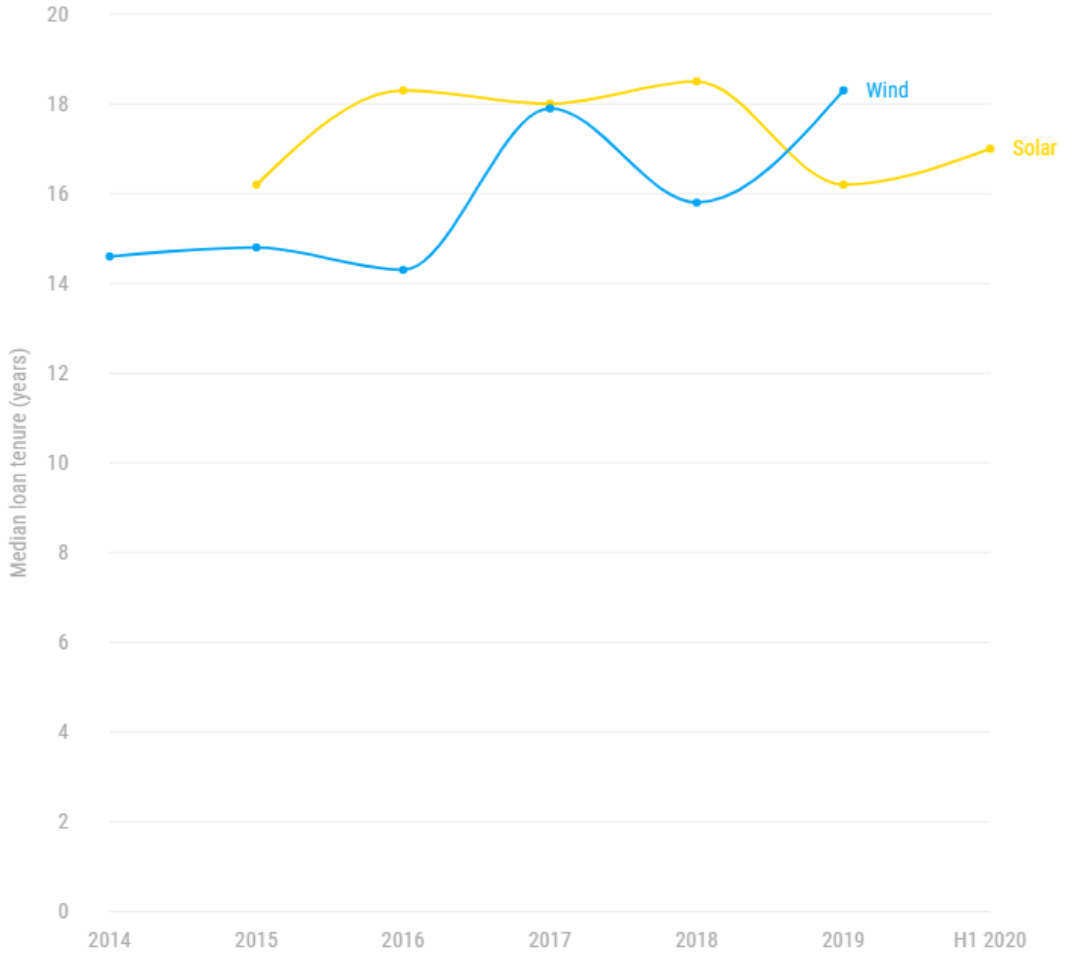
Notes: MFIs are non-governmental organisations and can also be granted NBFC-MFI status by RBI. The data here is from all 2017 deals captured on the Bloomberg Terminal and is not an exhaustive list.

Challenges to growing renewable energy finance

Beyond exposure limits, it can be challenging for domestic financiers to provide long-term, fixed price loans (e.g. for 15 to 18 years) for renewable energy projects, as their primary source of capital is short-term deposits (i.e. 3-5 years) (NRDC-CEEW-IREDA, 2018).

Scaling up finance for smaller transaction sizes (e.g. for solar irrigation pumps and rooftop PV) can also be a challenge, given the lack of a standardised framework to assess the creditworthiness of those smaller borrowers (CBI, 2019). Smaller borrowers also often lack credit histories or can have poor creditworthiness, adding a further challenge to scaling-up loans to small businesses and residential consumers.

The lack of financial performance track records for some clean energy technologies can also constrain lending.



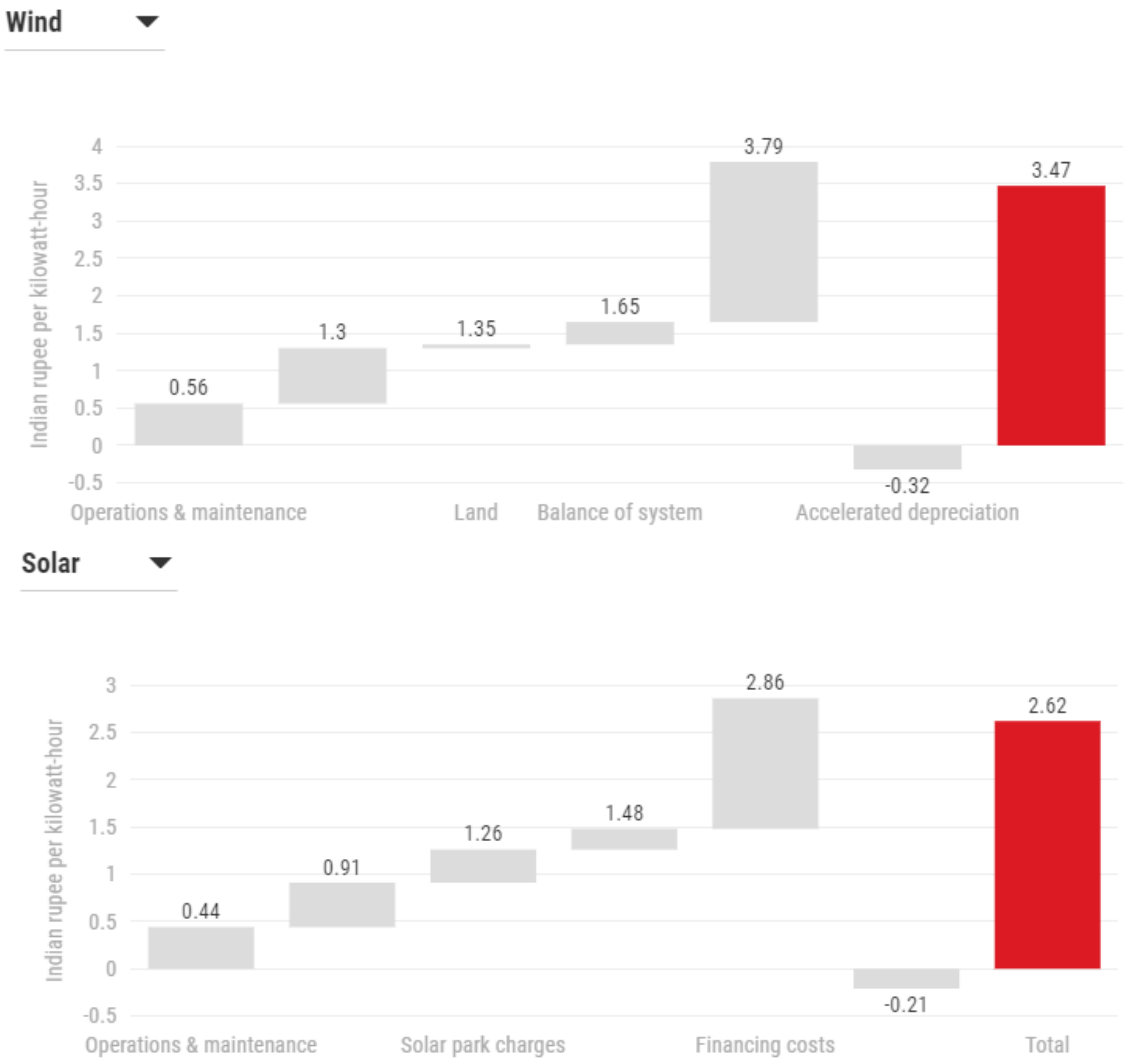
Source: IEA-CEEW, 2020

Need for lower financing costs

The cost of debt, particularly for smaller-scale and distributed renewable energy projects, is another challenge to meeting India's ambitious targets.

The high cost of finance in India, including high variable interest rates, has fallen in recent years but can still add as much as 30% to 50% to the cost of renewable energy tariffs (ADB, 2020).

High cost of finance can equally affect private sector spending on renewable energy. For instance, Indian corporates looking to issue bonds typically pay high coupons, as rates of the basic government security are equally high (CBI, 2019).



Source: ADB, 2020

Efforts to improve renewable energy finance and investment

India has a number of initiatives and support mechanisms aimed at improving renewable energy finance and investment. These include (*but are not limited to*):

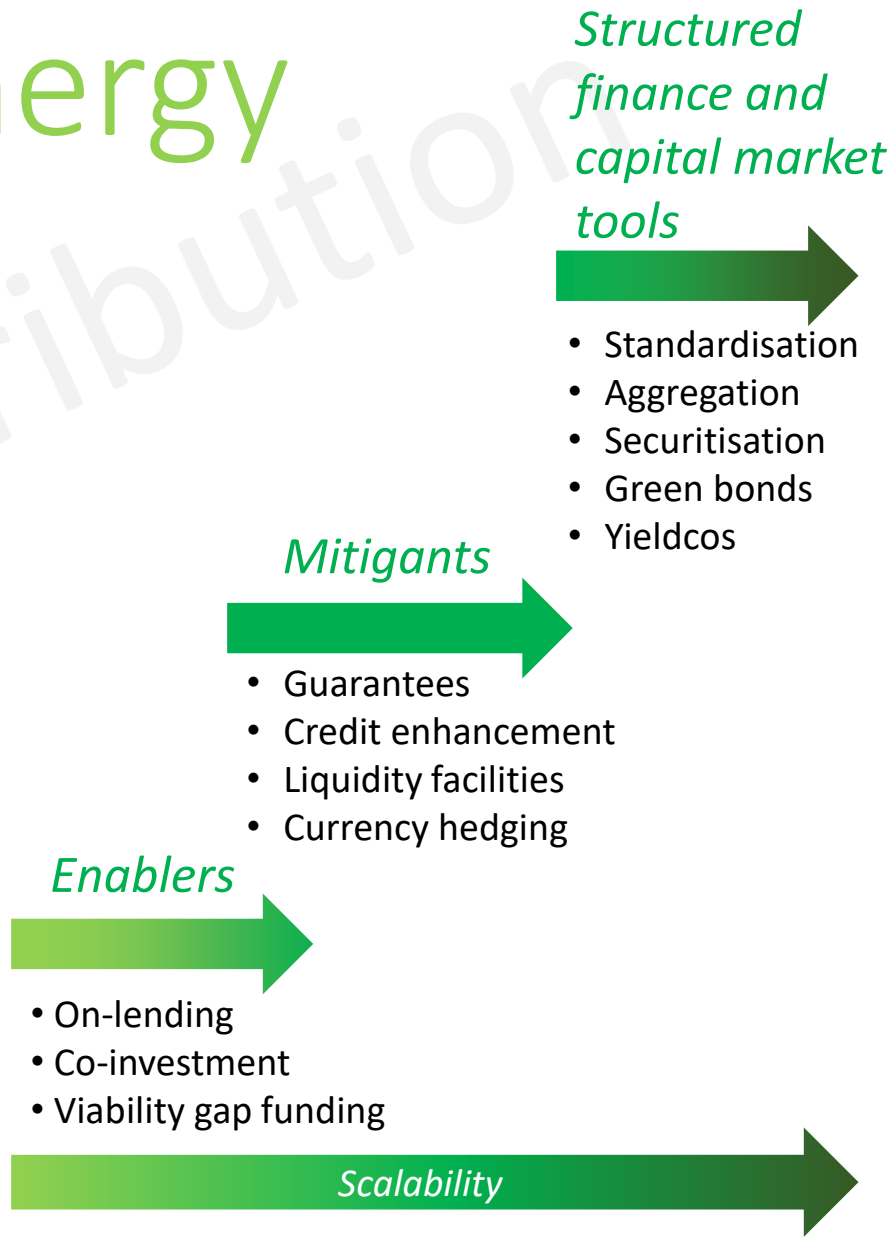
- IREDA Financing Schemes
- *New* IREDA Alternative Investment Fund
- *New* IREDA Green Window
- MNRE Bioenergy Schemes
- MNRE & UNDP/GEF Biomass Power Refinance Scheme
- SECI Payment Security Mechanism
- PFC Fund-based products and policies
- IIFCL-ADB Credit Enhancement Mechanism
- NABARD-TCCL & GCF Solar Rooftop Line of Credit
- AIIB-Tata Cleantech Sustainable Infrastructure On-Lending Facility
- TEDA Solar Rooftop Capital Incentive Scheme

Catalysing renewable energy finance and investment

Global experience (e.g. in solar PV and on-shore wind) has shown that targeted public interventions can support increased flows of finance to renewable energy projects (Steffen, Egli & Schmidt, 2020).

For example, risk mitigation (e.g. the IREDA credit enhancement scheme) and financial tools such as the Ministry of Finance's Partial Credit Guarantee Scheme can help to enable flows of private capital to renewable energy projects.

A number of potential financing vehicles can build upon these initiatives, helping to catalyse the scale needed to finance India's 2030 ambitions.



Source: Adapted from IRENA, 2016

One such example is structured finance (e.g. via aggregation partnerships) to increase investment volumes and reduce due diligence costs, for instance for smaller-scale and distributed renewable energy projects.

Standardisation (e.g. of project documents) can also be used to prepare projects to be pooled as securitised assets for trading in capital markets (IRENA, 2016).

Other financial instruments such as green bond issuance, which has ramped up in India in recent years, can help scale up and recycle capital for renewable energy projects, particularly for more established, utility-scale renewable electricity developments. This could be done, for instance, through a limited-period, subsidised credit enhancement facility to support opening up India's domestic bond market, which has seen very limited renewable energy bond issuances (CEEW, 2020).

These instruments can also expand the current investor base, for instance tapping into international institutional investors such as insurance and pension funds (CEEW-CBI, 2019).

Lessons from global experience

The following case studies pull from experiences in developing and applying financing vehicles that have been used to increase overall finance and investment in renewable energy development.

Common threads across these experiences include:

- **Identifying the right instrument:** each of the examples targeted a particular barrier (e.g. access to finance) or need (e.g. increased capital capacity) to design tailored solutions that addressed underlying risks and paved the way for increased flows of capital.
- **Engaging the right partner(s):** the interventions identified key partners (e.g. local financial institutions, credit specialists, business angels and industry experts) to help structure and prepare the financing mechanisms and ensure their effective application.
- **Targeting potential investors:** each case worked to address perceived risks and to demonstrate financial viability, helping to open the doors for potential investors, from venture capital and commercial banks to pension funds and company shareholders.

These shared considerations can be used to identify eventual opportunities and similar design elements that could be applied in the Indian context to increase finance and catalyse private investment in renewables.

Transaction enablers to empower renewable energy solutions

Targeted public support can improve access to finance, particularly for borrowers and technologies perceived as risky by private capital.

Microfinance arrangements, for instance, can facilitate access to capital for households and small businesses looking to purchase renewable energy solutions.

De-risking tools (e.g. guarantees or using combinations of grants and equity) can similarly help prepare less-established renewable energy markets, emerging technologies and innovative businesses for private finance.

On-lending and co-lending structures can help local finance institutions to gain confidence in lending to renewable energy projects (IRENA, 2016). These partnerships also can be used for eventual aggregation and securitisation (e.g. for issuance of solar asset-backed securities).

These types of financial instruments can also help apply limited public funds strategically in a way that addresses market barriers while improving the overall "bankability" of renewable energy solutions.

Microfinance to improve access to clean energy finance

Rooftop solar additions in India's residential sector have not met expected targets, despite a 30% capital subsidy offered by the government (IEEFA, 2019). Uptake of rooftop solar by micro, small and medium enterprises (MSMEs) is likewise in early stages, despite their potential for 16-18 GW of rooftop solar capacity (JMK, 2020).

A number of factors influence this limited market deployment. For example, subsidised electricity tariffs for the small residential segment (along with access to finance issues) has contributed to limited traction for distributed renewables such as rooftop solar (CEEW, 2018). The distributed nature of these small-scale projects means a large number of local actors are involved, many of whom may not have the right training, capacity or awareness to support market development and financing. Policies (and changes in policies) regarding rooftop solar also can vary considerably by state in India, increasing complexities for developers and investors (Das, 2021).

Local financial institutions can also be reluctant to lend to these projects, given weak credit ratings (or lack thereof), stringent collateral requirements and high transaction costs (Deloitte, 2019), part of which is due to lack of standardised project documentation.

To address such barriers, financial intermediaries like India's NBFCs could work with partners (e.g. multilateral development banks) to build upon existing work with local banks and MFIs and deploy potential products, such as lines of credit, revolving loans and even venture capital, in support of households and MSMEs seeking finance for renewable energy solutions. These could equally be complemented by support for innovative business models to address specific challenges constraining rooftop solar financing (CEEW, 2018).

As the following example from Bangladesh shows, this type of concessional finance can help increase overall comfort and capacity by local lenders with renewable energy projects, while also helping enable market uptake through actors that know their local partners well.

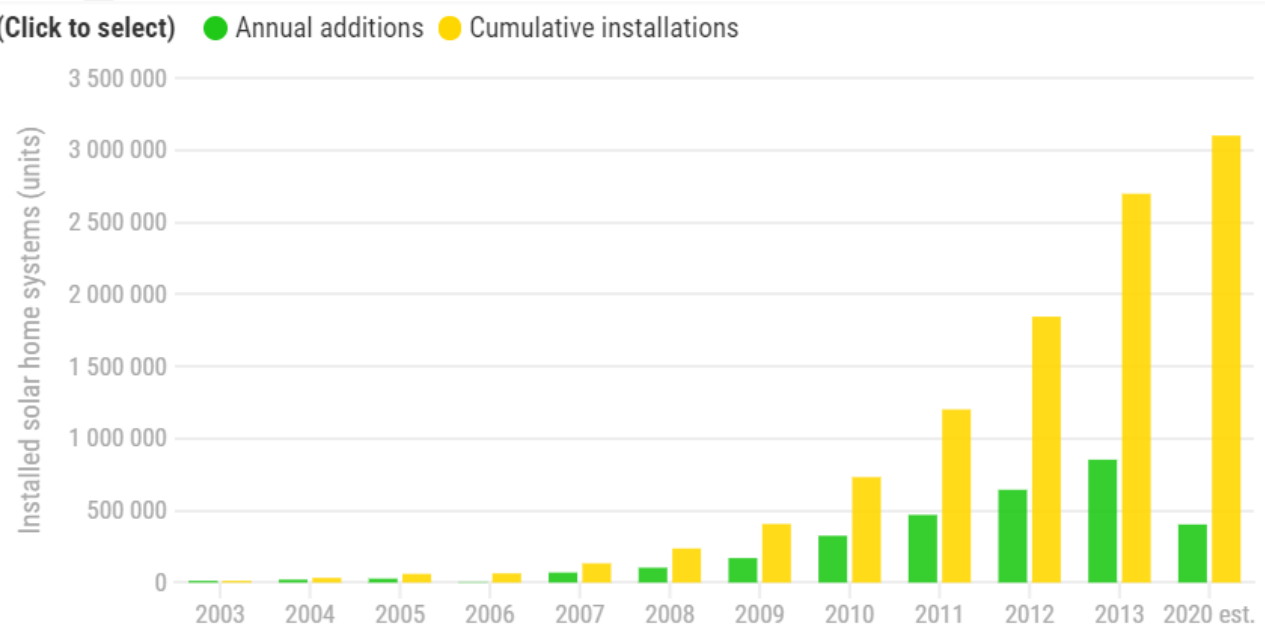
Increased deployment through these strategic partnership can also help improve local economies of scale (e.g. via improved supply chains and technical capacity). Not only does this improve the financial viability and affordability of renewable energy solutions, but it equally can help to create new jobs and business opportunities.

Bangladesh's solar home system programme

Bangladesh's rural electrification agenda was set in 1997, but concerns over its pace and costs led the government to seek more cost-effective solutions for remote households. In response, a solar home system initiative was developed with the World Bank Rural Electrification and Renewable Energy Development (RERED) programme. It aimed to reach rural households using a combination of concessional credit and subsidies to help make the systems more affordable (World Bank, 2014).

The initial programme to 2008 was successful and was the broadened to other technologies such as clean cook stoves and solar irrigation pumps.

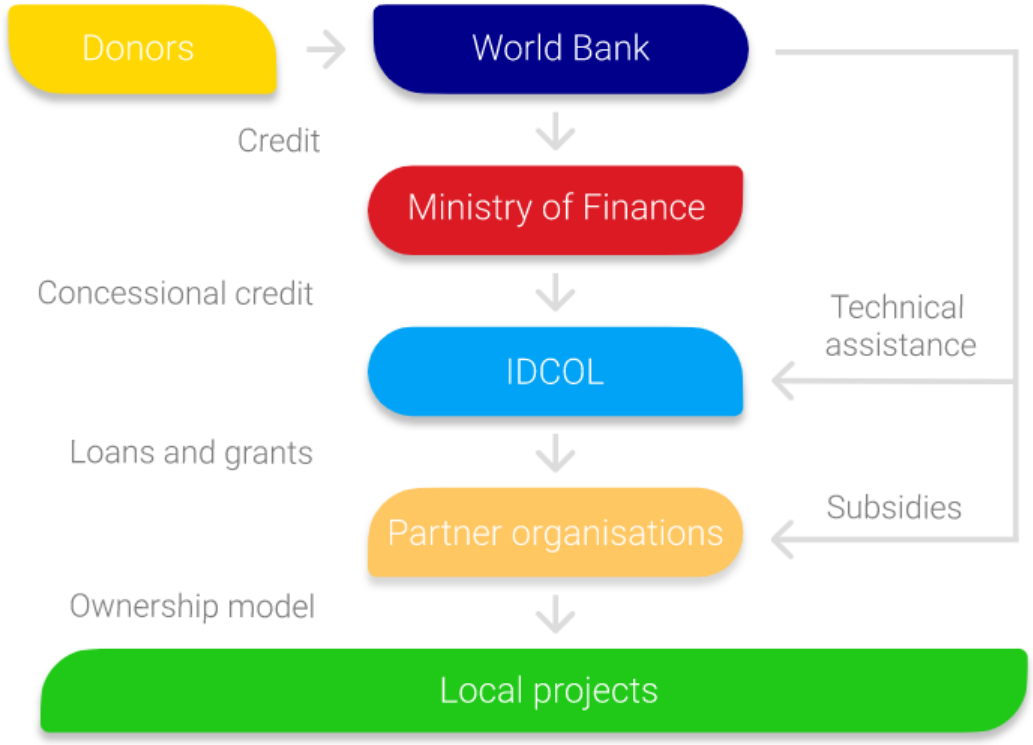
By 2020, 3.1 million households had a solar home system. The programme also supported construction of 14 solar mini-grid projects as well as installation of 1 153 solar irrigation pumps, 10 486 small domestic biogas digesters and 1.9 million improved cook stoves (World Bank, 2020).



Source: World Bank, 2020

The solar home system initiative was financed by the World Bank's International Development Association, which provided concessional credit with long-term maturity (38 years) to Bangladesh's Ministry of Finance. The Ministry then channelled this finance through concessional credit to Infrastructure Development Company Limited (IDCOL), a government-owned non-bank financial institution that implemented the programme. Some of the funds were also disbursed as grants (though liability for the overall credit from World Bank remained).

World Bank equally acted as a conduit for grants from other parties such as the Global Environment Facility (GEF), Global Partnership on Output Based Aid, KfW, the Asian Development Bank and USAID. Donor grants supported World Bank technical assistance in developing IDCOL's capacity for technology promotion and market development activities, programme administration, and monitoring and evaluation. The donor funds also supported subsidies disbursed by IDCOL to partner organisations for early market development.



The use of subsidies with partner organisations evolved over time with regard to purpose and amount:

Direct subsidies for market development	Covered costs to establish a new business line for solar home systems. Capital-buy down grants passed onto consumer through market competition. The average subsidy in 2003 was USD 90 per system, decreasing to USD 45 in 2006. By 2013, a USD 20 subsidy remained only for systems of 30 Watt power or below.
Indirect subsidies for capacity building	Supported technical training for new partner organisations to ensure they gained proficiency in the market, including with technology, supplier selection and aftersales services. Training also included topics such as cash flow management and business planning.
Indirect subsidies for consumer awareness	Supported customer training and awareness raising to promote the systems. These activities were co-financed using a cost-sharing basis in which partner organisations initially bore 20% of the cost, later bearing most of the costs as the programme evolved.

Source: World Bank, 2014

The RERED programme provided several rounds of financing, subsidies and technical assistance to develop the solar home system market and to reach rural consumers. Partner organisations were central to the strategy. These microfinance institutions, often non-governmental organisations, ranged from small entities operating in specific localities to large microfinance banks. Of these, one key partner was Grameen Shakti, a not-for-profit microfinance supplier of renewable energy technologies established under Grameen Bank.

Notably, the partner organisations had pre-established relationships with rural low-income customers to whom they could sell the solar home system through purchase contracts. Supported by refinancing from IDCOL (as well as some grants in the early programme to help bring costs down), partners sold the solar home systems to households using microcredit agreements.

Potential partner organisations were screened by IDCOL's selection committee using clear eligibility criteria. Once in the programme, their technical and financial capacity was developed through training. An operations committee was also available to provide operational solutions. Specifically, IDCOL provided training to help partners develop technical expertise beyond their normal financial activities, which allowed them to become solar home system dealers (e.g. with technicians installing the systems).

To ensure a high standard of the installed systems, IDCOL also set up a multi-layered monitoring and quality control process. In addition, partner organisations were required to submit a monthly programme report to IDCOL, providing data on installation and credit repayment.

Improved finance for solar access

Partner organisations were responsible for all technical, commercial and financial aspects of the solar home system business, including procurement and pre-financing of the systems. They also installed the systems using their own network of technicians and looked after maintenance as well as aftersales service, including any related training or capacity building for customers.

Prospective consumers were screened using pre-defined eligibility criteria. Group lending and social collateral models were also employed. Once approved, consumers placed a down payment equivalent to 10-15% of the system cost, with the remainder typically repaid over 2-3 years on microcredit terms spelled out in the purchase contracts, generally at prevailing market interest rates (typically 12-15%).

To help bring down the cost of credit, refinancing through IDCOL acted as an incentive for partner organisations. Between 70-80% of credit to customers was eligible for refinancing at market rates of 6-9%, with a 5-7 year repayment period and a 1-1.5-year grace period. The refinancing also helped to ensure quality, as IDCOL carried out technical verifications of installed systems within 21 days of the refinancing claim before providing the improved credit, along with any applicable subsidy (World Bank, 2014).

In case of default, partner organisations could reclaim a solar home system. Conversely, customers had a buy-back guarantee at depreciated price if they obtained a grid connection within a year of purchasing the system. Once the loan was repaid, partner organisations offered an optional service contract for an annual fee.

Lessons learned

The RERED solar home system experience highlights the central role partner organisations played in accessing an existing customer base. For instance, the programme benefitted considerably from the extended network and reputation of Grameen Shakti.

IDCOL also played an important part as a financial intermediary, addressing barriers and challenges with partner organisations, particularly as the sector had previously been unwilling to finance “non-productive loans” such as those for solar home systems.

Flexible project design using a range of subsidies and system sizes equally allowed for adaptation with evolving technology and market conditions, as well as with consumer feedback. The combination of consumer credit and subsidies particularly helped to make the system affordable for early market adoption. As competition in the local supplier market increased and local technical competencies improved (e.g. through training), system costs came down, allowing the subsidies to be reduced.

Economies of scale through the partnerships also helped to bring down the cost of technology. Notably, the success of the partnerships in achieving sizable demand (through existing customers) and in working with supply chains helped to achieve attractive costs early in the programme.

The success of this initiative in Bangladesh led to a number of private competitors outside of the RERED programme entering the solar home system market. Adapting to this evolving context, the RERED II programme in 2014 expanded to clean cook stoves, solar irrigation pumps, biogas digesters and solar mini-grids. While solar home systems continued to be a component of the programme, these were mostly targeted to small systems designed for the poorest households.

The RERED programme design also had a number of potential elements that could be used to deploy local, small-scale solar solutions for homes and businesses in other countries such as India. For instance, India already has strong experience with MFIs applying a diverse range of business models (Jayadev & Rao, 2011). This includes a number of existing microfinance initiatives that support distributed renewable energy access.

Like partner organisations in the RERED example, MFIs in India can perceive risks with supplying energy products (PACE, 2018). A flexible partnership programme through a financial intermediary like IDCOL (e.g. via IREDA or REC in India) could help build lender confidence and capacity, while supporting escalated deployment of small-scale solar solutions. Development of technical expertise, particularly at the branch level, would also facilitate the processing of distributed renewable energy loans by financial institutions in India.

Programme design could also consider additional or alternative elements beyond concessional credit, such as credit guarantees or partial risk-sharing agreements, depending on the needs of eventual partner organisations. A buy-back guarantee could equally be a valuable mechanism in the Indian context, given irregular supply in many states, where rooftop solar solutions can act as a valuable complement to grid electricity as grid electricity continues to expand and supply stability improves.

Capital facilitation for nascent and high risk markets

India's renewable energy ambitions require finance for innovative and emerging technologies, such as off-shore wind, storage and solar-wind hybrid solutions (NRDC-CEEW-IREDA, 2018). Global experience with these types of markets (e.g. on-shore wind and solar PV in their early days) has shown that private banks are often hesitant to finance these projects given their lack of track-record and potential high risks (Steffen, Egli & Schmidt, 2020).

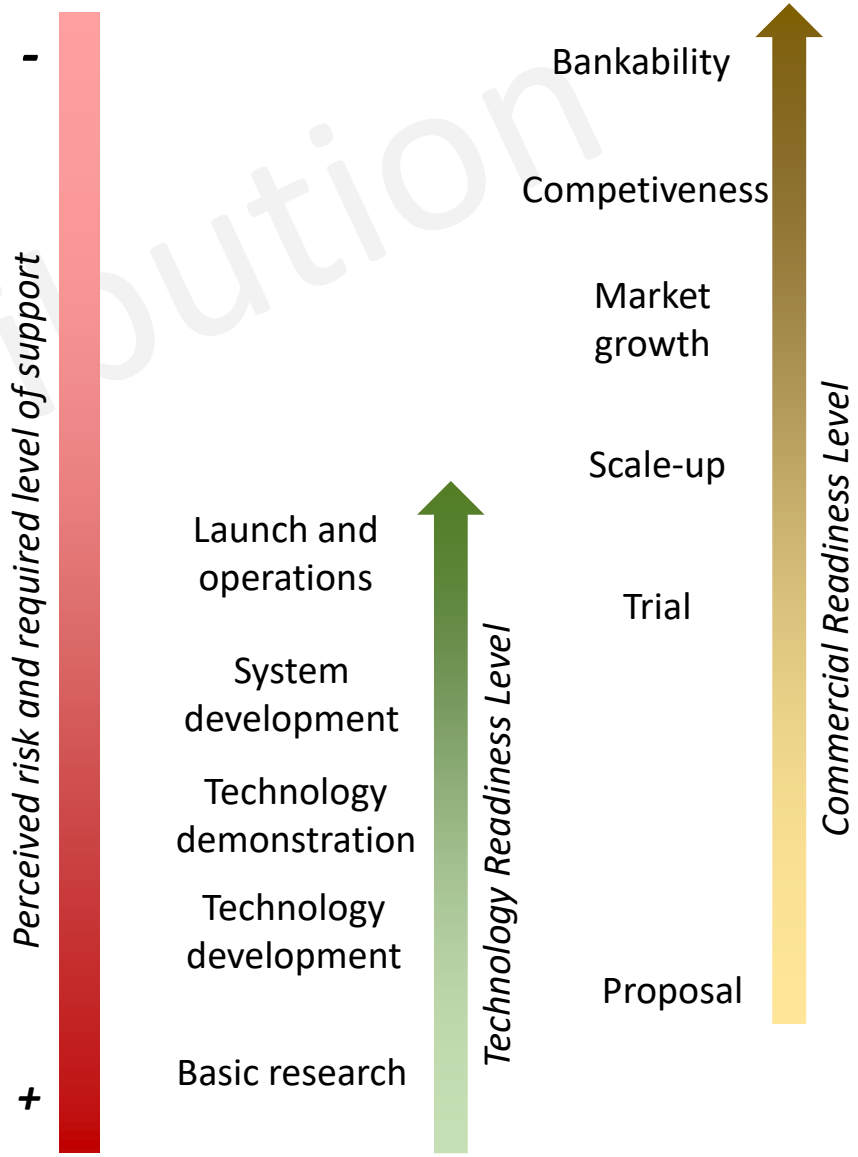
Tailored finance and de-risking instruments such as the *IREDA credit enhancement and guarantee schemes* help prepare high-risk projects for market, in turn helping them to attract private capital. Blending concessional funding with other finance on commercial terms can also help attract and accelerate private sector investments in new or challenging markets (IFC, 2019).

The choice of support or financing mechanism depends of course on a number of considerations, including the anticipated state of technology development, commercial viability and investment readiness level.

Enabling promising technologies can also require a combination (or series) of support mechanisms, allowing them to go from idea to demonstration to commercial operations and finally a readily financeable project.

The following study from the European Union is an example of this innovation chain, building upon a number of other initiatives and public support mechanisms to bring onto market technology solutions that attract private sector investment.

While the example is not exclusive to renewable energy, the programme's design illustrates how tailored support (e.g. through combined financing and business acceleration services) can bridge the gap to private capital for renewable energy solutions, which for diverse reasons may still be perceived as too risky for investors.



Source: Adapted from ARENA, 2014

Support for clean energy development in Europe

As in other countries, a critical gap for renewable energy markets in Europe has been the lack of finance for downstream, capital-intensive and high-risk technologies (Mazzucato, 2018). For example, the capital need for some renewable energy projects could be an order of magnitude larger than what even venture capitalists would normally be willing to provide (Ghosh and Nanda, 2010; Gaddy et al., 2016).

In response, the European Union (EU) has established a number of programmes and funding instruments to support energy market development, including specific mechanisms targeting renewable energy and the EU's clean energy transition.

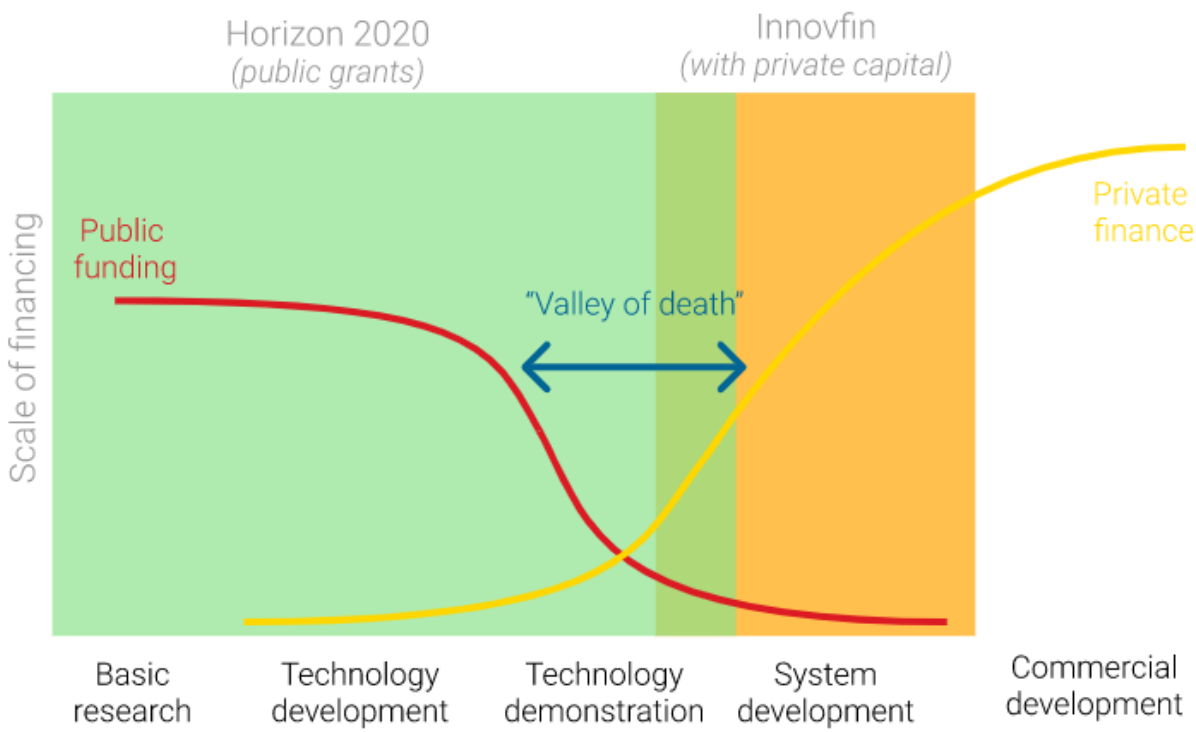
These include (*but are not limited to*) elements within several notable funds addressing the research, innovation, development, demonstration and deployment of energy technologies, businesses and infrastructure solutions across Europe.

- Horizon 2020
- Innovation Fund
- Connecting Europe Facility
- Cohesion Fund
- Just Transition Mechanisms
- European Fund for Strategic Investments

On such fund is Horizon 2020 (recently succeeded by *Horizon Europe*), the EU's flagship programme on research and innovation with a budget of about €80 billion between 2014-20. Under the programme, Technology Readiness Levels (TRLs) 0 to 6 or 7 (from basic idea to product demonstration) were eligible for grant support.

In the TRLs 6/7-9 range, the Innovfin programme was designed to help unlock private investment. The fund was tailored to provide loans, guarantees and equity-type funding (between €7.5-75 million), where critically innovators had to bring *at least 50% private capital* to the table and demonstrate their overall bankability.

As such, *Horizon 2020* and *Innovfin* did not necessarily cover innovative projects at higher lever TRLs that for various reasons were still considered high-risk investment by private capital.



Source: Adapted from JRC, 2018

The European Innovation Council

To address this financing gap, the European Innovation Council (EIC) pilot was created in 2017. With a budget of €3 billion over 3 years (under Horizon 2020 funds), the pilot was conceived to address market barriers for innovative solutions that did not necessarily fall under other EU support programmes and that were still too risky for commercial finance. In particular, this included high-risk and high-potential small and medium enterprises (SMEs) that promised to bring to market new innovative products, services or business models.

The EIC pilot was designed to target public funds through combinations of financial instruments, including co-investment with private investors, grants and equity. Notably, there were two pilot programmes:

1) The EIC *Pathfinder* (TRLs 4-5)
2) The EIC *Accelerator* (TRLs 6-8)

The EIC Accelerator

Companies selected for the *Accelerator* (€1.3 billion in funds) could receive grant funding as well as equity to scale up their idea. For grants, projects could include activities such as trials, prototyping, validation, demonstration and testing in real-world conditions, or market replication activities.

Accepted projects (grants) received between €0.5-2.5 million and could request a higher or lower amount if justified. Normally projects would take between 12 to 24 months to complete, but could be longer on an exceptional basis.

The *Accelerator* also offered blended finance to for-profit SMEs in the form of optional equity in addition to the grant. The maximum investment in the form of equity was €15 million.

For close-to-market activities (i.e. TRL 9 or above), only equity participation was available, as long as the proposal was still "non-bankable" (else, these could apply for *Innovfin* financing up to €75 million, for example for first-of-a-kind energy demonstrations).

Source: European Commission, 2020

Phase 1: feasibility study (ended in September 2019)

For eligible *Accelerator* projects, a lump sum of €50 000 was provided to help prepare the technical feasibility and commercial potential for their idea to become a credible business plan and growth-orientated strategy. Support could include: risk assessment, market research, analysis of regulatory constraints, intellectual property management and partner search, amongst others.

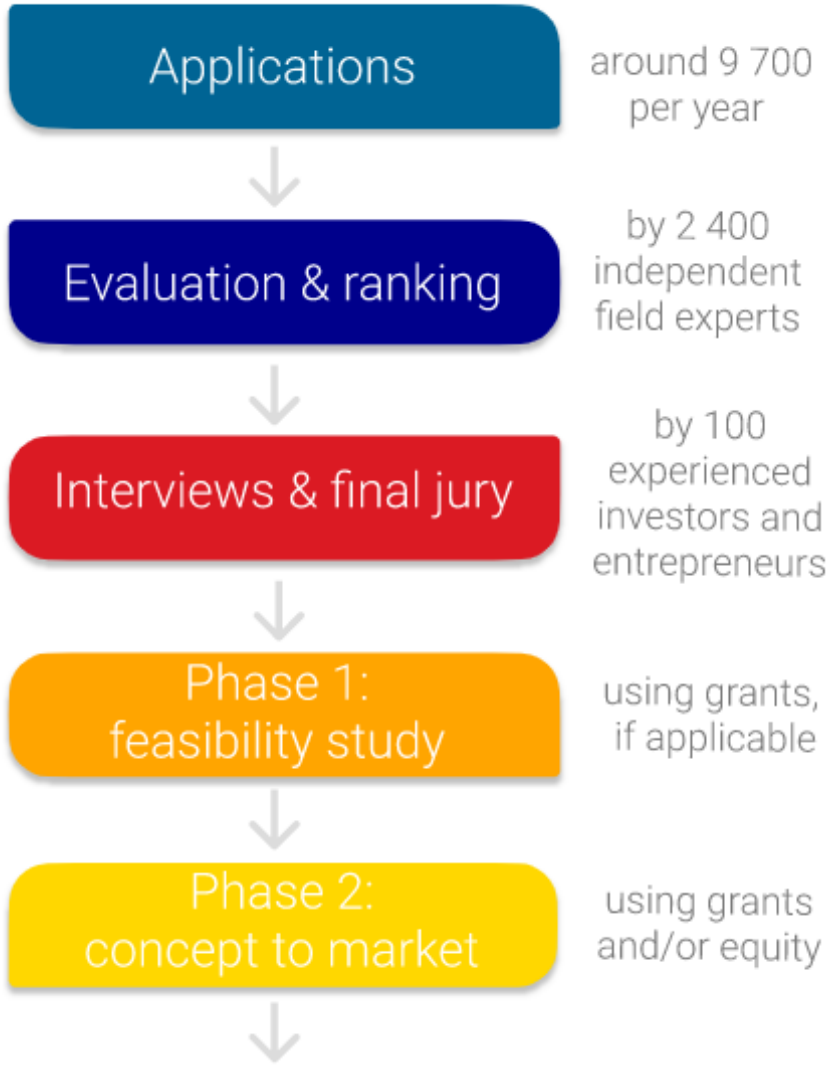
Phase 2: concept to market

Grant and/or equity helped to turn the proposal into a market-ready product, service or process.

- Grant only was for SMEs in need of a push to develop their idea.
- Blended finance was for SMEs looking to scale-up and grow their business.

Example activities included product or service development, prototyping, validation, trials, testing in real-world conditions and market replication.

Proposals required a strategic business plan (developed under Phase 1 or otherwise) and specifics on the expected outcome, criteria for success, impacts on the company (e.g. employment, sales and market size) and de-risking level from EIC support.



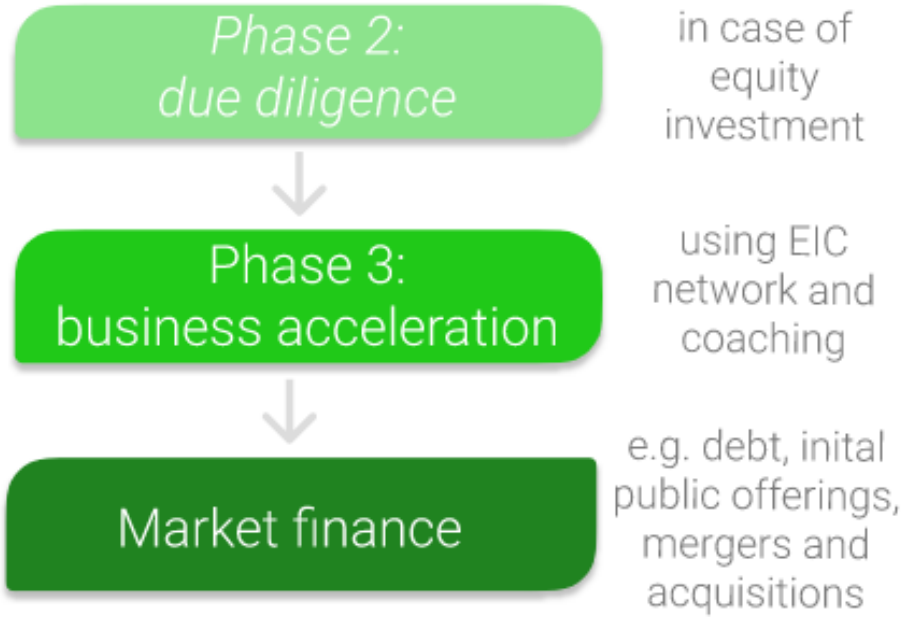
Source: Adapted from Ouaki, 2020

Phase 3: business acceleration services

In addition, business support was offered via the *EIC Community Platform*. Projects had access to participating companies (around 5 700), innovation-driven research teams across Europe and investor day events as part of the EIC *Business Acceleration Services* working with corporates, procurers, investors and other partners. For instance, several online e-Pitching events have been organised for EIC-funded renewable energy projects.

EIC business support could also take the form of coaching and training. For example, the EIC pilot offered up to 12 days of free coaching for things like support on business development or on acquiring private financing.

The coaching service was facilitated by the *Enterprise Europe Network*, with experienced business coaches recruited from a database managed by the European Commission. EIC Business Acceleration Services also provided specific support to help SMEs access new markets through participation in trade fairs or by linking them to potential customers and investors.

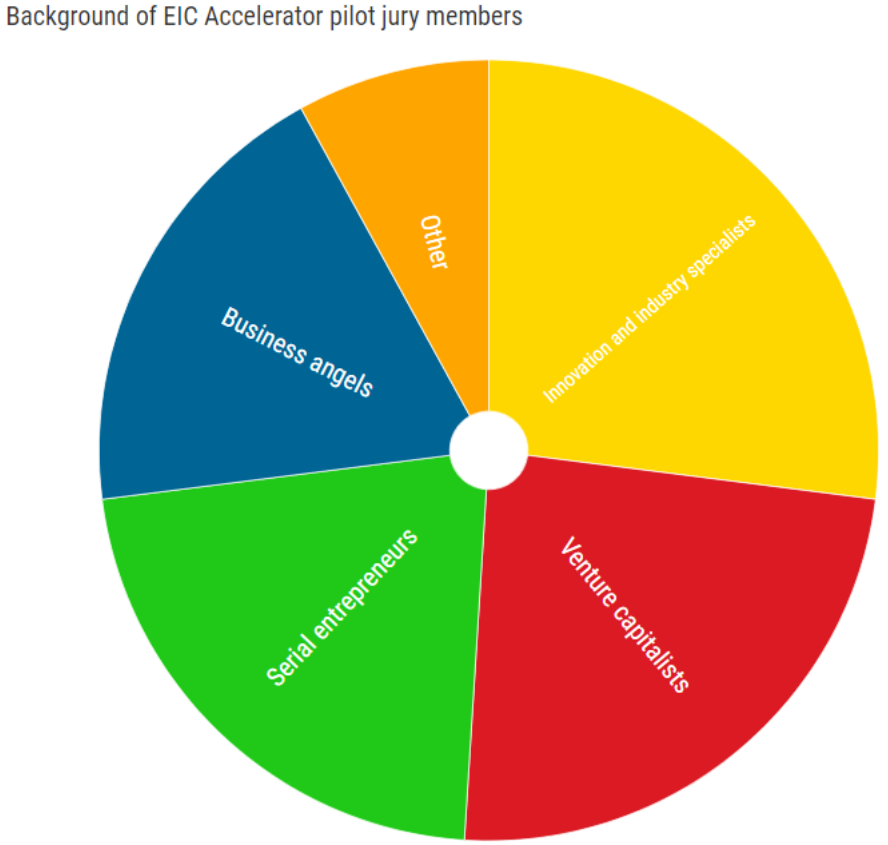


Source: Adapted from Ouaki, 2020

EIC Accelerator projects

Accelerator projects were chosen through a number of criteria assessing their financial and operation capacity. Submission documents included descriptions of the product or service, details on infrastructure or technical capacity relevant to the activities, and information on the responsible persons/partiers, including any third party participants. Minimum sustainability and expected impact requirements were also considered.

These criteria helped to assess the worthiness of each proposal, as well as its need for financial support through the *Accelerator* (or for example if it should apply under another EU fund).



Source: European Commission, 2020

Selection was carried out by a jury consisting of members such as business angels and venture capitalists with experience working with innovative businesses. For projects receiving equity, an additional step for due diligence was required.

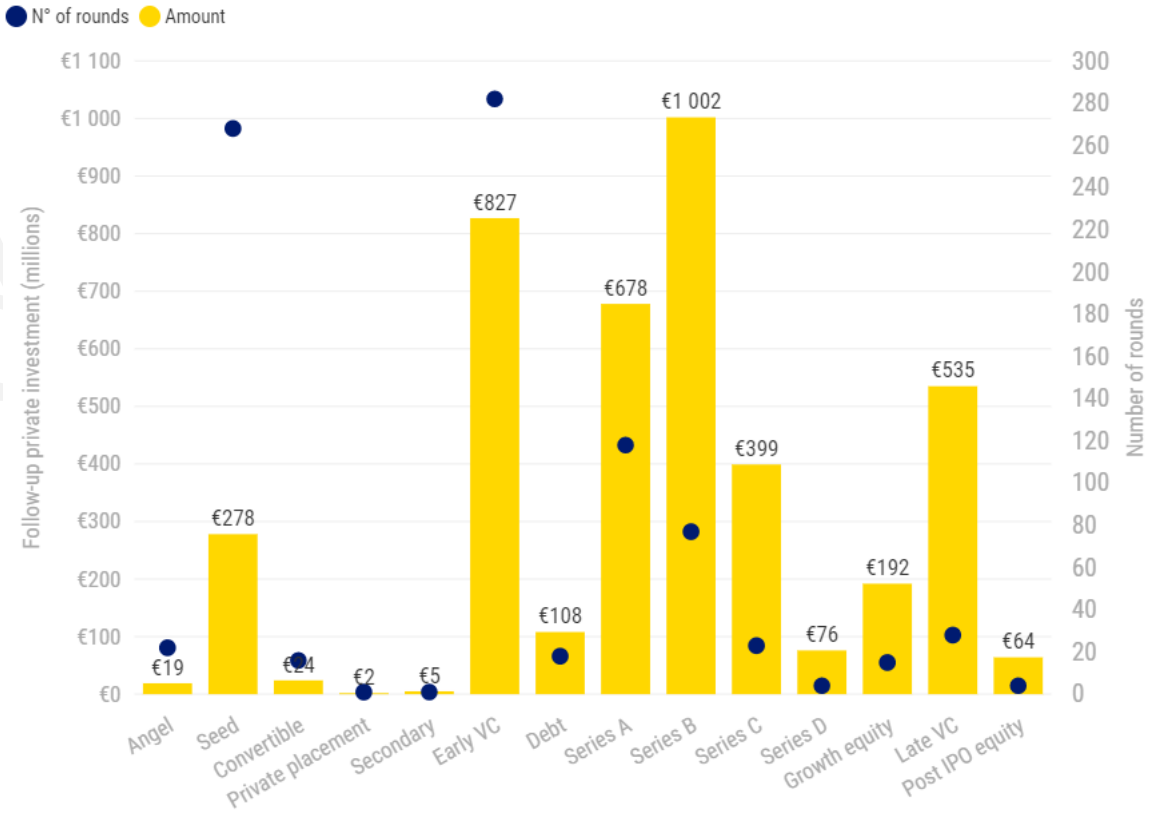
This selection process allowed the *Accelerator* to tailor necessary support (including business services) for SMEs. As an investor (specifically for projects with equity), the *Accelerator's* process also helped ensure a return on investment (via successful follow-up with private finance).

As of May 2020, the EIC *Accelerator* had helped to:

- support more than 5 500 companies in 39 countries
- enable more than €5 billion in follow-up private investments (equity, debt, mergers and acquisitions, initial public offerings)

  This includes 922 energy businesses that obtained more than €435 million in follow-up private investments.

- double employee numbers on average within 2 years
- submit 46 patent applications, with 14 already awarded
- go to market, with 17 companies making initial public offerings and another 43 acquired by larger firms
- and grow, where the combined valuation of EIC-backed companies (for which data are available) was between €20.1 and €28.3 billion in 2020.



Source: European Commission, 2020
Notes: VC = venture capital; IPO = initial public offering.

In the renewable energy sector, the EIC helped to bring to market a number of innovative renewable energy solutions. For example, the EIC supported Belgian start-up Wello Oy to take its Penguin wave-energy technology from demonstration to a full-scale, commercially ready investment phase.

Blended support using grant plus equity was provided to the Spanish company Beridi to help it bring to market (and investors) a new deep-water floating technology for off-shore wind energy generation. Blended grant and equity was also given to the Swedish company Modvion to help reduce wind energy costs using stronger, taller wind turbine towers made from wood composite materials.

The Greek company Brite Solar, producing a 80% transparent solar glass panel using a nano-structured coating material with silicon solar cell technology, also received EIC blended support. Blended grant plus equity was likewise provided to the Spanish company Abora Solar, which is now making high-efficiency hybrid solar PV-thermal panels.

Lessons learned

The success of the EIC pilot contributed to political agreement in 2020 to launch a fully-fledged EIC in 2021, with a budget of €10 billion between 2021-27. Pulling from pilot experience, the fully-fledged EIC will simplify applications, improve funding opportunities and include a wider range of support services to help innovators to get over the "valley of death" in order to access private capital.

The success of the EIC pilot also illustrated the opportunity to leverage public finance with private capital for innovative businesses and solutions. In this light, an EIC Fund was recently created in 2020. The Fund's platform will build upon existing EIC services to partner potential investors with EIC-funded projects. Specifically, it will be working to build a portfolio of early-stage technology companies (including renewable energy providers) to enable a matchmaking platform for potential co-investors. As of early 2021, the Fund already had nearly 160 companies looking for a total of €680 million in investment.

The EIC pilot highlights opportunities to bring onto market innovative solutions using the right combination of public support. Notably, the pilot showed there was strong demand for blended financing, where tailored equity (e.g. through shares or convertible debt) has helped meet SME and start-up company profiles and financing needs to help them "cross the finish line" and attract private investors. The blended use of public grants and equity also means that those public funds (i.e. the equity portion in successful ventures) can be recycled for future use (unlike the grant portion).

In the Indian context, innovative financing like the EIC *Accelerator* could play a role in bringing to market effective and affordable renewable energy solutions such as off-shore wind and storage technologies as well as domestic solar manufacturing capacity to meet India's ambitious clean energy targets. This type of financing could be done, for instance, through IREDA's Green Window, which could serve as the conduit for channeling funds to an innovation facility, blending public funding with other sources of capital.

Such innovative financing does not necessarily need to be through a dedicated innovation facility. The use of blended public support could be applied with other energy or innovation schemes (in fact, EIC funds can be paired with other EU financial instruments). It could also be applied in other combinations (e.g. via loans and equity), depending on the company profile, perceived investor risk and targeted outcomes.

The EIC experience may also be considered as India's Social Alpha moves forward with its recently announced initiative to support innovators and entrepreneurs working on energy innovation gaps. The initiative, under the auspices of Mission Innovation, is the third such challenge under India's Clean Energy International Incubator Centre (CEIIC).

On-lending through aggregated partnerships

Intermediated finance, working with other financial institutions such as local banks, can be used to improve the liquidity of renewable energy finance. These partnerships, for instance distributing capital for green banks or windows, can also be used to increase access to lower cost financing for small-scale renewable energy assets.

Partnerships with intermediary financial institutions can equally be used to enable larger, standardised portfolios, which can then help to improve marketability to institutional investors (e.g. through aggregation and securitisation for green bond issuance). The Climate Aggregation Platform is one such example being developed by the United Nations Development Programme (UNDP), GEF and the Climate Bonds Initiative to grow a pipeline of standardised green projects and expand the investor base for such projects in East Africa and South-East Asia.

In India, NBFCs can play a critical role as financial intermediaries, especially as many are already structured to mobilise larger transaction volumes and have experience with MSME credit lines (NRDC-CEEW-IREDA, 2018). Concessional debt, mezzanine finance and guarantees through NBFCs, public banks or IREDA's green window can work in partnership with commercial banks to help them gain experience and be more comfortable lending to renewable energy projects they have not traditionally financed or still perceive as risky (Steffen, Egli & Schmidt, 2020).

The following example of this type of on-lending in Australia illustrates the opportunity – as well as some eventual considerations for similar programmes – of such aggregation partnerships, working with commercial financial actors to improve access to low-cost capital for smaller scale renewable energy projects.

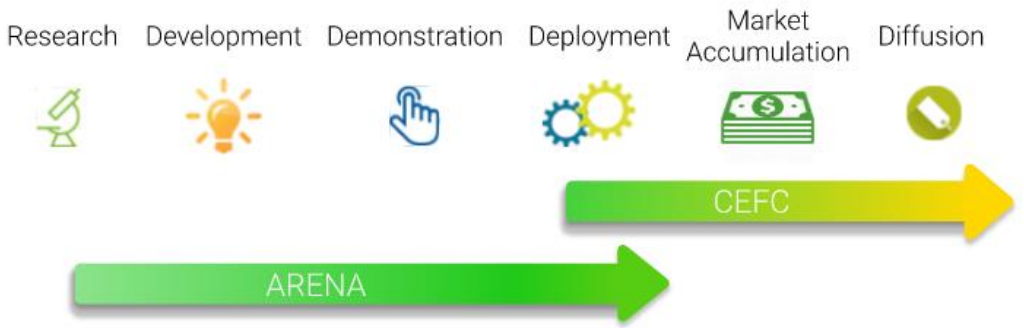
Australia's Clean Energy Finance Corporation

The Clean Energy Finance Corporation (CEFC) is a state-owned green bank that facilitates increased flows of finance to clean energy projects by investing AUD 10 billion on behalf of the Australian Government. CEFC is a government statutory authority expected to mobilise investment in clean energy technologies using financial products and structures that address barriers to finance, and in particular barriers to private capital. Notably, at least half of CEFC funds since 2018 are to be invested in renewable energy technologies, which represented as of June 2020 53% of funds invested, including more than 3 GW of utility-scale solar and wind.

While topically similar, CEFC differs from the Australian Renewable Energy Agency (ARENA), which has stronger emphasis on knowledge and capability development (Deloitte, 2018).

This distinction is due in part to CEFC's mandate as a bank with investments expected to deliver positive returns for taxpayers, where ARENA grants help to increase industry capability and technology development.

The two consequently complement each other in terms of the overall continuum to achieve Australia's renewable energy ambitions.

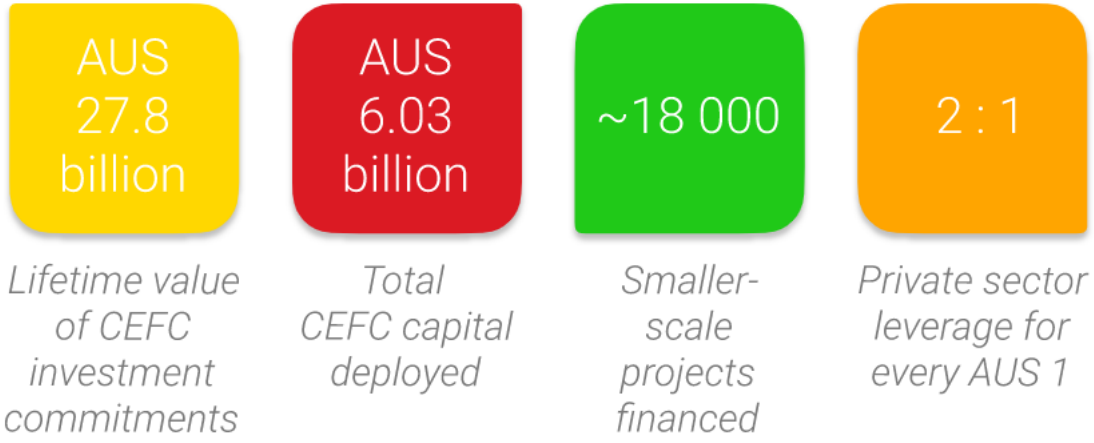


CEFC uses a number of investment vehicles, including direct investments (e.g. flexible debt, equity finance or a combination of the two), investment funds, asset finance (working with banks and co-financiers to deliver discounted finance) and debt markets (e.g. using green bonds).

Since its inception in 2012, CEFC has made nearly 200 large-scale commitments (e.g. large-scale wind farms and energy-efficient properties), helping attract an additional AUD 2.30 in private sector finance for each dollar of CEFC finance (CEFC, 2020).

In parallel, CEFC finance has also invested AUD 1.27 billion in nearly 18 000 smaller projects through its tailored, low-cost *asset finance* programmes with co-financiers.

Cumulatively, these investments represent an estimated 220 Mt CO_2eq in lifetime emissions abatement.



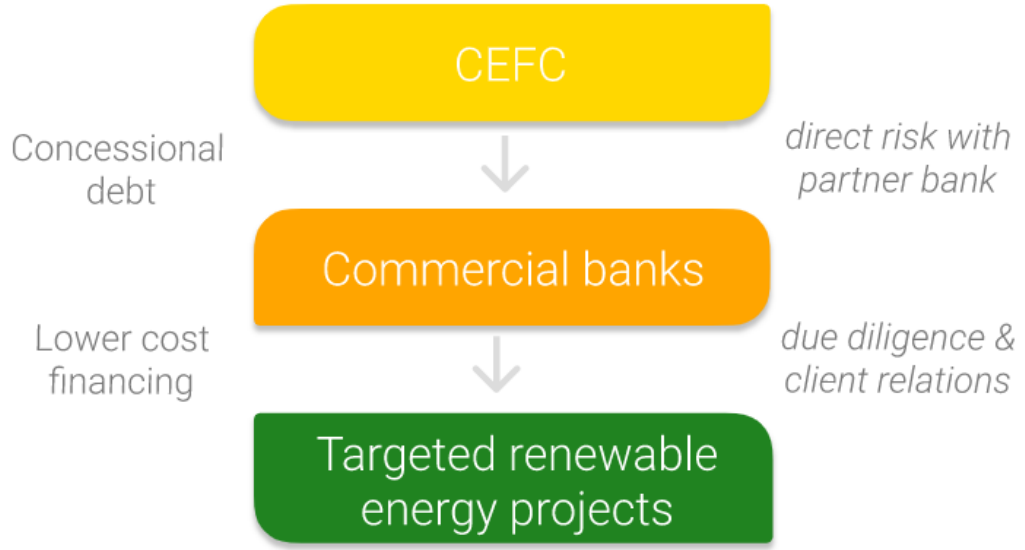
Source: CEFC, as of 25 January 2021

CEFC projects

As part of its asset finance work, CEFC uses its aggregation partnerships with leading commercial banks throughout Australia to offer debt (on-lending) for subsequent clean energy financing. This on-lending structure offers debt to partner banks, who in return offer that financing to their customers for eligible technologies, with up to AUD 5 million available for individual projects.

Up to 100% of equipment cost can be financed, where the application goes through the financier's usual credit approval considerations. CEFC itself is not involved in individual financing decisions or loan administration.

This wholesale finance through an intermediary (thereby "aggregating" customer demand) helps CEFC to tap into smaller projects (e.g. with small businesses, manufacturers and agribusiness) and build upon local relationships. It also means CEFC takes risk on the partner institution and not the underlying borrowers. This allows CEFC to offer low-cost funding to commercial partners, who in return can offer attractive terms such as discounted interest rates.



As of 2019, CEFC's aggregation partnerships represented over AUD 800 million in investments for more than 5 500 small-scale projects across Australia (Green Bank Network, 2019). Individual loans were as low as AUD 2 000, and on average investments were around AUD 73 000. Most recently in its 2019-20 *Performance Commitments*, CEFC provided more than AUD 187 million in wholesale finance to support some 6 700 smaller scale investments in clean energy.

These loans have been dominated by SMEs, particularly in the agricultural sector, for instance for small-scale solar and battery storage, cold storage facilities and energy-efficient equipment or irrigation systems. Through the aggregated partnerships, final borrowers get 0.7% discount on whatever the commercial bank is offering on that technology or sector.

The funds invested through the partnerships generate an estimated return of approximately 1.0% over the Australian Government Bond Rate, which is lower than CEFC overall portfolio return (targeted at 3 to 4%). Yet, the partnerships are very low risk for CEFC, allowing flows of finance to target technologies at a smaller project scale, which otherwise would be costly (e.g. cost of due diligence and staff) for CEFC to seek and administer itself.

Examples from 2019-20 CEFC asset finance

Agribusiness

Solar helps juice company ease the squeeze on power costs

75 kW

Solar system powers orchard and packing shed

Family-owned orchard and juice company The Great Australian Squeeze is using solar energy to operate its packing shed and juice factory. The business has been operating for more than 60 years in Barham in southern New South Wales and is now a leading manufacturer and supplier of orange juice. A decision to operate the orchard and packing shed using renewable energy saw the installation of a 75 kW solar system. CEFC finance delivered through the Bank of Queensland Energy Efficient Equipment Finance Program.

Solar

Newcastle solar farm helps cut council power bills

$420,000

Revenue in just six months

The City of Newcastle Summerhill Waste Management Centre has become a renewable energy hub with a 5 MW solar farm built alongside a 2.2 MW landfill gas generator and small wind turbine. Early data released by the Council in mid-2020 found the solar farm was providing better than forecast results, having delivered $420,000 in revenue in its first six months of generation. The business model had estimated savings of $250,000 a year. The solar farm, built on a capped landfill site, is expected to supply more than half the Council's annual energy needs. CEFC commitment: $6.5 million in direct debt finance.

Source: CEFC, 2020

The return itself also does not reflect any equity contribution made by the ultimate beneficiary of the loan. It equally does not take into account other potential benefits of the partnerships, such as improved willingness by partner banks to lend to clean energy projects.

Through the aggregation partnerships, CEFC can also work with banks to securitise debt, pool granular assets and attract capital from large-scale investors, for instance potentially through issuance of certified green bonds. This capacity plays a key role in CEFC's efforts to attract capital from Australia's superannuation funds (pension funds), which typically have low-risk appetite and high investment thresholds.

The issuance of debt to capital markets has also allowed the partnerships to continue since 2015 (by recycling capital).

Lessons learned

It is important to note that the CEFC is one component of a broader ecosystem for renewable energy policy, finance and investments (Deloitte, 2018). CEFC plays an important role in leading the market where there are perceived risks for investors or barriers to access finance for businesses and individuals. For instance, the aggregation partnerships have helped to building commercial bank's experience and confidence in clean energy projects, creating momentum in markets like clean energy technology for the agriculture sector.

Looking back, the programme also created a bit of "neighbourly competition", where other banks wanted to join once they heard their contenders were participating in the partnerships.

Looking forward, a possible evolution of the partnerships could build upon this experience. For example, there is a growing focus on responsible lending in Australia (and globally), which may entice financial institutions to participate more actively in a partnership programme (e.g. beyond concessional finance). The partnerships may also want to be more specific in the choice of eligible clean energy technologies or sectors (e.g. manufacturing) to target underserved opportunities.

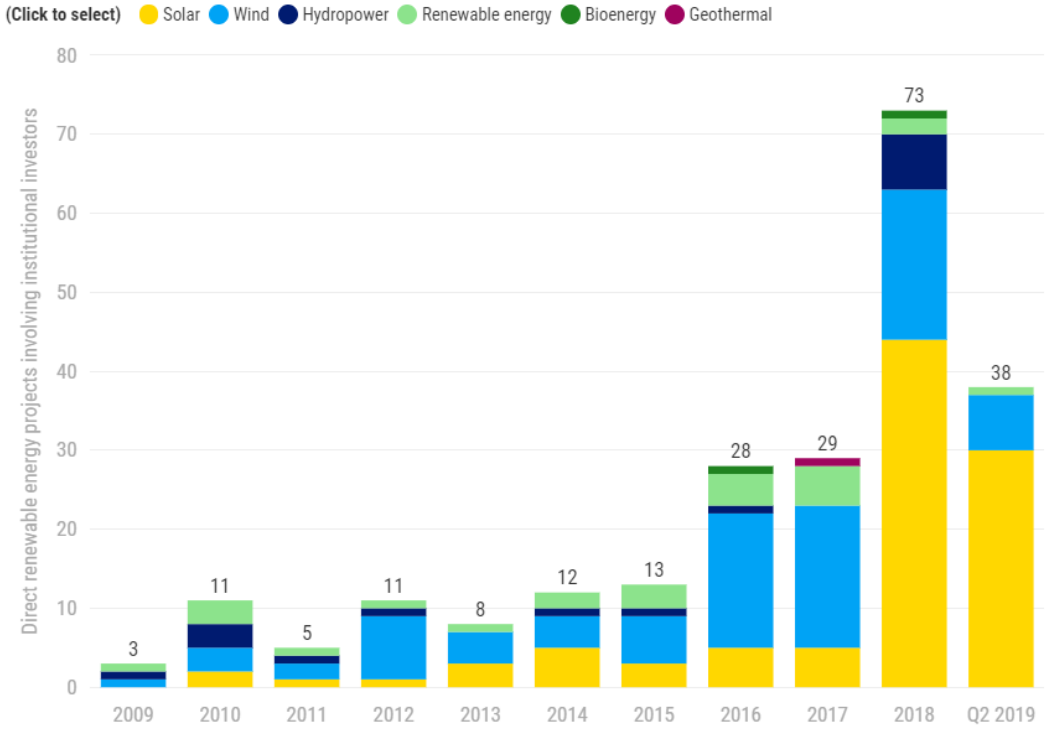
Lessons are equally that the product could be structured in different ways, depending on the specific context. For instance, in a large country like India, the programme could be designed in a way to pool resources (e.g. with development banks) for a large fund in which several financial institutions and financiers are involved. This could be offered on top of other funding programmes and be designed not to be the primary focus (i.e. other initiatives or financial instruments would come first).

Capital markets to catalyse renewable energy finance

As renewable energy markets mature, they generally need greater capital flows, including refinancing vehicles such as asset-backed securities that can recycle capital for new projects.

Debt capital market solutions for renewable energy projects have increased considerably in recent years and can help mobilise assets managed by institutional investors such as hedge fund and pension fund managers.

For example, IREDA Green Masala bonds and PFC off-shore bonds have helped tap into capital markets and accelerate flows of finance to renewable energy projects in India.



Source: IRENA, 2020

Note: IRENA analysis based on Preqin data. Represents only around 2% of all renewable energy projects.

Institutional capital for renewable energy projects can be delivered using a number of investment vehicles, such as projects bonds, investment funds and even equity.

Broadly speaking, institutional investors have shown a preference for operating assets, avoiding risks in the design and development stages of projects. Between 2009-19, over 75% of renewable energy deals involving institutional investors were in operating assets (IRENA, 2020).

The choice and design of the vehicle play a key role in the types of investors willing to provide capital, depending on the desired scale, simplicity, liquidity and risk.

Key investment considerations for investors

	Domestic pension funds	Domestic insurance companies	Foreign institutional investors
Return	High	High	High
Risk	Medium	Medium	Medium
Liquidity	Low	Low	Medium
Time horizon	High	High	High
Regulatory	Low	Low	High
Overall	Medium	Medium	High

Source: CPI, 2018

For example, institutional investors such as pension funds and insurance companies typically require deals greater than USD 300 million (IRENA, 2016). Both domestic and international institutional investors also typically require ratings of AA and above, a threshold most renewable energy project loans are unable to achieve by themselves. Aggregating renewable energy assets can therefore help to achieve the right investment volume.

A limited-period, subsidised credit enhancement facility could also can help unlock bond market financing in India by helping generate an initial track record of issuances and providing risk-return guidance for future issuances (CEEW, 2020).

Securitisation and the growing institutional market for green

While foreign institutional investors (e.g. hedge funds, mutual funds, sovereign wealth funds and pension funds) have been one of the biggest drivers of India's financial markets since the mid-2000s (OECD, 2017), India's bond market capitalisation is still relatively limited.

India can take advantage of the massive global bond market and increasing investor appetite for green to support its renewable energy ambitions. Globally, renewable energy already dominates green bond issuance, accounting for 50% of volume in the use-of-proceeds categories and with 16% of total issuance exclusively earmarked for renewable assets (IRENA, 2020).

Green bond issuance in India for renewables has started to take off in recent years, though issuance from "pure-play" renewable energy companies (i.e. publically traded entities with one line of business) such as NHPC hydro power, Narmada Wind Energy, Suzlon Energy and Websol Energy System Ltd. still remains uncommon. This may be changing, though, as issuances from renewable energy developers have increased over the past couple of years.

Additionally, most of India's green bond issuance to date has also been for "use of proceeds" (i.e. for new financing), while the securitisation market remains underutilised (CBI, 2018).

Asset-backed securities

Asset-backed securities are one effective vehicle that can tap into this market, taking into account some of the design considerations (e.g. collateralisation and credit tranching) that may help draw in institutional investors seeking low-risk and long-duration yields.

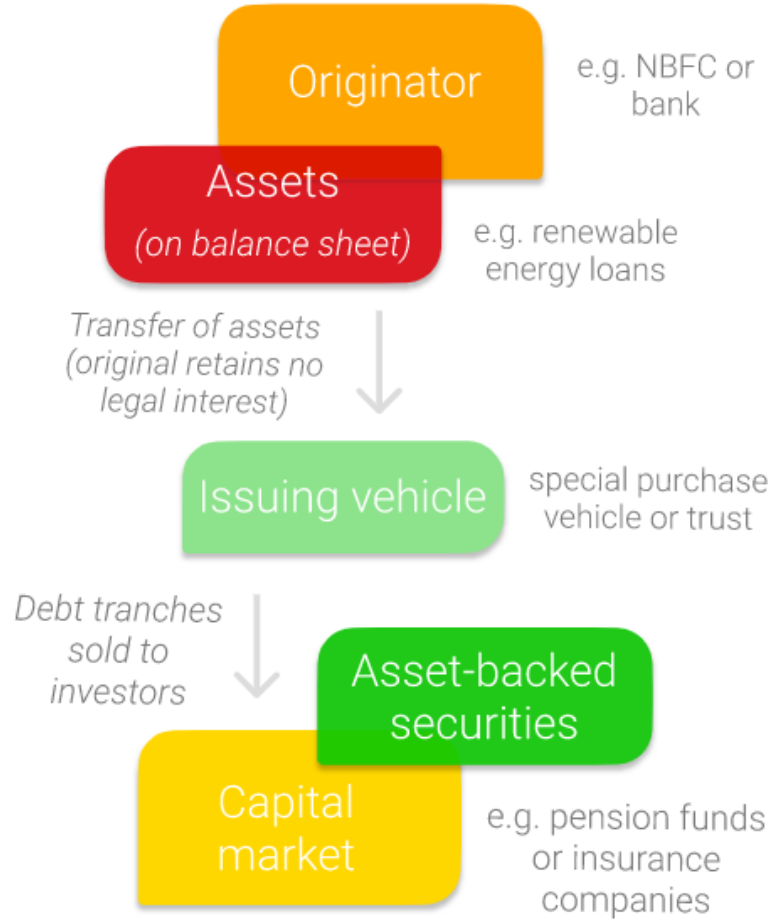
Importantly, securitisation creates liquidity and can be used to address limitations with on-balance-sheet financing, which could address high exposure of many Indian financial institutions to renewable energy projects and the overall power sector.

Securitisation also often results in lower cost of capital, given the diversification benefit (i.e. a small piece of many loans rather than a large piece of one loan) for investors. This can be used to provide more attractive terms for renewable energy finance (either new builds or for existing assets).

Securitisation can be designed in different ways, depending on the needs of the issuer and the intended investor pool. For instance, a special purpose vehicle (SPV) or trust is often created to ring-fence (financially separate) underlying assets, taking them off the originator's balance sheet and providing additional assurance to investors (e.g. that payments will not be used for other things). A quality collateral pool with a sufficient level of investment-grade projects is equally important in the uptake of securitised products.

The following example from the United Kingdom used *synthetic* securitisation, in which losses are funded (i.e. insured) by the investor (Stanworth, 2005). This type of securitisation is not permitted in India under the *2020 RBI Draft Framework for Securitisation of Standard Assets*. Globally, it is also much less common than traditional (cash-funded) securitisation.

Basic flow of asset-backed securitisation



Sources: UNESCAP, 2017; IMF, 2008.

Nonetheless, the study illustrates some of the considerations that issuers (e.g. commercial banks or NBFCs like PFC) can have in designing asset-backed securities. It also underscores the importance of how securities are designed to attract potential investors.

Additional information on traditional asset-backed securities for the Indian context can be found in the Climate Bonds Initiative 2019 report on Securities as an Enabler of Green Asset Finance in India.

The Royal Bank of Scotland

The Royal Bank of Scotland (RBS) (now *NatWest Group*) is a leading lender to the renewable energy sector in the United Kingdom. Like other financial institutions, RBS has obligations to manage its portfolio of loans, including risks such as high exposure to one sector. For that reason, when the bank set out to reach GBP 10 billion in total lending to clean energy projects in 2020, it needed to find a way to free up capital to meet its lending ambitions.

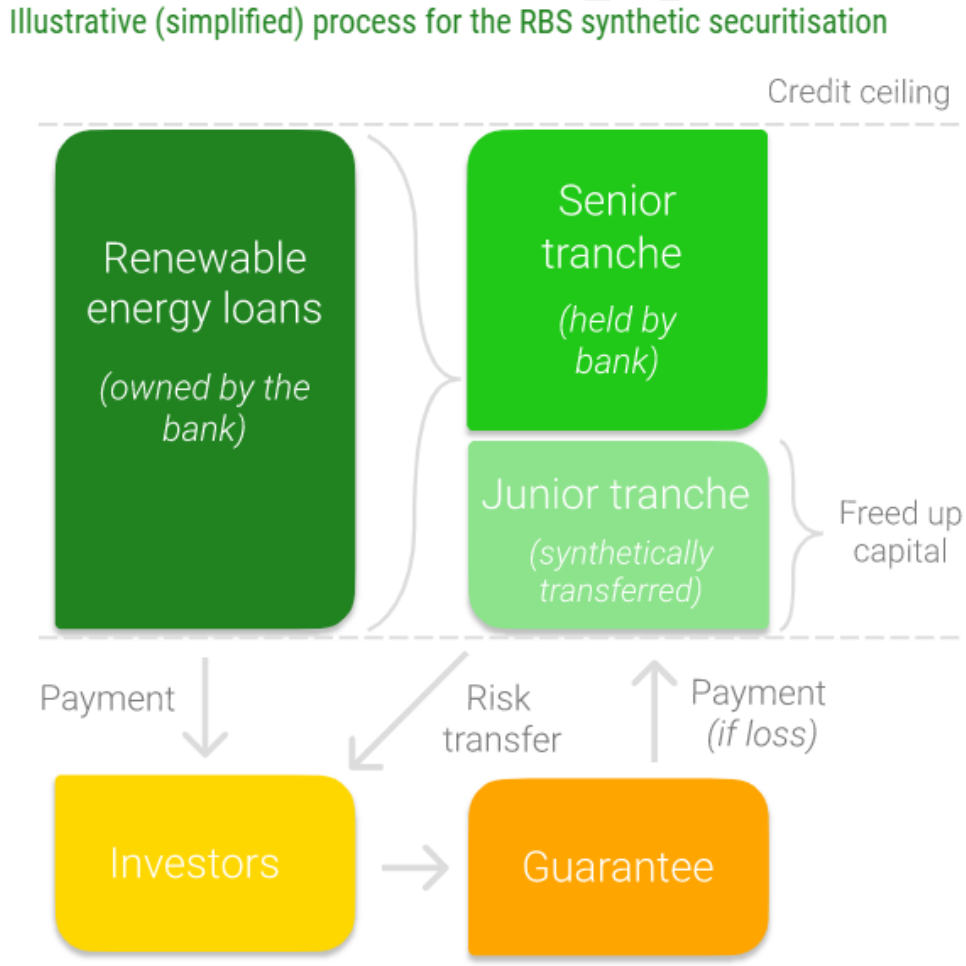
To do so, RBS issued a GBP 1.1 billion *synthetic securitisation (capital-relief trade)* with Macquarie Infrastructure Debt Investment Solutions (MIDIS) in late 2019. The deal provided credit protection against a portfolio of renewable energy loans such as solar and wind projects, smart meters and hydro power. The transaction was the first such exclusively Environmental, Social and Corporate Governance (ESG) aligned synthetic securitisation in the United Kingdom, and it enabled a significant release of capital for RBS to increase its lending to sustainable energy and renewable electricity projects.

Synthetic securitisation

While similar to traditional asset-backed securities (in respect to the tranching of credit risk), the RBS synthetic securitisation did not transfer the actual underlying loans to the issuer (an SPV). Rather, the underlying assets (i.e. loans) remained on the bank's balance sheet using credit protection (e.g. a financial guarantee), for which the bank pays a fee to the investor.

This transaction allows the issuer (RBS) to raise capital (not *cash*) in order to finance new projects, as the credit protection (insurance) against the tranche of debt issued allows the bank to hedge its risks, thereby lowering its capital charge and raising its capacity to lend to new projects.

In short, the synthetic risk transfer to the investor(s) helps the bank to meet capital rules without having to offload (sell) its loans. In the case of default, the investor(s) reimburse the bank for eventual losses in the portfolio (up to the size of the junior tranche, the amount depending on the agreement).



These types of synthetic securitisations (also known as capital-relief trades) have been used by other lenders such as Nordea Bank Abp, Standard Chartered Plc and Banco Santander SA in recent years (Bloomberg, 2020). The synthetic risk transfer helps the banks to meet tougher capital rules without having to find buyers for large portfolios of loans.

Synthetic securitisation can also be attractive if the banks do not need *funding*, as the process for traditional cash securitisations is typically heavier (e.g. with risk packages and cash collection going to the SPV, with the bank usually retaining the first-loss tranche) and means the bank transfers the underlying equity along with the issued debt.

The choice and design of securitisation therefore depends on bank need (e.g. capital capacity or cash) as well as the underlying resources (e.g. structuring expertise and credit analysis) to prepare the transaction. For instance, determining the impact of the synthetic transaction on post-capital requirements can be quite data heavy, requiring a modelling team that can assess how much risk (expected as well as potentially unexpected losses) has been transferred, affecting how much capital can be recycled.

As the issuing bank holds onto the underlying assets in a synthetic securitisation, this also means that these types of synthetic transactions are limited. Specifically, issuing credit notes to investors in the capital market transfers the risk of the tranche's equity portion, but not the underlying portfolio. Regulators therefore generally look to see that there is permanent capital against these types of synthetic transactions, meaning that the transactions are designed to be effective to term and generally cannot be called early before maturity.

Securitisations of this type also have a specialised investor base (CBI, 2019). As with traditional securitisation, a "happy medium" in terms of design in credit tranches and their underlying risks needs to take into account target investors. For synthetic transactions, finding this medium can be a bit more challenging, as the senior tranche (normally sold into liquid capital markets in a cash securitisation) remains with the bank. Ensuring the right "mix" of assets (generally performing) for synthetic transactions therefore requires careful consideration for the prospective investor(s), particularly as the synthetic securities market globally has a much smaller investor pool.

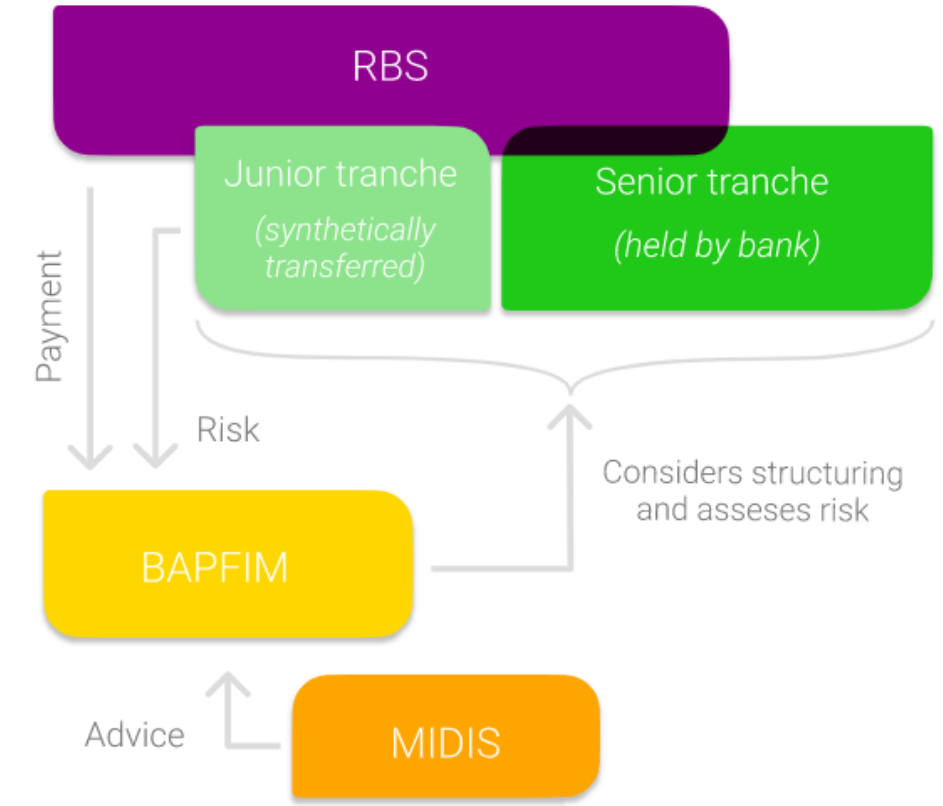
The RBS securitisation

For the RBS securisation, MIDIS acted as an adviser for BAE Systems Pension Scheme, which bought the equity tranche of the transaction through its BAE Systems Pension Funds Investment Management Limited (BAPFIM) (Macquarie, 2020). This partnership built upon MIDIS' expertise in the United Kingdom's renewable energy sector, alongside BAPFIM's competency in structuring transactions and assessing risk.

The renewable energy portfolio's longer term debt (compared to other synthetic transactions with terms closer to 3-5 years) also was a nice fit BAPFIM's pension portfolio. Additionally, the green credentials of the transaction, underpinned by loans meeting the Loan Market Association Green Loan Principles, address growing demand for green by pensioners.

Macquarie's Green Investment Group calculated that the portfolio's annual electricity generation avoids emissions equivalent to taking 2.3 million cars off the road.

Illustrative (simplified) process for the RBS synthetic securitisation



Lessons learned

The spread on the synthetic transaction is higher than what RBS would have paid from issuing a less risky senior bond, but it allows the bank to maintain and grow its clean energy portfolio while also increasing its credit capacity. The deal also serves as an important example, given the strong push by the United Kingdom's Government to deploy low-carbon energy infrastructure.

As banks with similar lending constraints look to issue additional credit or recycle capital for clean energy projects, structured finance (whether traditional securitisation or a synthetic deal like the RBS issuance) can play a role in increasing overall flows of finance to renewable energy assets (OECD, 2020). In particular, the RBS example stresses the need for advisors and financial experts that can assess risks and structure securitisations in a way that is both favourable to the issuer and attractive to investors.

In the Indian context, financial institutions such as banks and NBFCs could convert pools of operative renewable assets into financial securities. Given the complexity in preparing these deals, specialised bodies such as an Alternative Investment Fund (AIF) and Infrastructure Investment Trusts (InvITs) could also be used (at least in the near term) to address structural concerns and deploy investment strategies on behalf of investors (CPI, 2019). For example, an AIF demonstration could be developed by an agency like IREDA. This would help build investor confidence about the viability of renewable energy asset securitisation, while also offering insights on eventual design strategies or investor concerns for future replication in the market.

Yieldcos and contractual assets

A yield company (yieldco) is an entity formed to own operating assets, such as solar or wind power, and to raise funds by issuing shares to investors. Cash flows from these operating assets are then used to distribute dividends (cash payments) to shareholders over time. By separating operating assets from riskier activities such as project development, yieldcos can attract investors who are looking for more stable, predictable returns (e.g. from power purchase agreements).

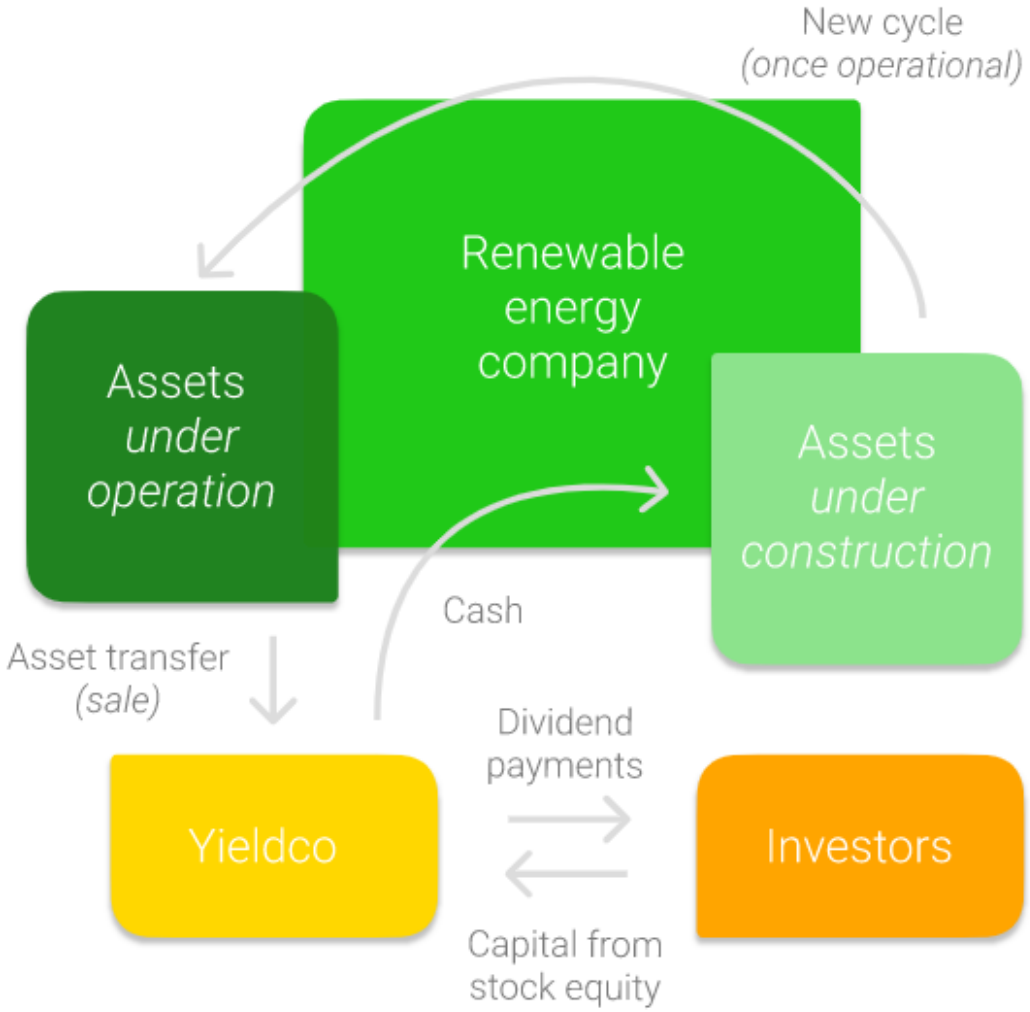
Like securitisation, the bundling of renewable energy assets under a yieldco (possibly with other contractual agreements) reduces risks (e.g. payment defaults) associated with individual assets. This can help to attract new investors, including those who may lack the interest, capacity or channels to place capital into individual renewable energy projects.

Bundling, alongside projected long-term dividend growth (how often and how much the dividend is raised over time) also allows yieldcos to raise capital at attractive terms. For example, capital raised through some of the first yieldcos in the United States was used to pay off expensive debt and to finance new projects at rates lower than those that were available through tax equity finance, which could exceed 8% (Urdanick, 2014).

Yieldcos have (re)emerged in recent years (after the failure of SunEdison in the United States) as an attractive option for utilities and renewable energy asset owners to move operational capacity from their balance sheets to finance new projects (Deign, 2020).

In a typical arrangement, a renewable energy company creates a separate entity (the yieldco) and transfers its operating assets, typically at a premium to their costs. To buy those assets, the yieldco raises equity by issuing shares to investors with the promise of predicable, low-risk returns (dividends).

In return, the parent company uses the sale to finance new assets. Once operational, those assets can then be sold to the yieldco, effectively creating a sort of revolving credit facility, which can be cheaper than through project financing (OECD, 2020).



To increase the overall distribution of free cash flow to shareholders (thereby making investment more appealing), yieldcos generally use a tax-efficient (pass-through) structure in which income is taxable at the investor level. Yieldcos also generally offset taxable revenues with asset depreciation expenses, whereby acquiring new assets helps to maintain high annual depreciation expenses.

Naturally, cash flows depend on the productivity of the renewable energy assets and their contractual agreements (e.g. if they are fixed price and have inflation-indexed revenue profiles). Dividend yields (annual cash payments relative to the share value) also depend on the yieldco's ability to manage and acquire new operative assets.

This ability to manage and in particular acquire (or even develop) new assets is a central element to the yieldco structure, as it affects the yieldco's capacity to maintain or grow its underlying value (e.g. accounting for asset depreciation) and subsequently maintain a high stock price (i.e. the investor's underlying investment). A high stock price in turn allows the yieldco to finance new acquisitions by issuing new shares with limited dilution to the existing shares.

This so called "virtuous cycle" (Konrad, 2021) can of course become a risk if not *well managed*. The more yieldco share price rises, the more underlying growth in dividend needs to be to maintain (or increased) for the yield to remain stable or grow. While short-term ups and downs may be manageable, maintaining this virtuous cycle with high growth in both the yield and dividends can mean taking on big risks.

Lessons learned

Global experience with yieldcos over the last decade has shown that as with any capital-intensive and fast-growing industry, there is a risk that the company grows too quickly, affecting its ability to manage its debt and pay its shareholders (IRENA, 2016). Yet, if operative assets (or a portfolio of different grade assets) are of good quality, are diverse and produce distributable cash flow (once capital expenditures to maintain the assets are taken into account), then this cycle can continue, helping to attract new investors and increase flows of finance to renewable energy projects.

A number of good practices in the design and operation of a yieldco can allow it to grow and meet investor expectations. Importantly, a manageable growth strategy is critical to avoid volatility in the yield valuation, which was a factor in the SunEdison crash (Mitidieri, 2020). As with structured finance, diversity of assets can also address potential associated risks. For instance, a portfolio of renewable energy asset types and locations can help manage issues like hydrological risks from droughts or periods of low electricity output from wind and solar farms.

In India, the opportunity for yieldcos as a way to manage operative assets while raising capital for new projects is not unprecedented. In 2014, the Securities and Exchange Board of India (SEBI) issued regulation for Infrastructure Investment Trusts, which allow companies to unlock tied up capital by transferring operating and revenue-generating infrastructure assets to a newly created trust (UNESCAP, 2017).

Similar to the yieldco structure, these trusts (e.g. the Greencoat Capital renewable investment trust in the United Kingdom) create investment opportunities for certain investor classes looking to avoid risks associated with project development. Though, the SEBI rules for these trusts have a stronger requirement than yieldcos, as the capital raised has to be used to repay at least 50% of the debt.

To date, these infrastructure trusts in India have had limited number of applications for renewables, but experiences from the overall growing use of investment trusts in India may provide useful insights for using the yieldco model for renewable energy projects. This could help to attract new capital, for instance from institutional investors. Recent developments by Powergrid and NHAI, two prominent public sector entities in the renewable energy space planning to monetise assets through Infrastructure Investment Trusts, may also help build momentum in the market (Jai, 2021; Ray, 2021).

Key findings of an OECD 2020 empirical investigation* found that around USD 150 billion of institutional investment in green infrastructure (not exclusively renewable energy assets) globally was already held through yieldcos, highlighting the important role of these securitised products. Further information on the emergence of yieldcos in institutional investor activity can be found in the OECD 2015 report on Mapping Channels to Mobilise Institutional Investment in Sustainable Energy. Additional information will also be included in the OECD 2021 Progress Update on *De-risking Institutional Investment in Green Infrastructure* (June 2021).

* Note: the report focuses on real economy investments, which in consequence exclude most corporate stock holdings as well as corporate bonds.