



Landscape of Green Finance in India

India's green investment flows in FY 2019-20

August 2022



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ABOUT CPI

CPI is an analysis and advisory organization with deep expertise in finance and policy.

Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. CPI has six offices around the world in Brazil, India, Indonesia, the United Kingdom, and the United States.

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RELATED CPI WORKS

[Landscape of Green Finance in India \(2020\)](#)

[Accelerating Green Finance in India: Definitions and Beyond](#)

[Mobilizing Green Finance while Managing Climate Finance Risk in India](#)

[Global Landscape of Climate Finance 2021](#)

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LANDSCAPE OF GREEN FINANCE IN INDIA FISCAL YEARS 2019/2020

India green finance flows along their life cycle in FY 2019-20. Values are average of two year's data, in INR thousand crores.

INR 309 THOUSAND CRORES PER ANNUM

44 BN USD ANNUAL AVERAGE



SOURCES AND INTERMEDIARIES

Which type of organizations are sources or intermediaries of capital for climate finance?

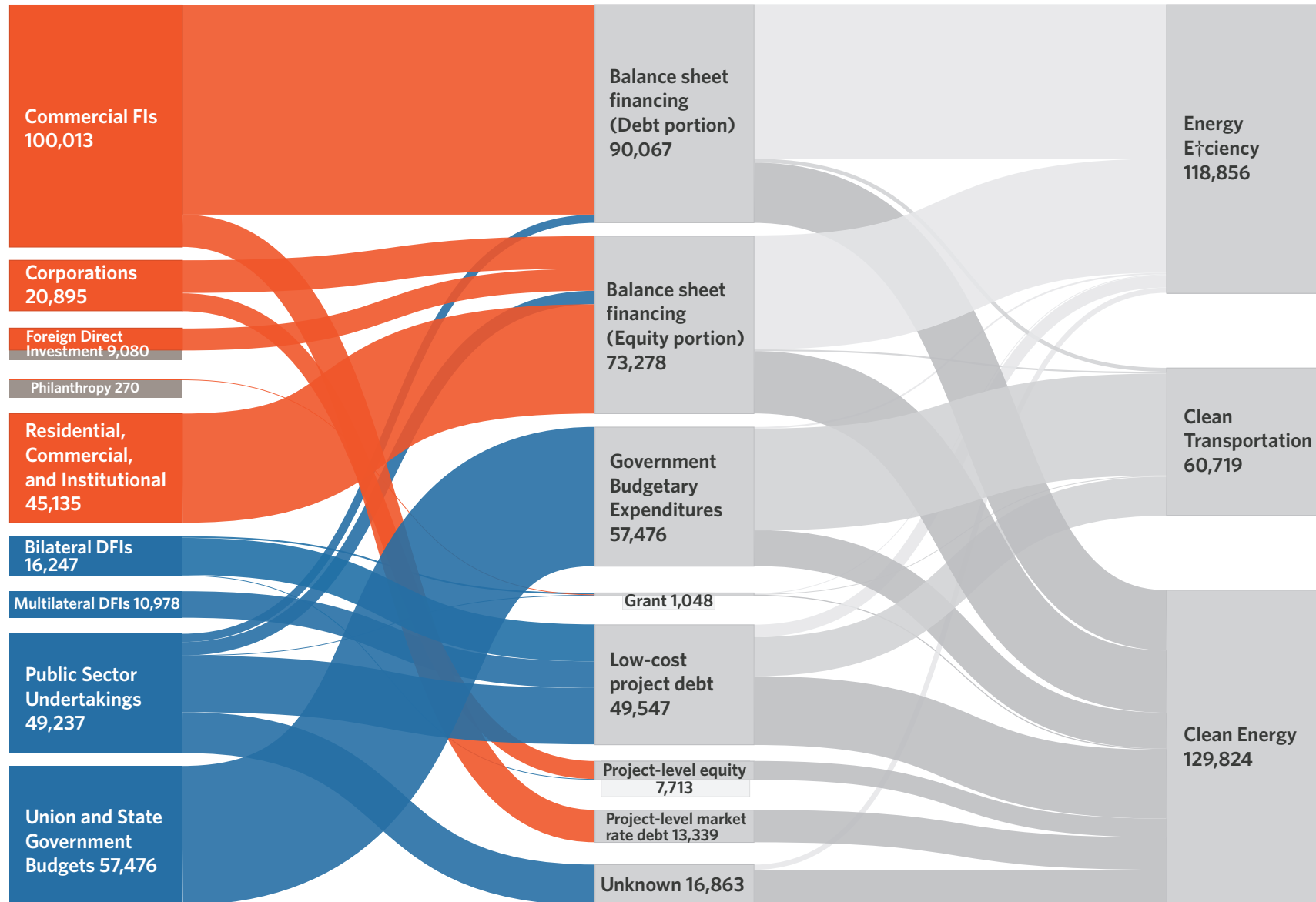
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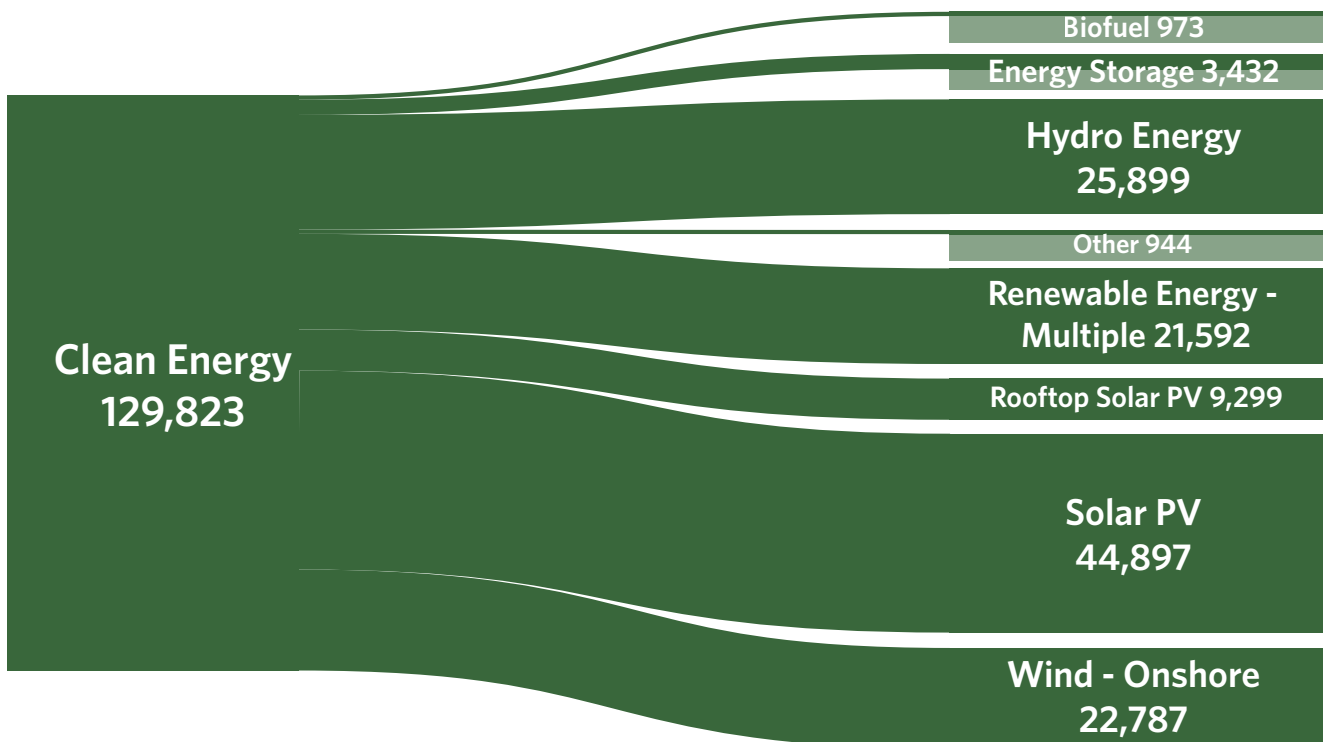
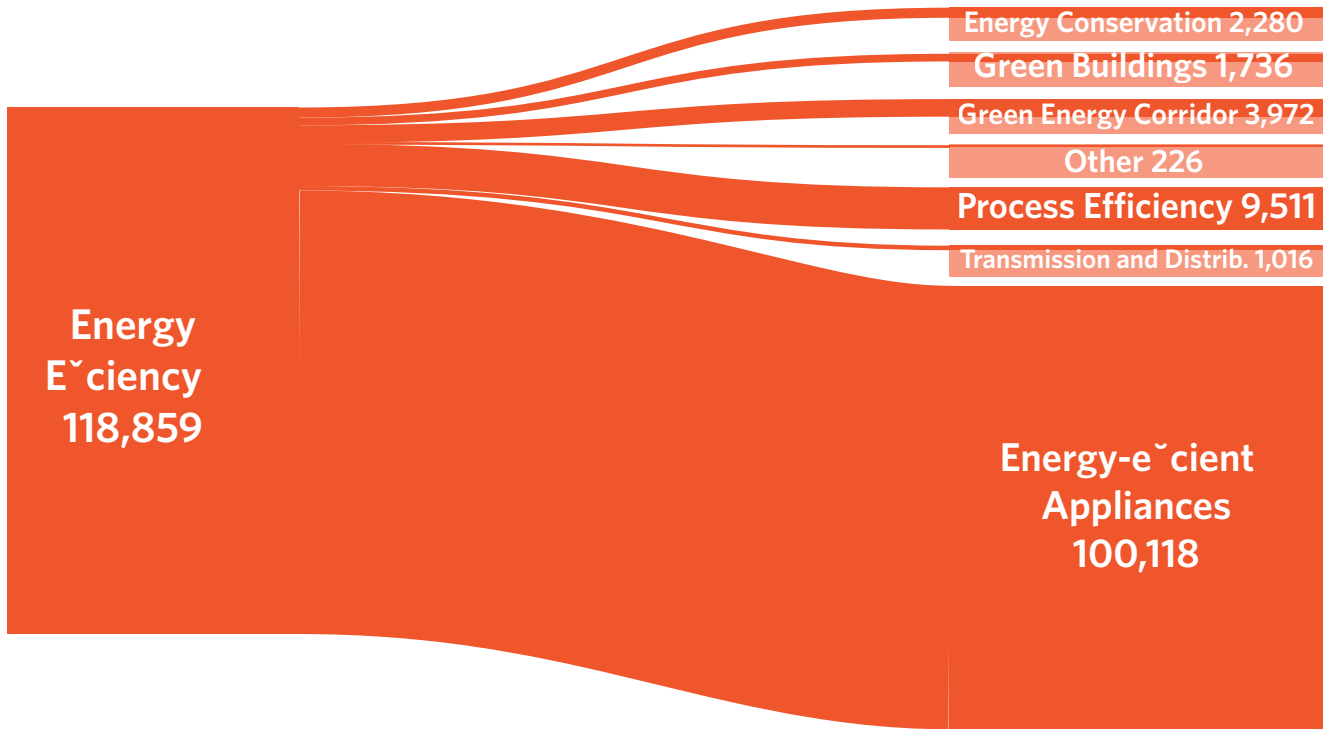
INSTRUMENTS

What mix of financial instruments are used?

SECTORS

What is the finance used for?





EXECUTIVE SUMMARY

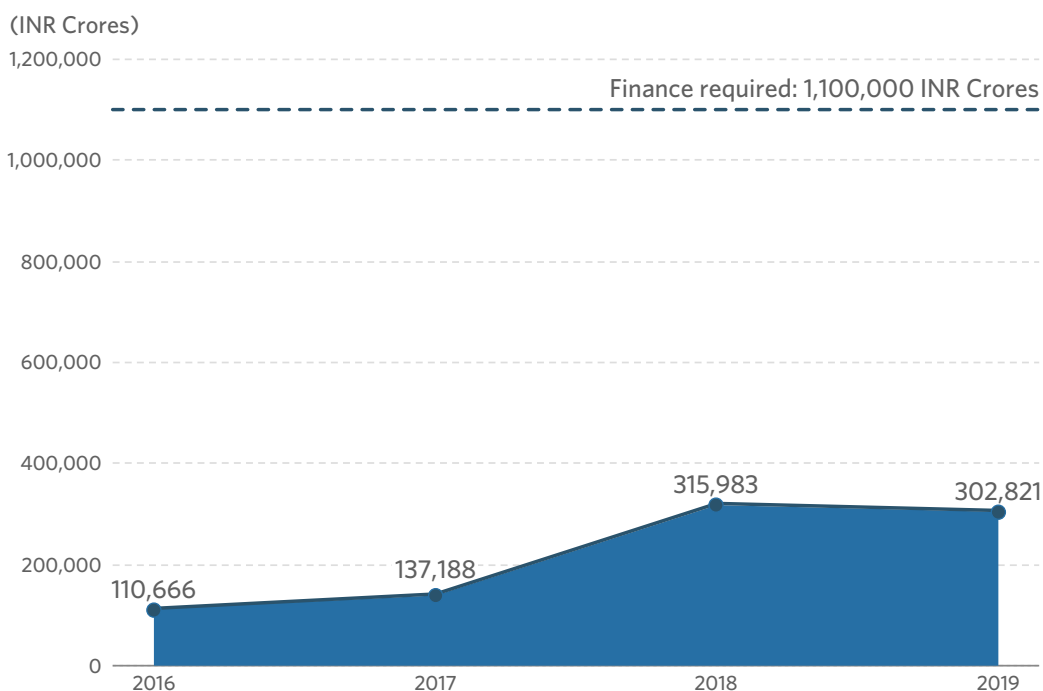
Green finance flows in India are falling far short of the country's current needs. In 2019/2020, tracked green finance was INR 309 thousand crores (~USD 44 billion) per annum, less than a fourth of India's needs.

The Landscape of Green Finance in India evaluates finance flows to key real economy sectors—Clean energy, clean transport, and Energy efficiency. The study tracks both public and private sources of capital-- domestic as well as international— and builds a framework to track the flow of finance right from the source to the end beneficiaries through different instruments. This year, the Landscape also provides a first-of-its kind evaluation of adaptation financing for select sectors.

It is estimated that to achieve India's [Nationally Determined Contributions](#) (NDCs) under the Paris Agreement, the country requires approximately INR 162.5 lakh crores (USD 2.5 trillion) from 2015 to 2030, or roughly INR 11 lakh crores (USD 170 billion) per year. In 2021, India put forth enhanced ambitions on climate action and announced the [Panchamrit targets](#), which include adding 500 GW of non-fossil fuel-based energy capacity and meeting 50% of its energy requirements through non-renewable sources. Such enhanced ambition requires mobilization of green finance at a much faster pace.

In the two years since our initial report, green finance flows increased by 150% from FY2017/ FY2018 to FY2019/FY2020. In the overall increase, public sector flows increased 179% and private sector flows by 130%. This shows increased commitment from public sources – both domestic and international. However, given the level of need and ambition, private sector finance mobilization must significantly outpace public sector finance in the years to come.

Figure 1: Tracked green finance investments and the estimated finance required to meet current NDCs



We must acknowledge that a portion of this increase could be attributed to improved data collection. Improvements in green finance tagging have taken place since our previous report. However, reporting remains anemic, especially in the private sector. This is a significant issue not only in understanding the current level of green finance, but in attracting additional capital; reducing information asymmetry will help uncover opportunities, including attracting capital earmarked for green investment. A concerted effort by public and private sectors is vital to increase the quality and quantity of data that is available online.

DOMESTIC SOURCES OF FINANCE

Domestic sources continue to account for the majority of green finance, with 87% and 83% in FY2019 and FY2020, respectively. Of these domestic sources, the private sector contributed about 59%—INR 156.9 thousand crores (USD 22 billion)¹. Public sector flows were evenly distributed between Government Budgetary spends (Central and State) and PSUs at approximately 54% and 46% respectively.

INTERNATIONAL SOURCES OF FINANCE

The share of international sources increased from 13% in FY 2019 to 17% in FY 2020. Public sources (Official Development Assistance (ODA)² and Other Official Flows (OOF)³) accounted for 60% of international finance over the two-year period. Foreign Direct Investment (FDI) flows increased substantially from FY2016-2018, reaching nearly INR 9 thousand crores (USD 1.2 billion) in FY2020. However, green finance still only accounts for ~3% of total FDI inflows to India⁴.

SECTORS - CLIMATE MITIGATION

The total fund flow towards mitigation was almost equally split between clean energy (42%) and Energy efficiency (38%), and was significantly higher than Clean transport (17%).

The **Clean energy sector** was equally split between public and private sources, with finance flows from PSUs at 35%, followed closely by Commercial FIs at 27%. Domestic inflows (82%) were far greater than international (18%).

Within the Clean energy sector, solar projects received the greatest share of financial investments at INR 54 thousand crores over 2019/2020, accounting for 41% of the total finance flows to the clean energy sector.

Clean transportation received the maximum funding from public sources (96%) amounting to INR 58 thousand crores for FY2019/FY2020. Domestic finance inflows at 72% were far greater than international flows at 27% (of which 99% came from international public sources).

1 Biennial average

2 OECD defines Official development assistance (ODA) as government aid designed to promote the economic development and welfare of developing countries. Source: [s://data.oecd.org/dfi/other-official-flows-oof.htm#:~:text=Other%20official%20flows%20\(OOF\)%20are,development%20assistance%20\(ODA\)%20criteria](https://data.oecd.org/dfi/other-official-flows-oof.htm#:~:text=Other%20official%20flows%20(OOF)%20are,development%20assistance%20(ODA)%20criteria).

3 OECD defines Other official flows (OOF) as official sector transactions that do not meet official development assistance (ODA) criteria.

4 https://dpiit.gov.in/sites/default/files/FDI_Factsheet_March20_28May_2020.pdf

Mass Rapid Transit System (MRTS) accounted for over 87% of the total fund flow to the sector. Despite electric vehicles (EV)s receiving less than 1% of total fund flows to clean transport, FY2020 witnessed an annual increase of 80% to the sub-sector.

Finance inflow to the Energy efficiency sector was primarily from the private sector (91%). Domestic fund inflows at 96% were far greater than international flows at 4%.

While finance flows to the **Energy efficiency sector** increased by 26% from FY2019 to FY2020, fund flows to process efficiency and green buildings decreased in FY2020 by 83% and 81% respectively. These drops may be attributed to changes in design of the scheme run for process efficiency by the Government of India (GoI), the onset of Covid, and variation in the size of projects in the case of green buildings.

CLIMATE ADAPTATION

This report presents a first-of-its-kind analysis of adaptation funding in India. For adaptation sectors,⁵ the total amount of green finance was INR 37 thousand crore (USD 5 billion) per annum over FY2019/FY2020⁶. The major source of adaptation funding was domestic (94%), and it was fully funded by Central and State government Budgets.

CONCLUDING OBSERVATIONS

1. **Green finance flows must increase rapidly to ensure that India meets its Panchamrit targets.**

India needs approximately INR 162.5 lakh crores (USD 2.5 trillion) till 2030 for NDCs and INR 716 lakh crores⁷ (USD 10.1 trillion) to achieve Net-Zero emissions by 2070. By conservative estimates, the current tracked green finance in India represents less than 25% of the total requirement across sectors just to meet the NDCs. This accounts for mitigation only. Adaptation flows are even more muted.

Public finance has played a major role in increasing green finance flows, but more involvement of the private sector is required.

To achieve this, public finance must increasingly play a role in mobilizing private finance. International finance—through DFIs, philanthropy, and others—also needs to play a bigger role in directly supporting India’s green transition and in mobilizing private finance. Further, while overall finance flows to mitigation sectors have increased, the majority of the flows remain concentrated in select sectors that have more market maturity. Additional policy support and investment mobilization are required to mobilize earlier-maturity sectors such as decentralized energy sources and EVs.

⁵ Includes only some specific sectors within adaptation. These numbers are not represented in the overall Sankey diagram.

⁶ Biennial Average

⁷ Exchange rate of INR 70.90 to 1 USD taken as given by RBI for FY2020

2. **A strong policy environment is critical to enabling green finance at scale.**

Green finance investments appear to be responding to the policy environment, with the Government making efforts to strengthen the green investment framework and green investment promotion.

For further impact, several policy considerations should be considered as key levers, including:

- A green taxonomy
- An integrated domestic Measurement, Reporting and Verification (MRV) system
- Coordinated policy interventions that target improving technology, and mainstreaming supply chains to accelerate investment and adoption in priority sectors that are lagging— such as electric vehicles and decentralized energy sources.

3. **Coordinated efforts across data collection, reporting and access will increase green finance flows.**

Reliable data is necessary to increase green investments. This may be achieved by furthering disclosure requirements and improving access to data, thereby reducing information asymmetry. Increasing the quantity and availability of green finance data will help uncover opportunities as well as attract capital earmarked for green investment.

4. **Accelerating financial flows towards adaptation is critical.**

India is one of the most vulnerable countries to climate change, and there is a pressing need for funds to flow into the adaptation sector. Tracked finance for the sector stood at INR 37 thousand crores (USD 5 Billion) in FY 2020, which was severely short of the required needs. Collaboration and planning are key to increasing finance flows to the sector, as is the development of adaptation investment plans at state level.

1. INTRODUCTION

In 2020, Climate Policy Initiative (CPI) undertook a first-of-its-kind study to track green finance investments in India for FY2017 and FY2018. This report covers FY2019 and FY2020, and goes beyond the last report in the following ways:

- The scope is expanded to include finance for adaptation⁸
- Improve upon the previous methodology
- Outline existing data gaps that hinder accurate and updated measurement of green finance
- Presents a set of recommendations for fast tracking the mobilization of green finance.

1.1 RATIONALE AND OBJECTIVE

India needs sufficient, timely, and directed investments to achieve its Nationally Determined Contributions (NDCs). By 2030, India has⁹ committed to reduce the emissions intensity of its GDP by 33-35% below 2005 levels; achieve 40% of cumulative electric power installed capacity from non-fossil fuel sources; and enhance forest and tree cover to create an additional carbon sink equivalent of 2.5-3 billion tons of carbon dioxide.

While India has made progress towards these targets, much more needs to be done. Given the urgency, Prime Minister Narendra Modi presented 'five nectar elements', or Panchamrit, at the COP26 Summit in Glasgow, as India's additional contribution to climate action. These are:

By the year 2030, India will:

1. scale up its non-fossil energy capacity to 500 GW
2. meet 50% of its energy requirements from renewable energy
3. reduce the total projected carbon emissions by one billion tons from now
4. reduce the carbon intensity of its economy by more than 45%
5. India will achieve the target of Net-Zero by 2070

India's NDCs estimate that the country will require ~INR 162.5 lakh crores (USD 2.5 trillion) from 2015 - 2030, or roughly INR 11 lakh crores (USD 170 billion) per year for climate action (UNFCCC, 2015). India would need cumulative investments of INR 716 lakh crores¹⁰ (USD 10.1 trillion) to significantly scale up the climate transition and achieve Net-Zero emissions by 2070 (CEEW, 2021).

⁸ This is still in early stages and is not tracked comprehensively in this report

⁹ The current NDCs are yet to be submitted

¹⁰ Exchange rate of INR 70.90 to 1 USD taken as given by RBI for FY2020

Careful estimation of possible sources of finance is a prerequisite for India to achieve its climate targets. Measuring green finance flows plays a significant role in identifying the right providers of capital; help regulators and policymakers understand the impact of policy measures in promoting Climate mitigation and adaptation; help private investors, both domestic and international, find avenues for green investments, or fulfill their 'net-zero' targets by better understanding the trends in India's climate action. It can serve as a tool, under the Katowice climate package and enhanced transparency framework, to track progress in achieving India's climate targets. Lastly, it can also serve as a basis for cross-sectoral, inter-governmental, and Government-donor discussions on resource mobilization for climate action.

We believe tracking the lifecycle of green investments in India will lead to:

- **Increased accountability**
- **More efficient alignment of spending with climate objectives**
- **More accurate tracking of progress made in implementing and achieving NDCs and Panchamrit targets**
- **Mobilization of new resources, identifying new opportunities to step up climate expenditure**
- **Building trust with national and international investors by effective, comprehensive, and nation-wide reporting**
- **Understanding how broader economic factors affect green investments, both positively and negatively, to make a strong case for increased green investment**

1.2 SCOPE

This study aims to collect actual spending and investment data from Union and State Budgets; national and international development finance institutions; corporates, residential, commercial, and institutional stakeholders; and public sector undertakings over two years—2019-2020. It establishes a trail of fund flow from sources and intermediaries, through different financial instruments, to sectors and sub-sectors.

Effectively, this study includes mitigation finance flows for three sectors¹¹ – clean energy, energy efficiency, and clean transportation. Data mapping is done retrospectively¹² in order to capture more comprehensive data on actual disbursements, as opposed to commitments. Along with mitigation, this year's report also includes a first-of-its-kind analysis of fund flows to adaptation.

While this report presents the most comprehensive information available, methodological issues and data limitations persist. Tracking green finance faces multiple issues related to the availability, quality, and robustness of investment data on both public and private sectors (detailed in section 4).

¹¹ Mitigation sectors, as defined by [Green Climate Fund](#), are a) Energy generation and access, b) Transport, c) Buildings, cities, industries, and appliances, and d) Forests and Land Use. For the purpose of the study we have focused on the first three sectors and have not included Forests and Land Use in our study,

¹² The data collection has been done in FY2021 and FY2022 for FY2019 and FY2020. This has been done to ensure that the latest and most accurate data points are collected. In-depth explanation on data collection is present in the Methodology Document.

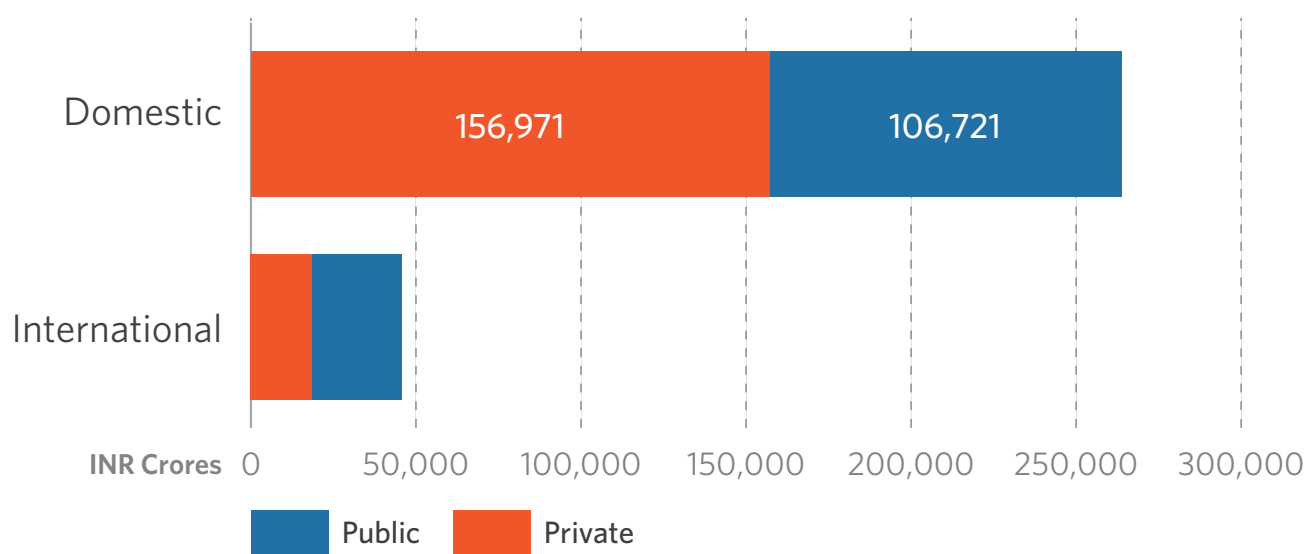
2. FINDINGS

Green finance flows¹³ in India total INR 309 thousand crores per annum (USD 44 billion) for FY2019/FY2020. This shows an overall increase of INR 185 thousand crores (USD 25 billion) per annum from FY2017/FY2018. The increase is attributable not only to the growth of financial flows but also to increased sectoral coverage both in terms of number of sectors as well as the depth of the sectors¹⁴. The increase in sectoral coverage not only allowed for better tracking by including more granular sources but also provided a more in-depth understanding of the reasons behind the flows.

2.1 SOURCES

For FY2019 and FY2020, the total finance raised was INR 309 thousand crore (USD 44 billion). Enabling policies and environment helped raise ~85% of this finance amounting to INR 263 thousand crore (USD 37 billion) per annum¹⁵ domestically. The share of domestic players remains consistent, at approximately 85%, over four years (FY2017 to FY2020). **It is interesting to note that while domestic flows — and hence overall flows — to green finance in India decreased from FY2019 to FY2020 by 4%, there was an increase in flows from international sources of ~27%.** This may be attributed to an increase of 146% in the flows from commercial FIs and an increase of ~27% in flows from Bilateral DFIs from FY2019 to FY2020. The increase was mainly in finance flows to clean energy and clean transportation sectors.

Figure 2: Green Finance by Sources (INR thousand crores)



¹³ Throughout the report, unless otherwise stated the numbers and figures are for mitigation only. The Sankey diagram is also for flows towards climate mitigation. Numbers for climate adaptation are discussed in section 2.4.

¹⁴ Please refer to the methodology document for details

¹⁵ While we recognize that certain percentage of the domestic financing may have originated internationally via External Commercial Borrowings and Non-sovereign debt, lack of any data on the subject has necessitated the classification as such. Refer to the methodology for details.

Figure 3: Green Finance by Domestic Sources (INR thousand crores)

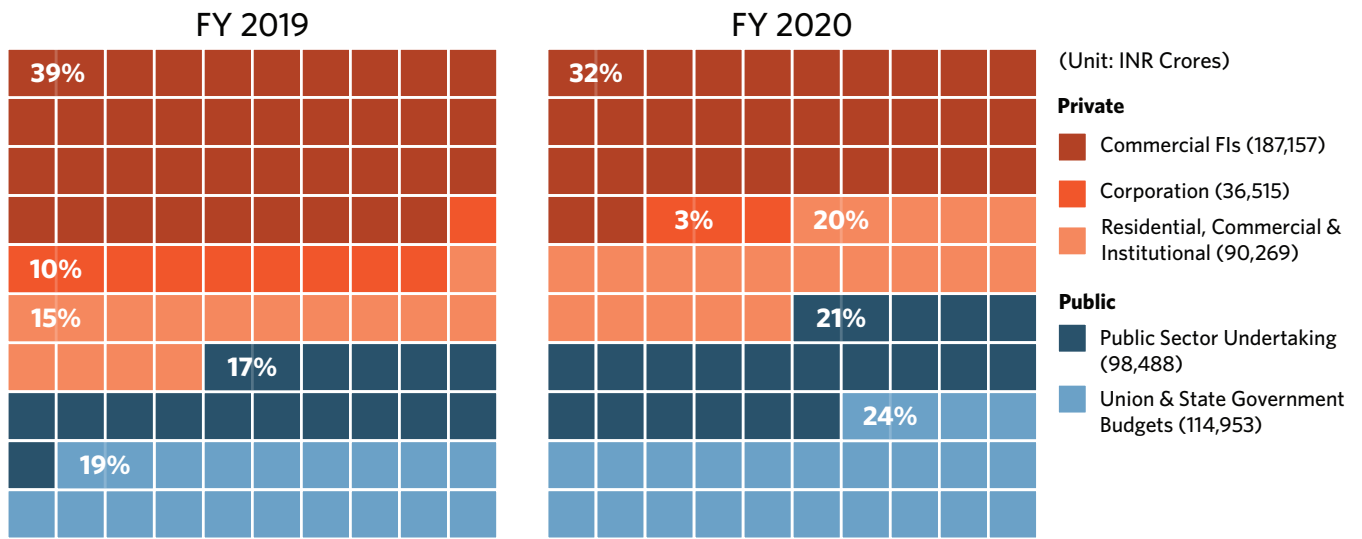
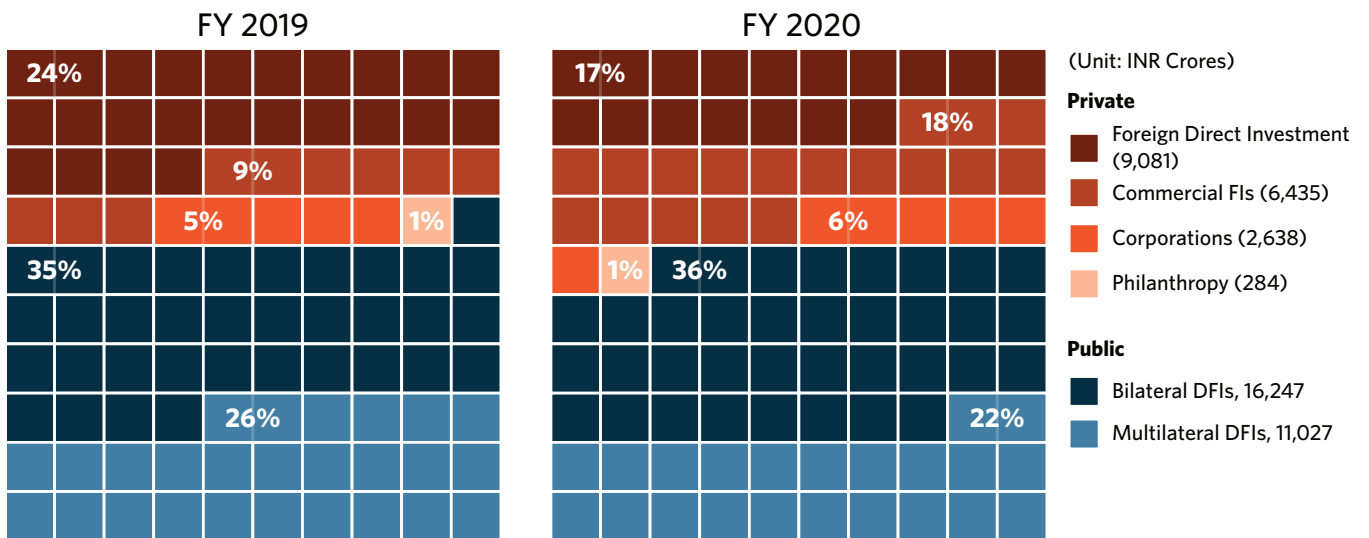


Figure 4: Green Finance by International Sources (INR thousand crores)



2.1.1 DOMESTIC SOURCES OF FINANCE

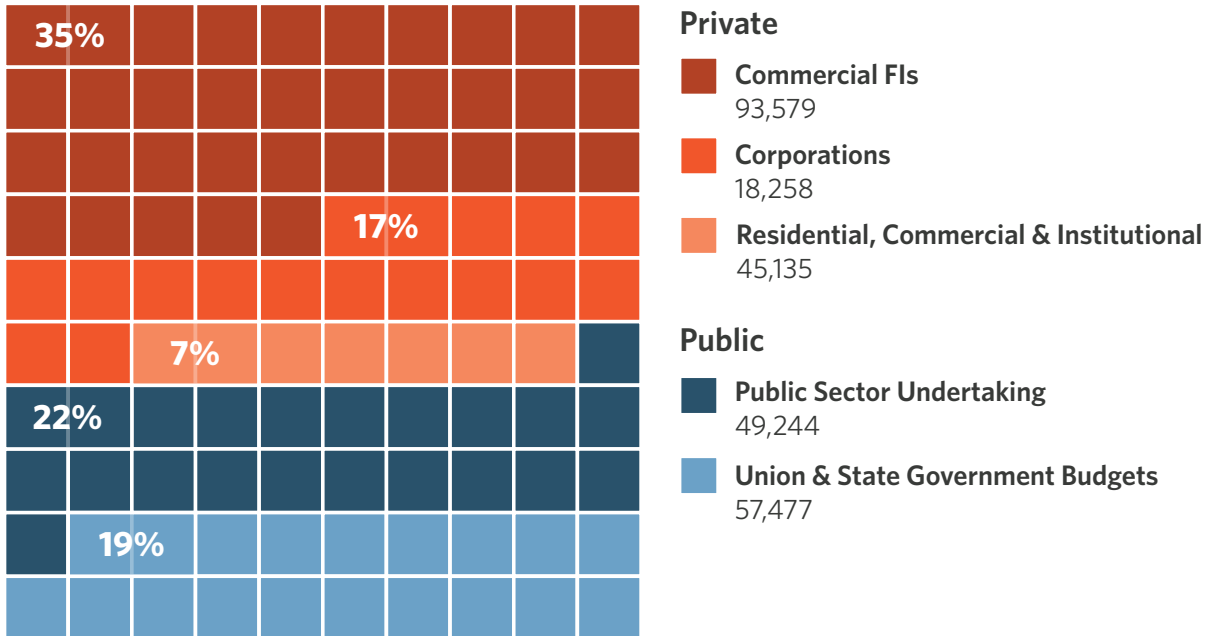
In FY2019 and FY2020, a major part of finance was raised domestically with domestic sources of finance accounting for 87% and 83% of total flows respectively, indicating a strong domestic preference of investors.

Private finance sources contributed 60% (INR 156.9 thousand crores or USD 22 billion) of the total domestic sources in FY2019/FY2020¹⁶. While private finance sources dominated overall domestic finance, public finance actors contributed the majority share in the clean

16 Biennial average

transport segment. We expect this to change in the coming years with an increasing focus on the adoption of electric vehicles in India, where the private sector can play a pivotal role.

Figure 5: Domestic green finance by public and private sources (INR thousand crores)



Domestic finance flows were evenly distributed between clean energy (40%) and energy efficiency (43%) sectors.

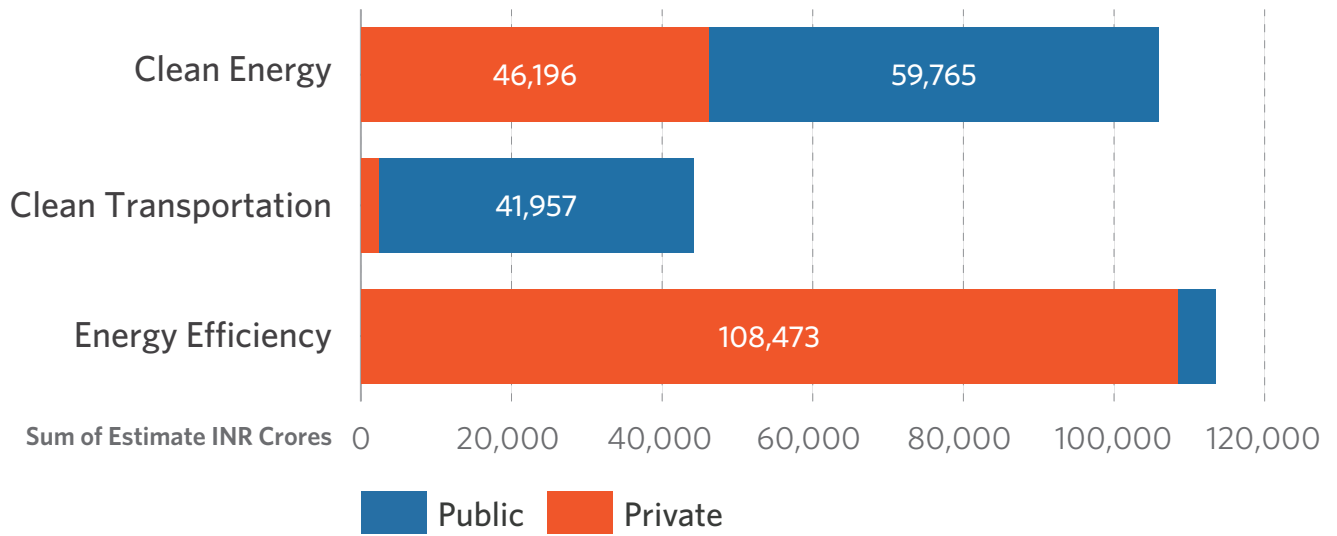
Public sector outflows were evenly distributed between Government Budgetary spends (both Central and State Budgets) and PSUs at ~54% and ~46% for FY2019 and FY2020 respectively.

Importance of public sector undertakings in India’s green journey

Public Sector Undertakings (PSUs) are companies and other bodies in which Government of India or State Governments have either a controlling or a financial interest. The aim behind setting up of these companies is to ensure self-reliant economic growth.

PSUs are important channels for the disbursement of funds by the Central and State governments, bond markets, and international development agencies. They are critical sources of green finance themselves. Therefore, to avoid double counting, this study only tracks the actual annual expenditures reported by the PSUs in their annual financial statements.

Figure 6: Domestic green finance flows to mitigation sectors (INR thousand crores)

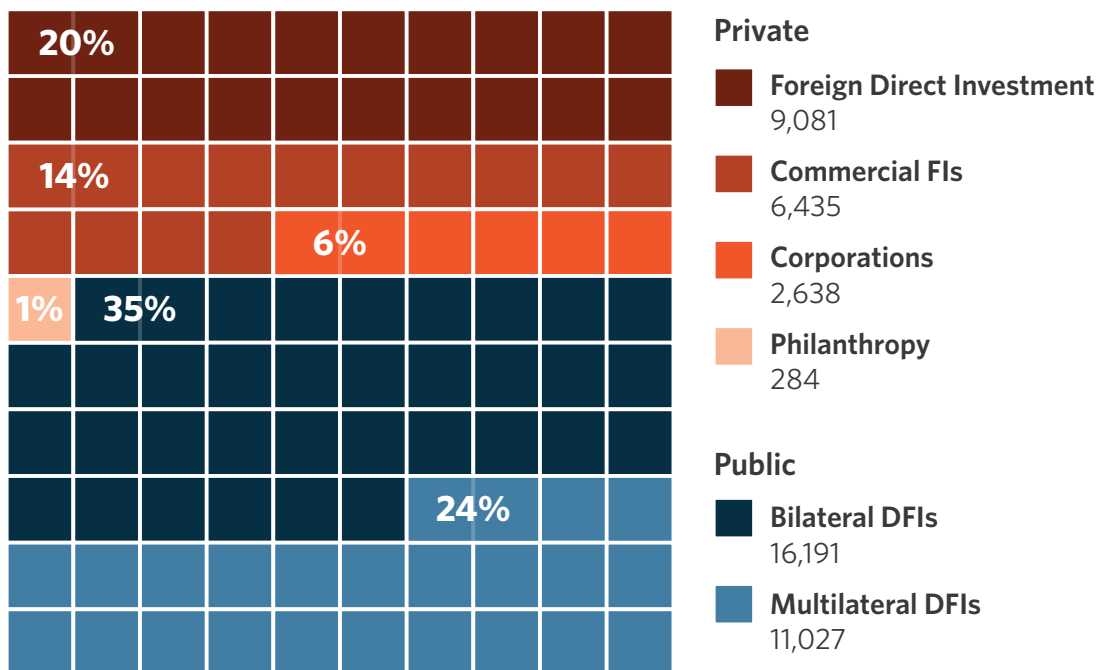


2.1.2 INTERNATIONAL SOURCES OF FINANCE

Despite the overall decrease in financial flows by 4%, flows from international sources increased, showing greater confidence in India’s path towards meeting its NDCs.

The share of international finance increased from 13% in FY2019 to 17% in FY2020. Public flows (ODA¹⁷ and OOF¹⁸) were higher than private flows (60% and 40% respectively) over the two years.

Figure 7: International green finance by public and private sources (INR thousand crores)

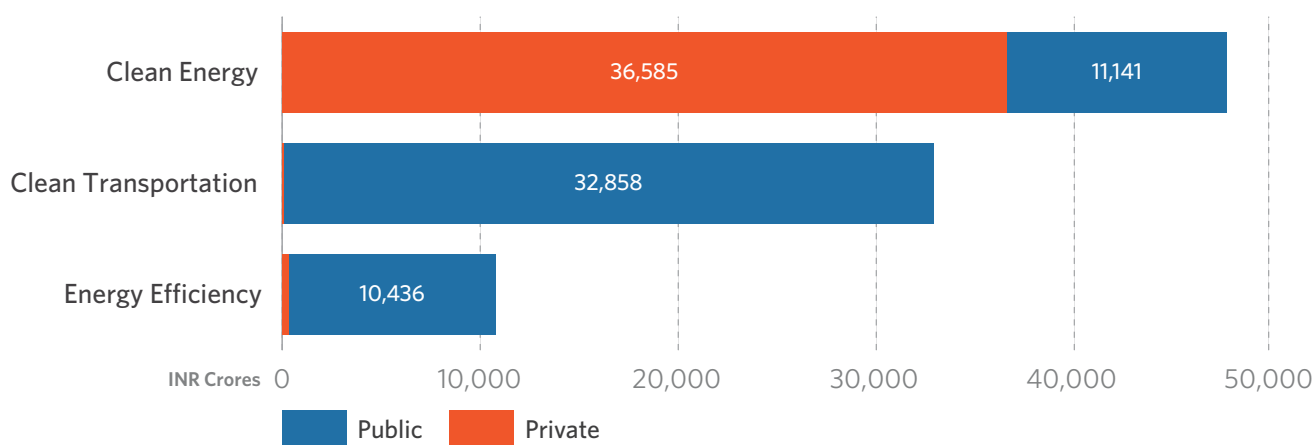


¹⁷ OECD defines Official development assistance (ODA) as government aid designed to promote the economic development and welfare of developing countries. Source: [s://data.oecd.org/dfi/other-official-flows-oof.htm#:~:text=Other%20official%20flows%20\(OOF\)%20are,development%20assistance%20\(ODA\)%20criteria](https://data.oecd.org/dfi/other-official-flows-oof.htm#:~:text=Other%20official%20flows%20(OOF)%20are,development%20assistance%20(ODA)%20criteria).

¹⁸ OECD defines Other official flows (OOF) as official sector transactions that do not meet official development assistance (ODA) criteria.

As with previous years, clean energy was the highest-funded sector overall by international funders, accounting for 54% of total international financial flows. Clean transport accounted for 52% of total international public funding, its rise of over 300% from previous years attributed to the increase in public expenditure on Mass Rapid Transport System (MRTS), as well as the increased coverage of tracked sub-sectors in our analysis. As with domestic finance flows, international public sector funding of clean transport was higher than that of private. However, the difference was substantial here, with over 99% of the funding for clean transport coming from public sector.

Figure 8: International green finance flows to mitigation sectors (INR thousand crores)



FDI flows¹⁹ increased substantially, to ~INR 9 thousand crores (USD 1.2 billion) in FY2020. However, it only accounts for ~3% of total FDI inflows during FY2020²⁰. This trend was true for both FY2019 and FY2020. Over 98% of FDI inflows were to the clean energy sector, with over 50% in Solar.

2.2 INSTRUMENTS

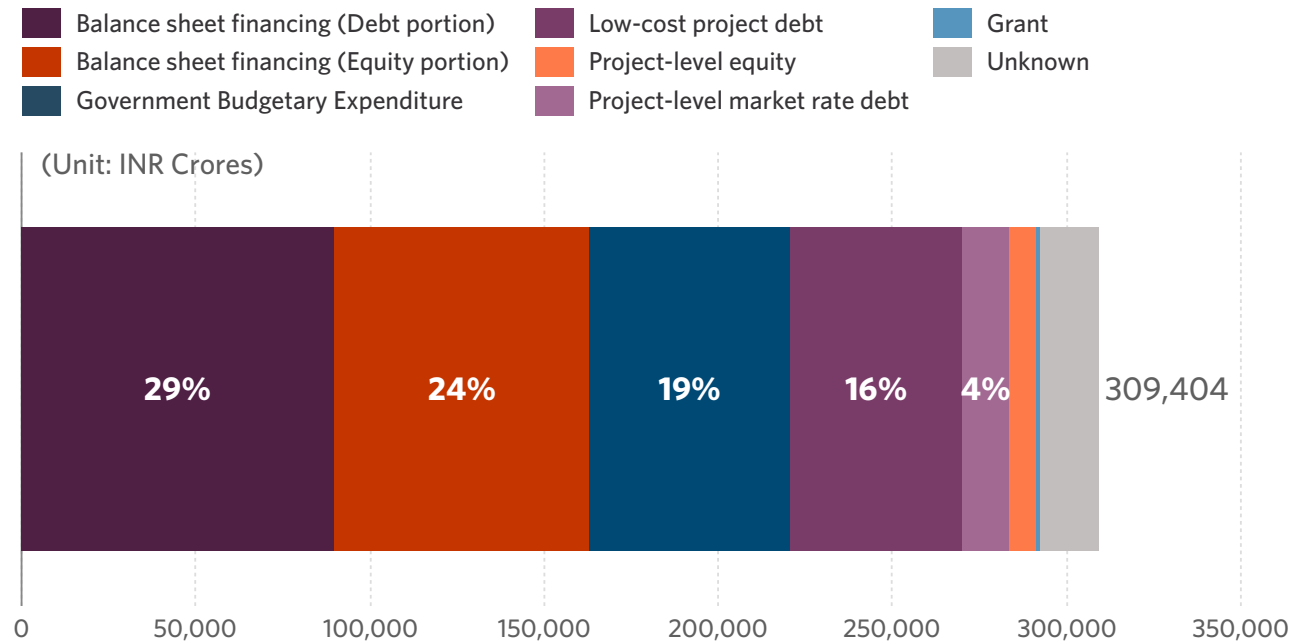
Debt, through project or corporate finance, was the largest financial instrument used to channel green finance, at an average of INR 152 thousand crores (USD 43 billion) per year during FY2019 and FY2020. It accounted for 49% of the total tracked green finance, indicating confidence in lenders on the projects being implemented.

Debt (including balance sheet financing, low-cost debt, and project finance debt) accounted for about 50% of the total finance flows; equity for roughly 26%, and Government and Budgetary expenditure at about 19%. Apart from direct Budgetary spends, the Government also invested through PSUs. The PSUs invested in projects through grants, debt, and equity, with debt being the highest at 50%.

¹⁹ All double counting issues were addressed manually during data filtration

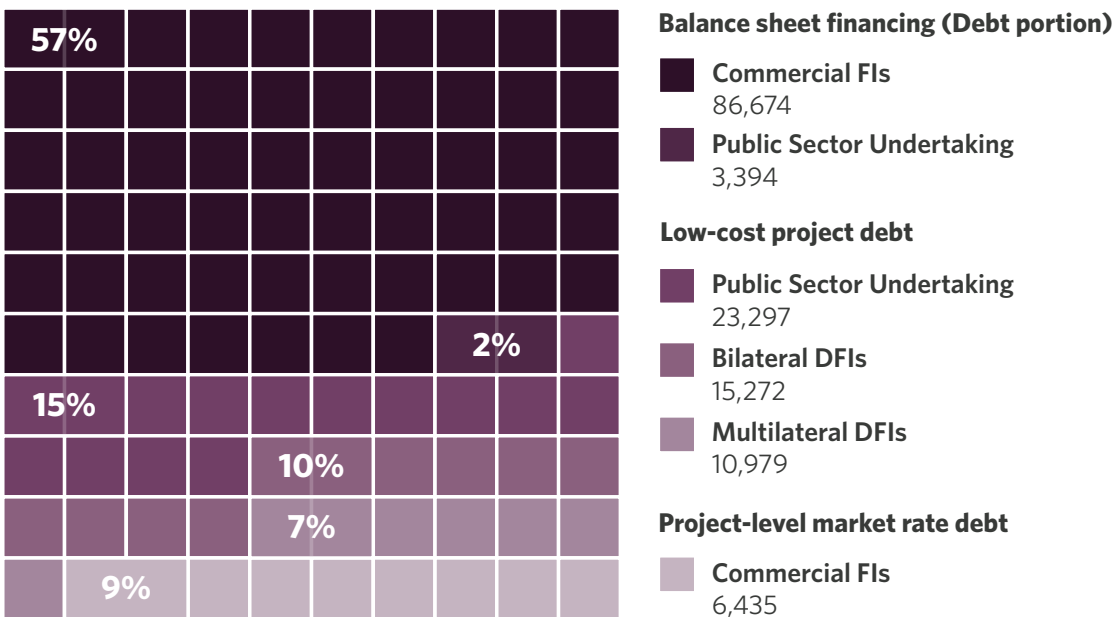
²⁰ https://dpiit.gov.in/sites/default/files/FDI_Factsheet_March20_28May_2020.pdf

Figure 9: Green finance flows by instrument (INR thousand crores)



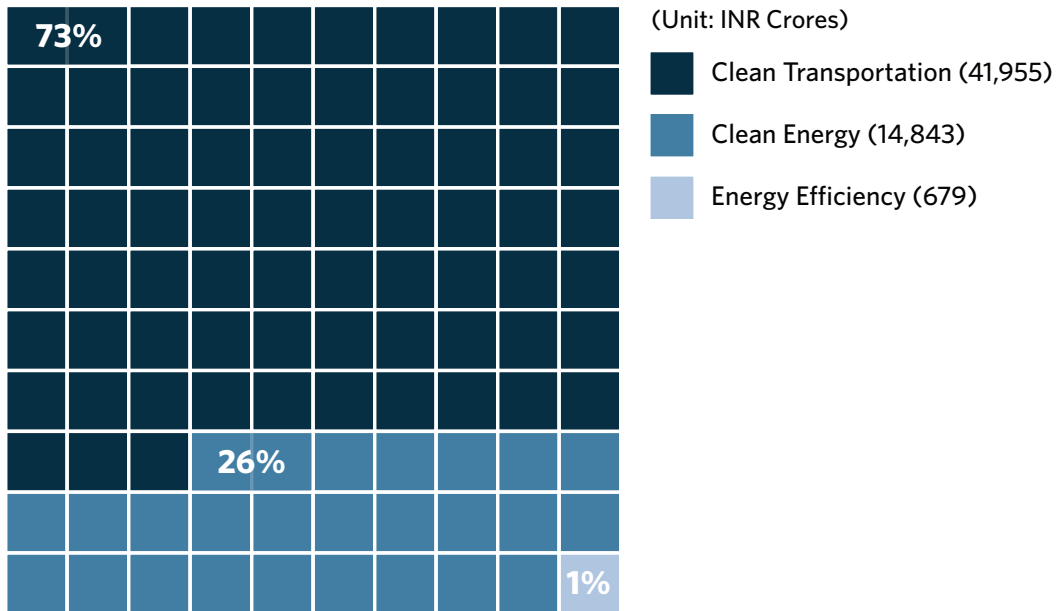
While debt via project funding or through balance sheet funding was primarily by domestic corporate FIs (96%), low-cost debt was almost evenly split between domestic PSUs and international DFIs (both bilateral and multilateral) at 47% and 52% respectively. Overall, contribution by commercial FIs, DFIs, and PSUs stood at approximately 65%, 17%, and 17% respectively.

Figure 10: Finance flows via debt instruments (INR thousand crores)



Government Budgetary expenditure was predominantly in the clean transport sector accounting for 73% of flows over FY2019 and FY2020. Clean energy accounted for 25% of the total Government and Budgetary expenditure. As anticipated, MRTS saw inflows of 99% (of flows to the clean transport sector), or 72% of total Government and Budgetary outflows over FY2019 and FY2020.

Figure 11: Government Budgetary Expenditure across mitigation sectors (INR thousand crores)



Meeting investment goals requires recycling of capital

Given the quantum of investment required and the limited time in hand, catalyzing capital markets is essential. A 2019 CPI study, *From Banks to Capital Markets: Alternative Investment Funds as a Potential Pathway for Refinancing Clean Energy Debt in India* proposes pathways to shift project debt to capital markets through:

1. Securitization of a diversified loan portfolio by financial institutions
2. Developers raising capital directly from the market, and using the proceeds to retire existing loans

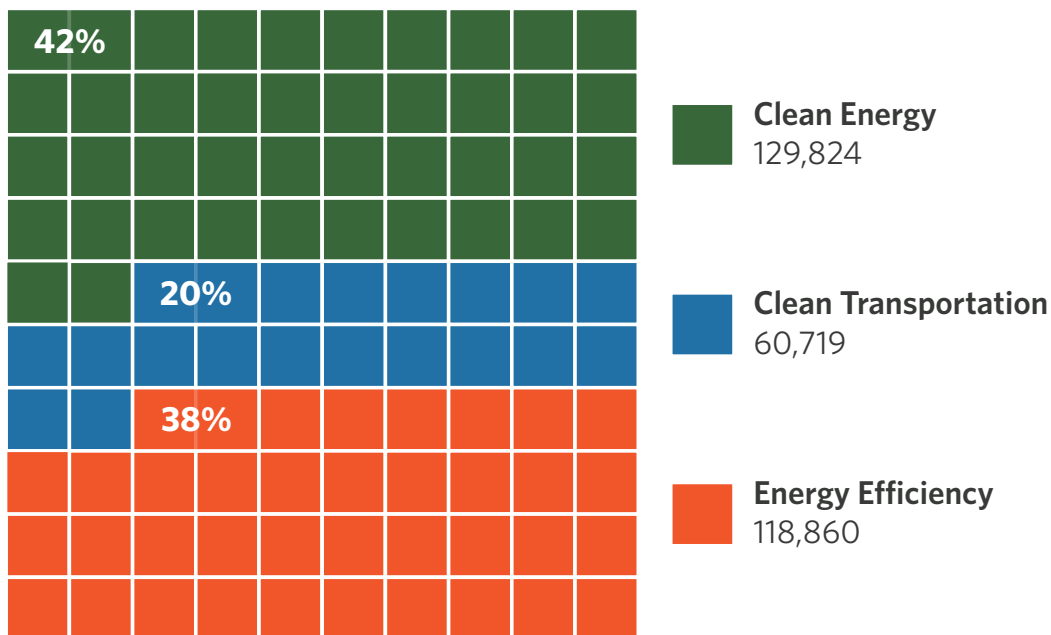
Given the depth and breadth of capital markets in India, there are numerous specific opportunities through which the bond market could be scaled. Introduction of new products, development of risk-transfer mechanisms, and identifying innovative solutions to de-risking are some examples.

2.3 CLIMATE MITIGATION

Fund flows towards mitigation were sector focused, as evidenced in greater flows to energy-efficient appliances (32% of total flows to mitigation), solar (18%) – both PV and rooftop, and MRTS (17%).

The total fund flow towards mitigation was channeled into clean energy, clean transportation, and energy efficiency²¹. Overall, the fund flow was almost equally split between clean energy (42%) and Energy efficiency (38%). While Clean transportation had the lowest amount overall, it was the only segment to witness an increase in financial flows (35%) from FY2019 to FY2020.

Figure 12: Green finance flows to sectors (INR thousand crores)



2.3.1 CLEAN ENERGY

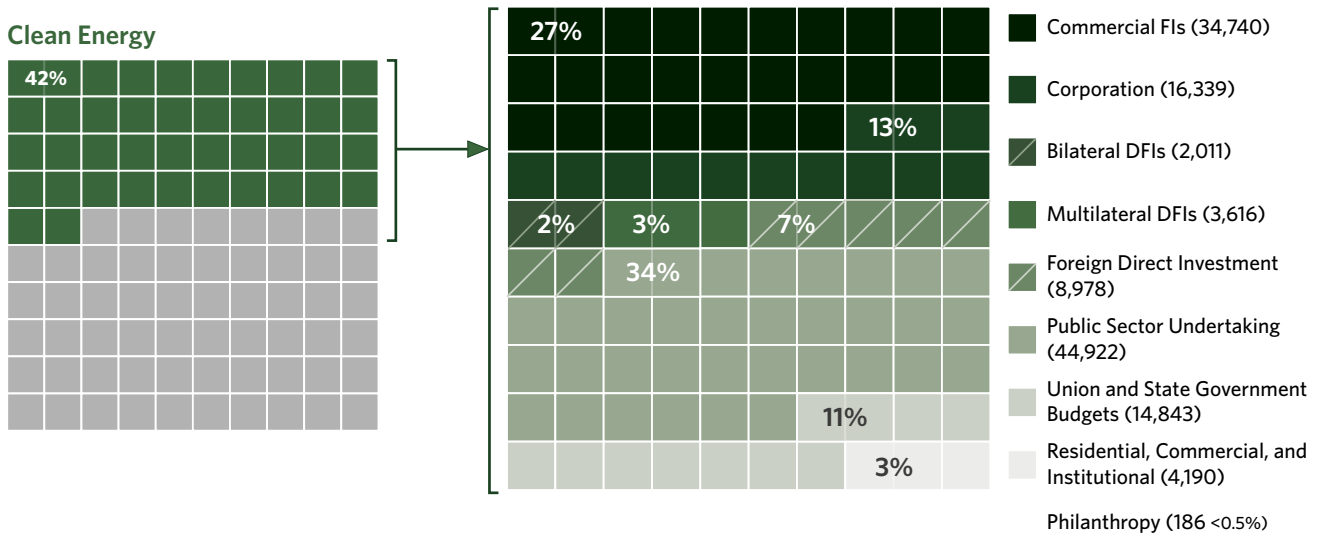
Renewable energy continues to play a pivotal role in India's green growth targets. According to a study (IFC, 2017), India will need INR 3,360 thousand crores (USD 450 billion) to finance its 2030 Clean energy targets. Of this, debt funding requirements²² translate to roughly INR 235 thousand crores (USD 31 billion) annually. Even with higher fund inflows, the sector holds great potential for further inflows in order to meet the 2030 Clean energy targets, given the current finance flow level of INR 66 thousand crores (USD 9 billion) annually.

Inflow of funds towards **clean energy sector** was highest from PSUs, at 34%, followed closely by Commercial FIs with a contribution of nearly 27%. Inflows from domestic sector players (82%) were far higher than that of international sector players (18%).

²¹ Mitigation sectors, as defined by Green Climate Fund, are a) Energy generation and access, b) Transport, c) Buildings, cities, industries, and appliances, and d) Forests and Land Use. For the purpose of the study we have focused on the first three sectors and have not included Forests and Land Use in our study.

²² Assuming a typical gearing ratio of 0.7 (70-30 split between debt and equity)

Figure 13: Energy finance by source (INR thousand crores)



Within the sector, solar projects - including rooftop (INR 9 thousand crores or USD 1 billion) - received the highest share of financial investments over FY2019- FY2020, accounting for 41% of the total fund flows to clean energy sector. The projects were primarily funded at the company level (balance sheet financing) with a nearly equal balance between debt (45%) and equity (55%). However, debt (56%) was the predominant instrument used for funding the overall Solar sector (including rooftop solar).

Figure 14: Finance flows to clean energy sector (INR thousand crores)

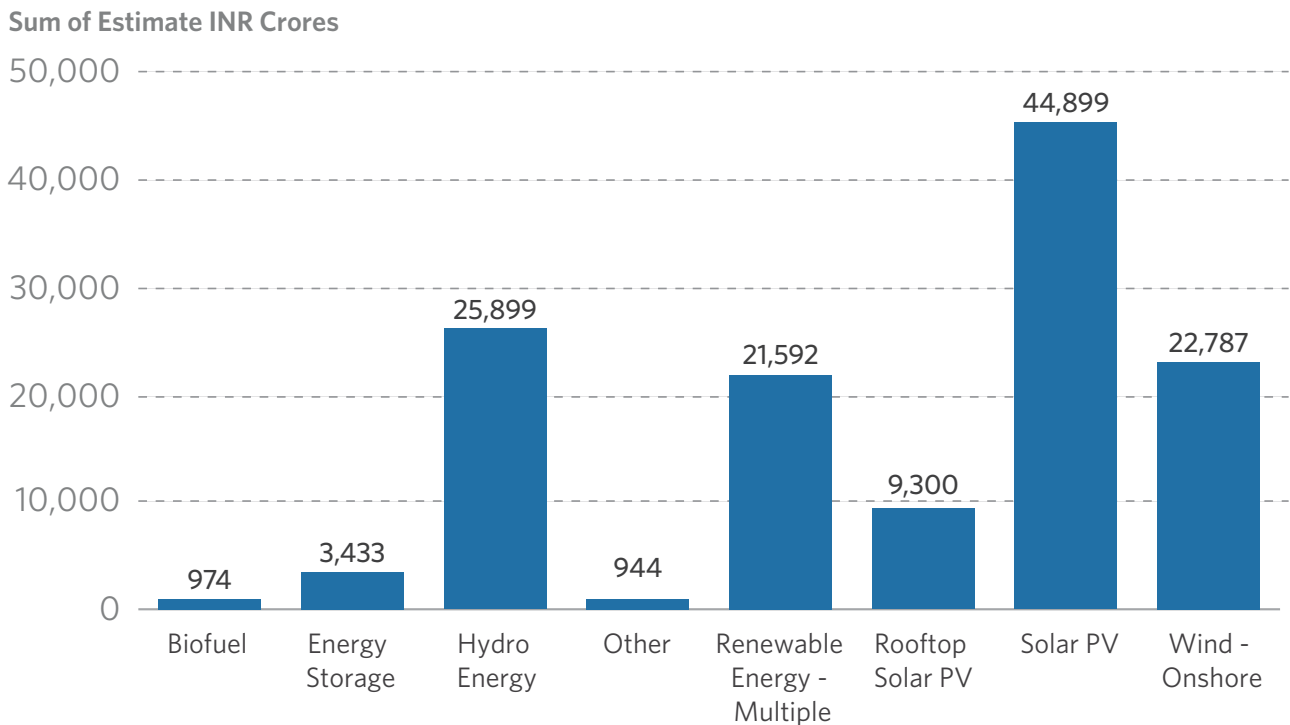
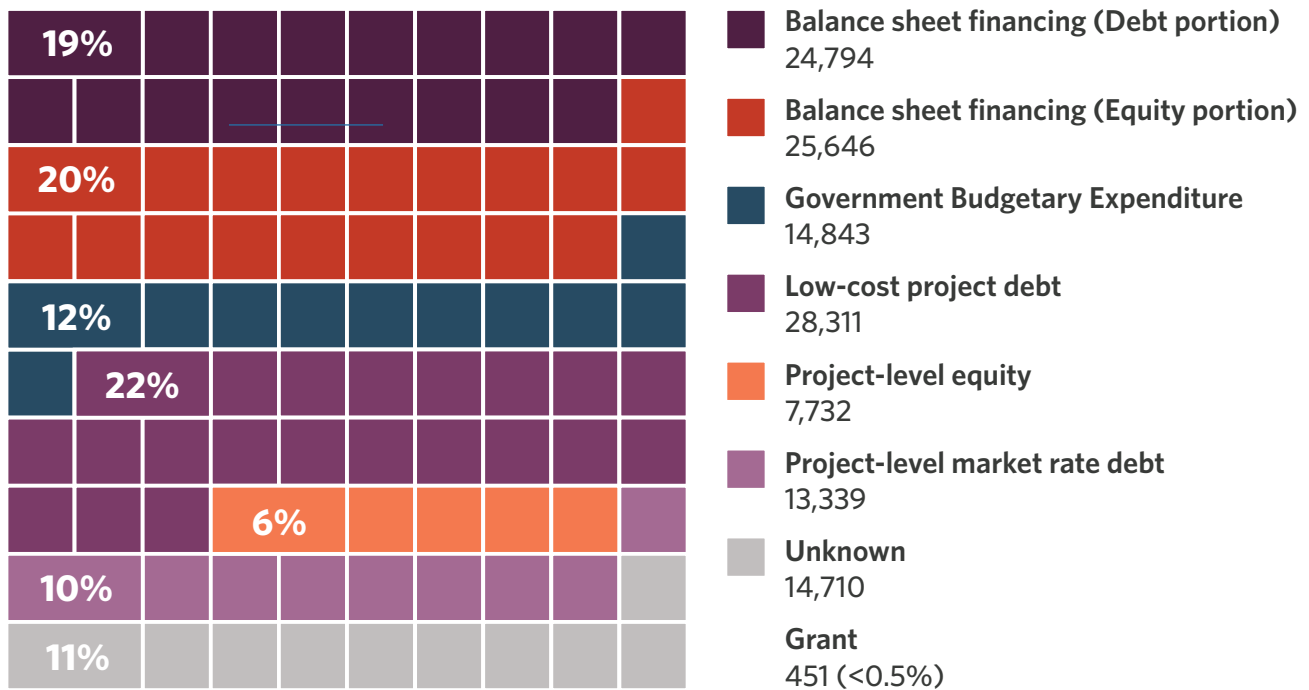


Figure 15: Clean energy funding sources (INR thousand crores)

ENERGY FINANCE DIRECTION

In 2020 (IRENA 2021b), the global average levelized cost of electricity of newly commissioned onshore wind projects declined by 13%, compared with 2019, followed by offshore wind (down 9%) and utility-scale solar PV (down by 7%). For India, the net capacity change in 2020 (in MW) was the highest for Solar (4122), followed by Wind (1053), Hydro (477), and Bioenergy (307)²³.

The increase in renewable energy was fueled by decreasing tariffs. Tariffs reached a record low in 2017 at INR 2.44 per kWh (USD 0.04) for utility-scale Solar and INR 2.43 per kWh (USD 0.04) for Wind energy generation (Press Information Bureau 2017, Government of India; Press Information Bureau, Government of India 2018b). For continued growth in the Renewable Energy sector, reduction in Levelized Cost of Energy (LCOE) is highly desirable. In the past (pre-2017), decrease in LCOE was witnessed as a combination of decreasing finance costs and decrease in module prices. However, with module prices reaching low levels, there is limited scope for reduction in unit module prices in absolute terms²⁴. So, for continued competitiveness, low financing costs are not only desirable but also required. For this to happen, policy interventions are required²⁵ to either de-risk the Renewable Energy sector or increase focus on de-risking financial instruments.

23 IRENA. Energy Profile: India. Available at: https://www.irena.org/IRENADocuments/Statistical_Profiles/Asia/India_Asia_RE_SP.pdf

24 Chawla, K., M. Aggarwal, and A. Dutt. 2020. Analyzing the Falling Solar and Wind Tariffs: Evidence from India. ADBI Working Paper 1078. Tokyo: Asian Development Bank Institute.

Available: <https://www.adb.org/publications/analyzing-falling-solar-wind-tariffs-evidence-india>

25 Ibid.

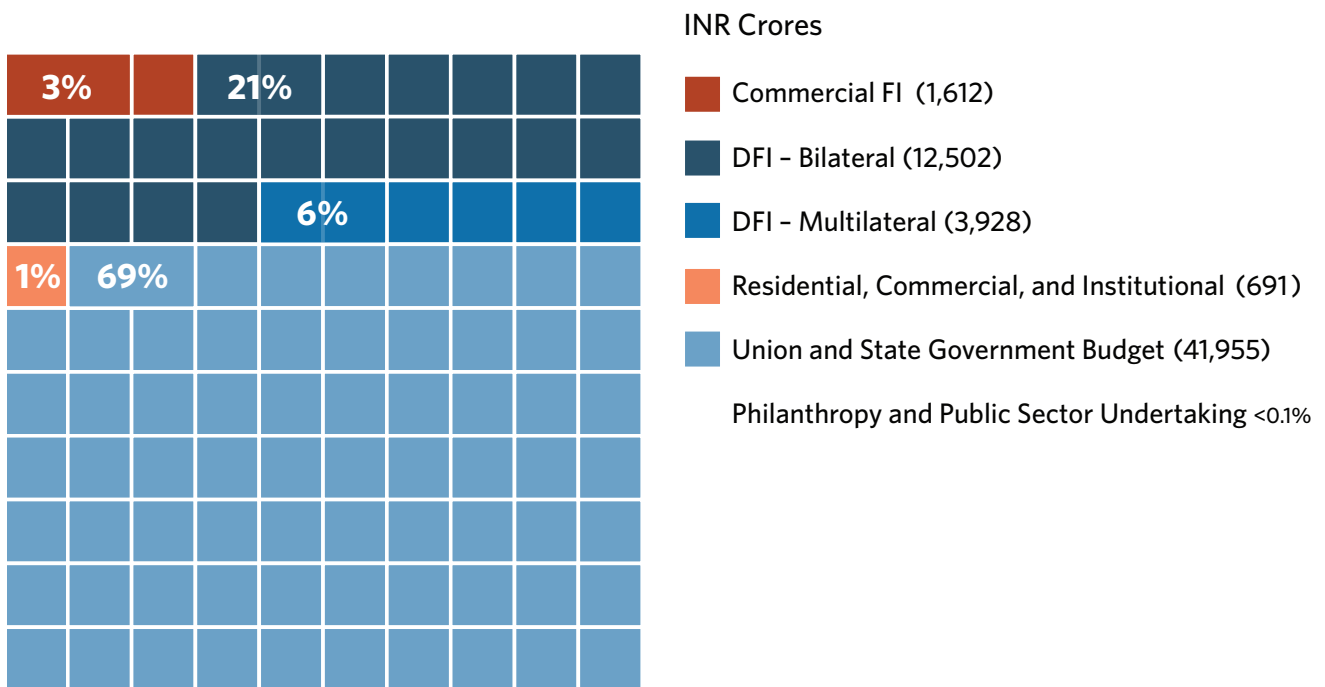
2.3.2 CLEAN TRANSPORTATION

Green finance for clean transportation came almost entirely from public sources (96%).

DFI funding (both multilateral and bilateral) accounted for 27% of total finance flows for clean transport.

Using India’s third Biennial Update Report (BUR-3) to the UN as reference, it is estimated that transportation²⁶ accounts for 10% of total GHG emissions. India’s vehicle fleet is relatively small when compared to its population and is expected to increase significantly in the future. For this, clean mobility has the highest potential for change and is also the highest priority for the Government. India’s 2030 vision of e-mobility²⁷ will require 120 million EVs by 2030. As per a CEEW report, this translates into cumulative investment needs of INR 1,250 thousand crores (USD 180 billion) by 2030, or 125 thousand crores (USD 18 billion) per annum investments in EV. Current EV investments are 2 thousand crores (USD 375 million) per year.

Figure 16: Clean Transport flow by Source (INR thousand crores)



Mass Rapid Transit Systems (MRTS) accounted for over 87% of total fund flow to the sector. This is largely because of the initiation and expansion of Metro rail projects in several Indian cities including Mumbai and Lucknow. FY2020 also saw an increase in fund flow (200%) to electric vehicles from FY2019. This trend is expected to continue with greater emphasis being placed on the adoption of electric vehicles, including through policy (see the box Electric Vehicles below), in the coming years.

²⁶ Internal CPI analysis identified three sub-sectors - Clean mobility (electric), Cleaner fuel, and Clean mobility (non-electric)

²⁷ 70% of all commercial cars, 30% of private cars, 40% of buses, and 80% of two-wheeler (2W) and three-wheeler (3W) sales to be electric by 2030

Figure 17: Clean transport sub-sector breakup (INR thousand crores)

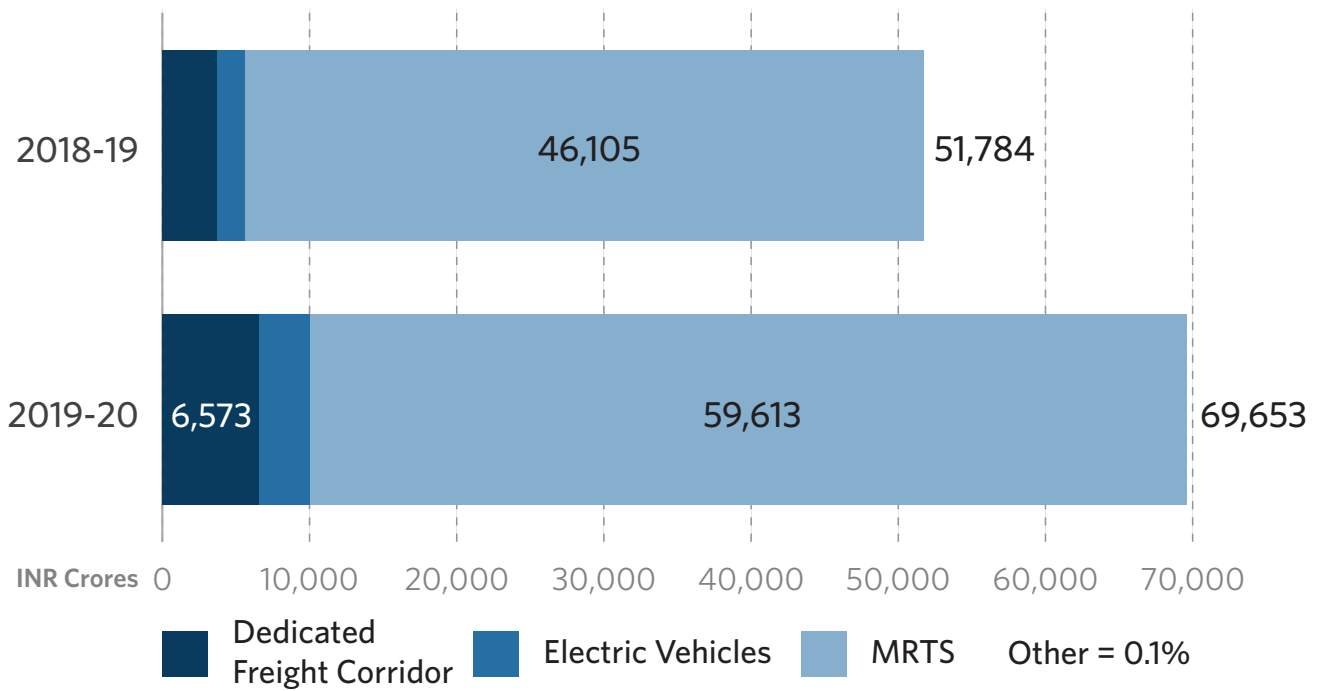
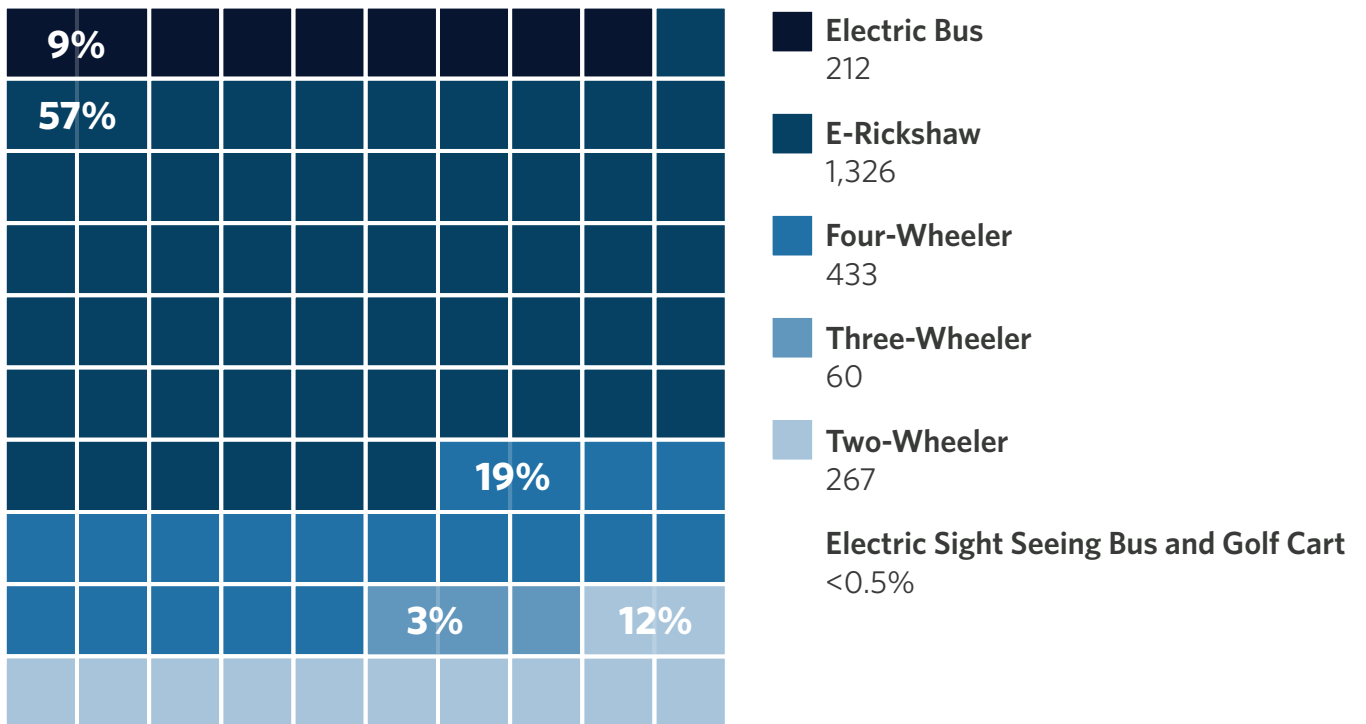


Figure 18: Breakup of Electric Vehicle Sales in India (biennial average)



Electric Vehicles

Growth in the clean transportation segment in India has so far been driven by Mass Rapid Transit Systems (MRTS). For clean transportation to progress, electric vehicle adoption must also expand rapidly. This trend is already seen in the growth of financing for EVs from INR 1.8 thousand crores (USD 269 million) in FY2019 to INR 3.4 thousand crores (USD 481 million) in FY2020. This number includes cars, buses, three wheelers (rickshaws), and two wheelers (mostly scooters). A major contributor to the two-wheeler segment is the low-speed electric scooters (accounting for almost 90% of total sales in FY2020). However, since these require neither license nor registration, and are not present in the Vahan database, they are not included in this study.

The growth of the EV industry in India requires the following:

1. **Policy support.** The Government had introduced the National Electric Mobility Mission Plan (NEMMP) in 2013 and has made subsequent revisions and updates to the same. Some States had launched incentive schemes by FY2020 (Karnataka, Telangana, Andhra Pradesh, Uttar Pradesh, and Tamil Nadu), while other States did the same in FY2021.

The extension of Faster Adoption and Manufacturing of Electric and Hybrid Vehicles in India (FAME) II scheme should also drive growth in the segment in the coming years. However, faster adoption by all States is required for faster adoption of EVs and also for the rollout of policies which are friendly towards auto manufacturers and auto ancillary manufacturers. Further, given the nature of electric vehicles and the quantum of data collection required for better product development, the firms are more likely to function like digital tech companies than as traditional auto manufacturers. Thus, it is imperative that there be policy focus on personal data collection and its privacy aspect.

2. **Charging Infrastructure** for EV adoption to become mainstream, increase in charging infrastructure is critical. To achieve this, not only is there a need for increased investment from public and private sectors but also innovation in the approach to development of charging stations. Given that charging stations will be public goods, greater investment from public sector is required. However, public finance flows alone will not suffice in creating the required level of infrastructure.

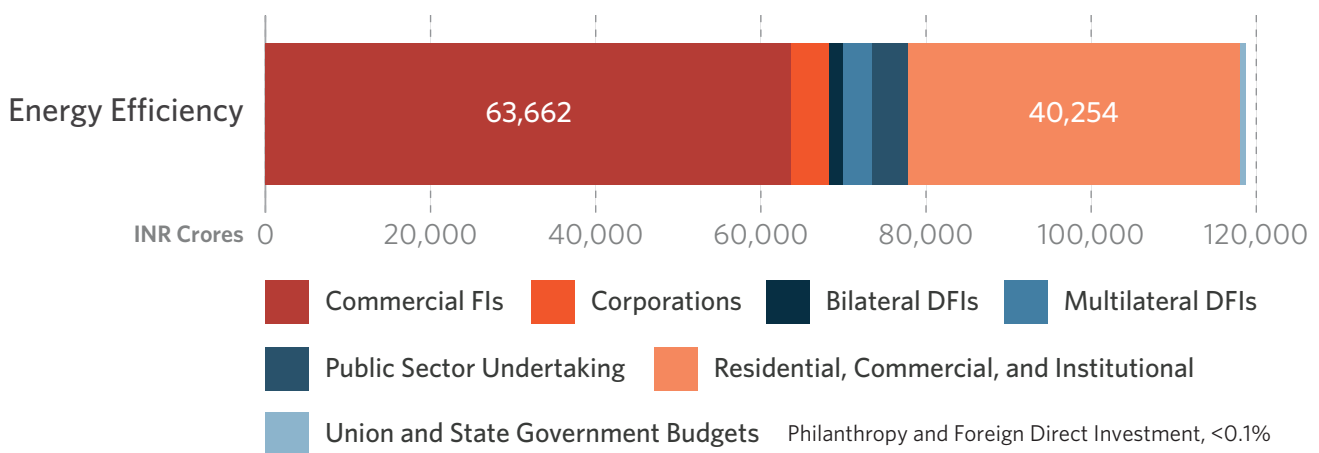
Further, unlike fossil fuel vehicles which need the fuel to be at a specific point, EV charging stations may be installed in areas that already have developed infrastructure. For example, EV charging units can be added to homes, restaurants, shopping malls, existing petrol pump outlets, hospitals, schools, etc.

2.3.3 ENERGY EFFICIENCY

Overall, green finance flows to the Energy efficiency sector increased by 26% to INR 118 thousand crores (USD 16 billion) per annum over FY2019-FY2020. Funding was primarily sourced through Commercial FIs accounting for 53%, followed by Residential, Commercial, and Institutional at 33%.

As part of its Energy India Security Scenarios, NITI Aayog estimates there will be an 850% increase in energy consumption in buildings from 2012 to 2047 under the 'Determined Effort Scenario'. According to an [ORF study](#), the overall building energy consumption in India is 37% of India's annual primary energy consumption. Building an energy-efficient India will require focus and investment in the Energy- efficiency sector.

Figure 19: Energy Efficiency flow by Source (INR thousand crores)

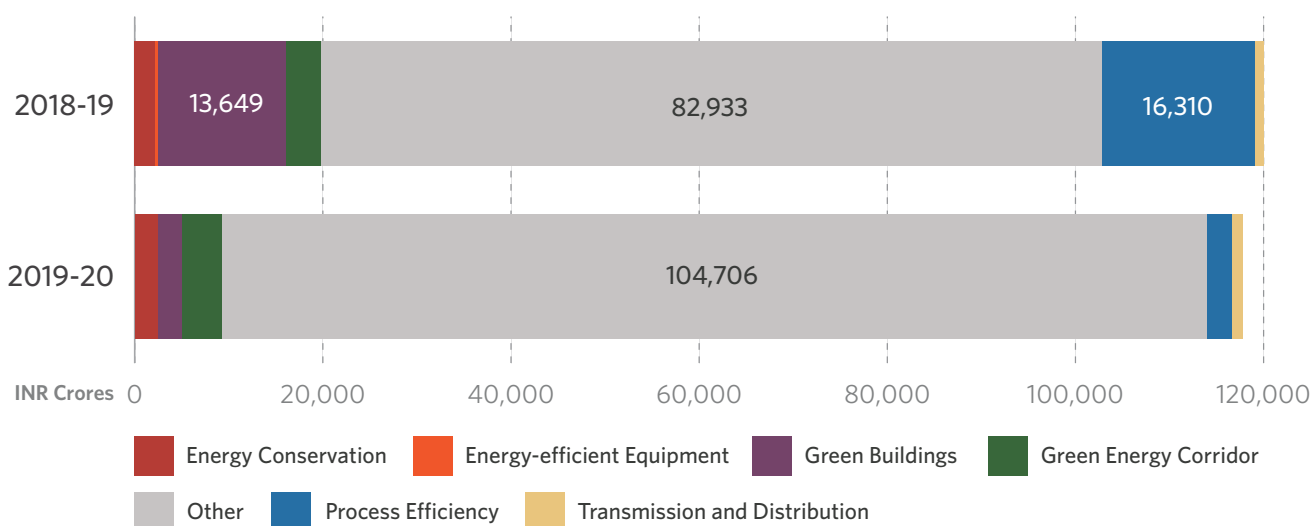


While finance flows to Energy efficiency sector increased by 26% from FY2019 to FY2020, fund flows to process efficiency and green buildings decreased by 83% and 81% respectively from FY2019 to FY2020. The decrease in process efficiency may be attributed to lesser numbers of designated consumers²⁸ and also to reduced energy saving targets in the PAT²⁹ schemes during this period. The drop in green building numbers may be attributed to the completion of buildings but delay in the issuance of certificates. This delay may be attributable to COVID-19. Also, for one of the certifiers, the number for FY2019 was higher since they had certified a few very large 'Built environment projects' that year³⁰.

28 Any entity, who is notified by the Government of India for participation in PAT scheme, becomes a Designated Consumer.

29 PAT scheme is a regulatory instrument to reduce specific energy consumption in energy intensive industries, with an associated market based mechanism to enhance the cost effectiveness through certification of excess energy saving which can be traded. Under this scheme, reductions in specific energy saving targets are assigned to Designated Consumers (DCs) for a three-year cycle. Available at: <https://beeindia.gov.in/content/pat-cycle>

30 Due to large projects, the total area under certification was significantly higher leading to a higher outlay

Figure 20: Finance flow to Energy efficiency sub-sectors (INR thousand crores)

2.4 CLIMATE ADAPTATION

Even though the adaptation sector has been partially tracked, it is evident that finance flows are not commensurate with the investment required. Currently, the contribution of the private sector seems to be limited, and will need to increase for India to meet its targets.

As part of the updated methodology, this report aims to track green finance flows to specific adaptation sectors for the first time. The sectors tracked are:

- Disaster, Monitoring, and Emergency Response System³¹
- Flood Mitigation
- Drought Management³²

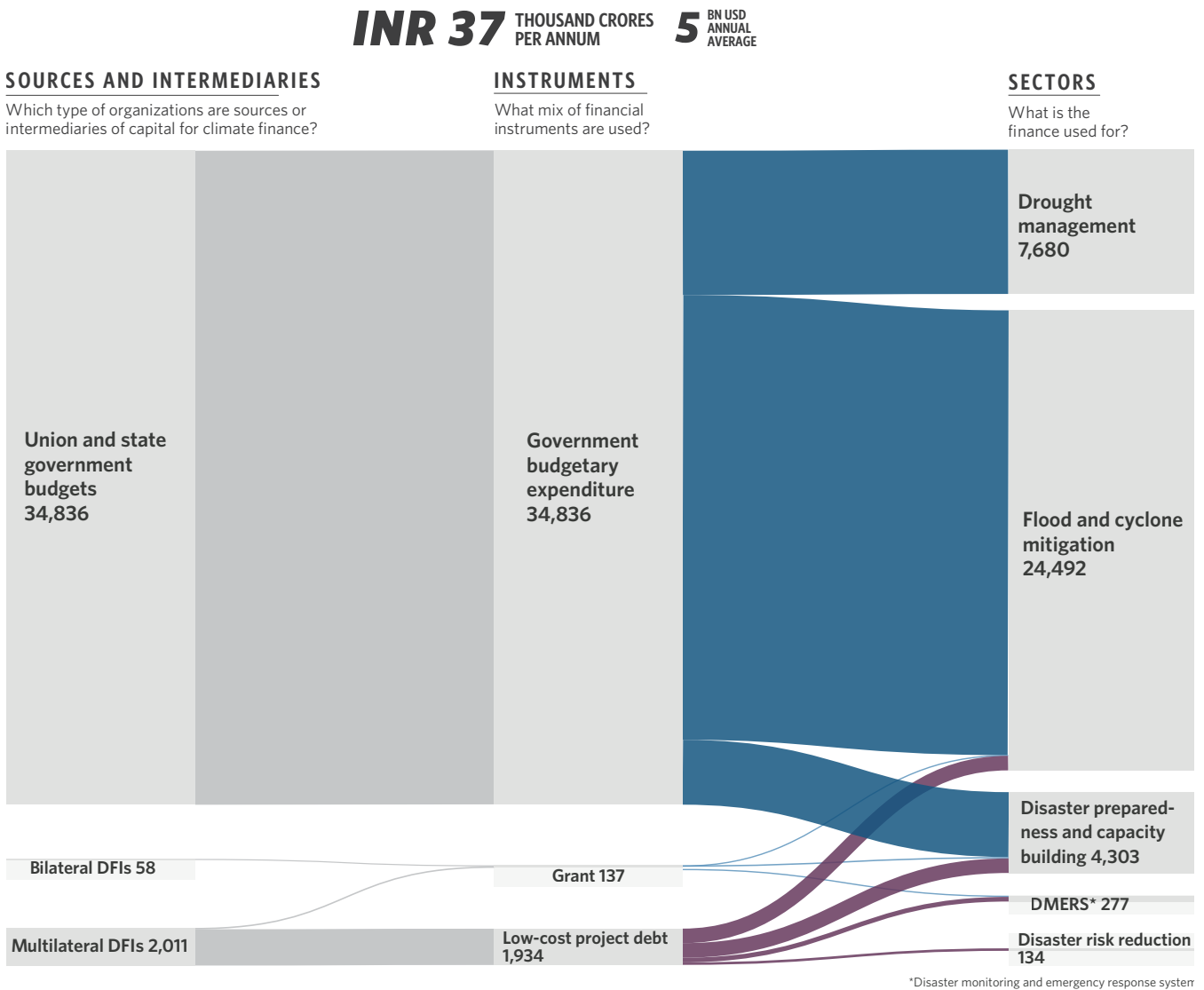
The total green finance for adaptation sectors in FY2019 and FY2020 was about INR 74 thousand crores (USD 10 billion) or INR 36 thousand crores (USD 5 billion) per annum, over FY2019/FY2020. There was an increase of 27% in the two years. This is, however, nowhere close to the [required estimate by DEA](#) of INR 28.9 lakh crores (USD 4 trillion³³) required by FY2020. Given that India is one of the most vulnerable country to climate change, there is a pressing need for funds to flow to adaptation sectors.

³¹ Reporting for Disaster, Monitoring, and Emergency Response System is further segregated into three sub-sectors: a) Disaster Monitoring and Emergency Response System, b) Disaster preparedness and capacity building, and c) Disaster Risk Reduction

³² Includes only some specific sectors within adaptation. These numbers are not represented in the overall Sankey diagram.

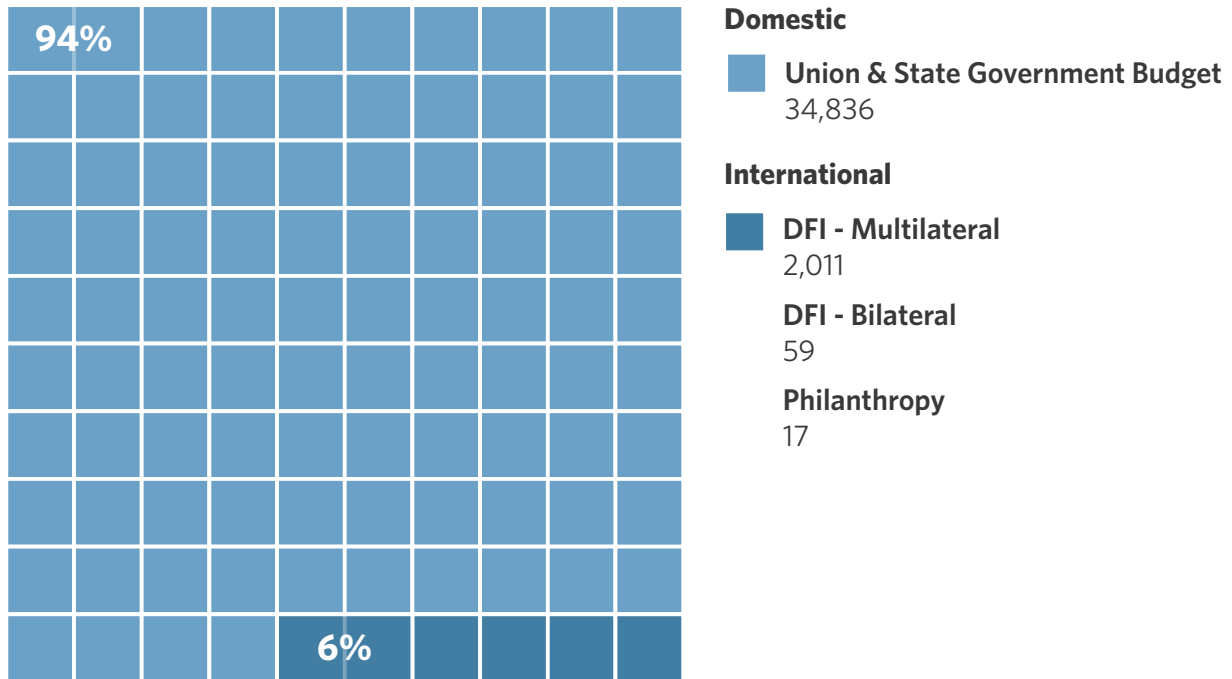
³³ Using exchange rate given by RBI for FY2020 of INR 70.90 = 1 USD

Figure 21: Sankey Diagram for adaptation



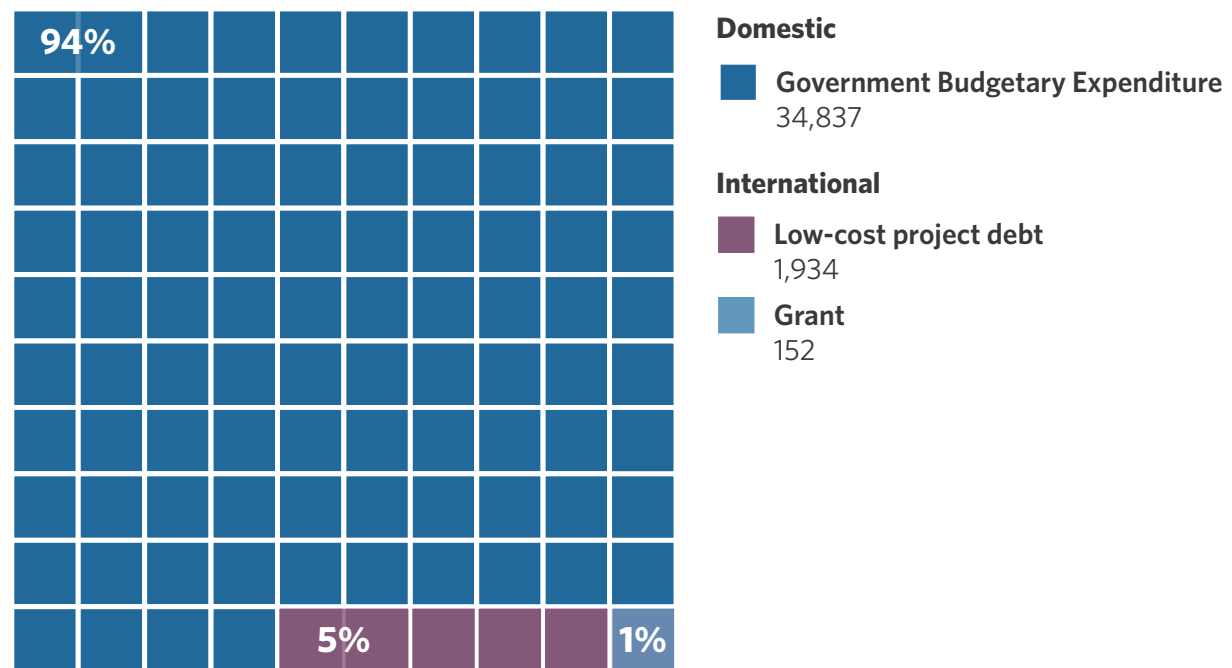
A large portion of the funding was through the domestic sector, by Central and State Government Budgets. The total outflow increased by 25% from INR 30 thousand crores (~USD 4.4 billion) in FY2019 to INR 38 thousand crores (~USD 5.4 billion) in FY2020. Private finance for adaptation is more challenging to track because of the lack of a common terminology and data availability. As a result, the actual amount contributed to adaptation by the private sector could vary.

Figure 22: Flow to adaptation sector by source (INR thousand crores)



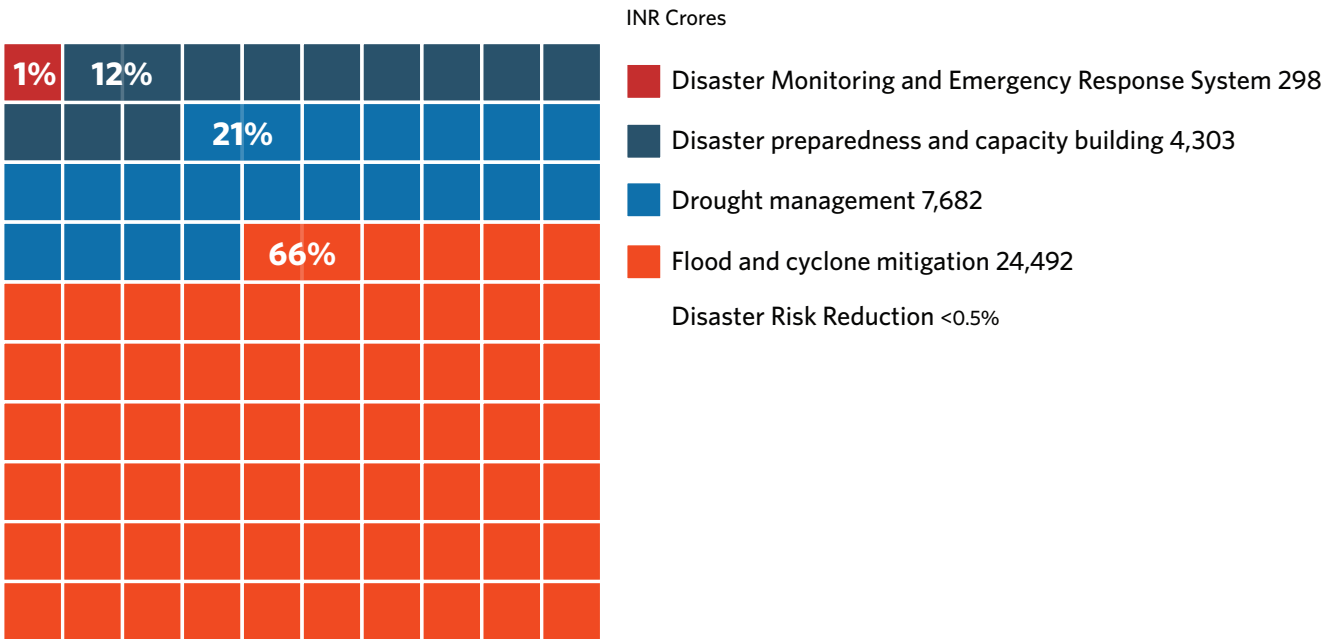
Low-cost project debt was the main instrument in international funding, contributing 92% of total finance flows in FY2019 and FY2020.

Figure 23: Flow to adaptation sector by instrument (INR thousand crores)



Flood and cyclone mitigation received the highest flows, accounting for 66% of total fund flows to adaptation per annum, for FY2019 and FY2020.

Figure 24: Flow to adaptation sector by sector (INR thousand crores)



3. APPROACH AND METHODOLOGY

3.1 APPROACH

3.1.1 DEFINITION - GREEN FINANCE

We have aligned the taxonomy with the findings of Building a Consensus on the Definition of Green Finance— a study developed by CPI and cKinetics with the support of Shakti Sustainable Energy Foundation, and the CPI published study [Accelerating Green Finance in India: Definitions and Beyond](#) (CPI, 2020). These publications define climate, green, and sustainable finance as follows:

Climate finance	Green finance	Sustainable finance
Climate finance refers to 'local, national or transnational financing, drawn from public, private and alternative sources of financing, that seeks to support mitigation and adaptation actions that will address climate change.'	Green finance includes climate finance as well as other environmental objectives that are necessary to support sustainability, and in particular, aspects such as biodiversity and resource conservation.	Sustainable finance covers a broader set of the investment universe, aiming to build an inclusive, economically, socially, and environmentally sustainable world.

The scope of this study is confined to a subset of the green finance universe described above. This study does not map pollution abatement activities; biodiversity; agriculture, forestry and other land use (AFOLU). While adaptation sector could not be fully tracked, expenditures for some Climate adaptation activities such as natural disasters, monitoring and emergency response systems, flood mitigation, and drought management, have been tracked

The Landscape is based on empirical data drawn from a wide range of primary and secondary sources. For the collection, preparation, and analysis of data, we adopted an operational definition³⁴ of green finance, as well as an accounting methodology to ensure comparability across data sets, and to avoid overlaps to the extent possible.

³⁴ India does not have a formal definition of green finance. For this study, the definition adopted is as explained in the beginning of the section.

3.2 METHODOLOGY

CPI uses a robust and sophisticated green finance tracking methodology, built from over a decade of our work in this area. Detailed methodology for this report is available in a [separate document](#).

Building on from the first Landscape of Green Finance in India (2020), we have expanded the depth and breadth of our coverage of finance tracking to cover climate-relevant expenditures. In this study we have covered private sector investments more comprehensively, particularly in the Energy efficiency sector, as well as other enabling activities offering environmental benefits indirectly. We have also tracked expenditures for Climate adaptation activities such as disaster, monitoring, and emergency response system; flood mitigation; and drought management.

We have identified the sources of data and made changes in our methodology to include investments in each of these sectors. A Working Group of experts with representation from academia, industry, and Government, provided expert guidance on the project approach and methodology.

A list of the sectors covered in The Landscape is in Table 1 below. For each of these sectors, we have collected disaggregated data on actual disbursements, as opposed to commitments.

Table 1: Sector inclusions in The Landscape of Green Finance in India

Sectors	Sub-sector	FY2017/ FY2018	FY2019/ FY2020
Clean Energy	Wind	Yes	Yes
	Solar	Yes	Yes
	Tidal	Yes	Yes
	Geothermal	Yes	Yes
	Biomass	Yes	Yes
	Green Energy Corridor	Yes	Yes
	Hydrogen	No	Yes
	Manufacturing of clean energy plant	No	Yes
	Energy Storage	Yes	Yes
Clean Transportation	Purchase of Electric Vehicle (EV)	Yes	Yes
	EV Charging Infrastructure	No	Yes
	Public Transportation	Yes	Yes

Sectors	Sub-sector	FY2017/ FY2018	FY2019/ FY2020
Energy Efficiency	Energy-efficient equipment	No	Yes
	Process Efficiency	No	Yes
	Bulk Energy Services	No	Yes
	Green Building	Yes	Yes
	Renovation of the existing building	Yes	Yes
Climate Adaptation	Disaster, Monitoring, and Emergency Response System	No	Yes
	Flood mitigation	No	Yes
	Drought Management	No	Yes

3.3 DATA GAPS AND ASSUMPTIONS

Green Finance tracking faces multiple issues related to the availability, quality, and robustness of investment data in both the public and private sectors. The following section describes some of the challenges encountered during data collection.

- Non-availability and trackability of disbursements:** Focusing on disbursements over commitments affects the magnitude of finance flows because large, committed amounts are often disbursed over several years. Consistent data on disbursements is often lacking across international public finance actors but is usually available through national Budget and expenditure systems. Extracting this information can be challenging due to the lack of effective Measurement, Reporting, and Verification (MRV) system in India. The Public Financial Management System³⁵ in its current form does not provide granular information about the flow of finance and end use. To overcome this challenge, the team has had to resort to the use of legally available mechanisms such as the Right to Information Act, 2005, which was cumbersome and only partially effective.
- Difficulty in green tagging of Budget entries:** The lack of a harmonized green finance taxonomy in the country, and non-standardized reporting of data, makes green tagging of domestic entries arbitrary and vulnerable to the user's discretion. Projects often have different names or codes in Budget documents vis-à-vis policy documents. This problem is exacerbated by the time lag in availability of data on Budget actuals, making it difficult to establish causality with other sectoral developments. The objective and typology of this study has had to be revised alongside the project to build a coherent analysis.³⁶

³⁵ Public Financial Management System is a financial management platform for all plan schemes. It is a database of all recipient agencies. It integrates with the core banking solutions of banks that handle plan funds, integrates with state treasuries and enables efficient and effective fund flow tracking to the lowest levels of implementation for government plan schemes. It is implemented by the Office of the Controller General of Accounts (CGA), Ministry of Finance. (<https://pfms.nic.in/NewDefaultHome.aspx>)

³⁶ See Methodology

- **Large variations in granularity, format and categorization of data at the State-level:** It is necessary to assess and analyze various divisions of Government expenditure (recurrent, investment expenditure or transfer payments) and revenue. This requires intense engagement with various stakeholders, as different ministries and departments are responsible for managing Budgetary data. Moreover, the format and granularity of State Budgets vary considerably and is often not user-friendly.

Despite these challenges, CPI was able to improve upon the data gaps observed in the previous Landscape report and make the following changes:

- **Addition of new sectors and sub-sectors:** For a comprehensive list please refer to the section on methodology.
- **More granularity:** This report provides more granularity in terms of the instruments of disbursement. Each sector is now broken up into more granular sub-sectors, and efforts have been made to reduce earlier ambiguities (such as classifying investments into 'Unknown' sectors).

While reporting in some areas has improved since the first India Landscape report, relevant information on private investments is still limited. To overcome these challenges, certain assumptions have been made. The assumptions are based on definitions outlined in the [methodology document](#). Roundtables and bilateral discussions with stakeholders from relevant sectors were convened to establish the accuracy of the assumptions made and ensure that new additions meet quality standards. The Advisory Committee was briefed thrice over the course of this program, and observations made by the Review Group duly incorporated into this report.

4. CONCLUDING OBSERVATIONS

In 2021, India took a significant leap by committing to Panchamrit targets. To meet this enhanced goal, India needs to mobilize a larger quantum of green finance. It is estimated that India requires INR 162.5 lakh crores (USD 2.5 trillion) till 2030 for NDCs, and INR 716 lakh crores³⁷ (USD 10.1 trillion) to achieve Net-Zero emissions by 2070.

In the two years since our initial report, India has increased green finance flows by 150% from FY2017/FY2018 to FY2019/FY2020. In the overall increase of 150%, public sector finance flows increased 179% and private sector flows, 130%. This shows increased commitment from public sources – both domestic and international. This increase, however, falls short of India's finance requirements. Based on the findings of this report, we recommend the following priorities in order to increase green investment in India:

1. Green finance flows must increase at a faster pace to ensure that India meets Panchamrit targets.

Although overall investment increased from FY 2017 to FY 2020, there was a slight decrease (about 4%) between FY 2019 to FY 2020. This may be attributed to the onset of COVID-19 across the world. However, pandemic recovery has only reinforced the need for greater green and sustainable finance flows. This requires coordinated action from all stakeholders as described below:

Government policies, regulations, and guidelines are important to encourage green finance as they signal commitment from the Government, and help build investor confidence.

To further accelerate investment flows, other market-based incentives, promoting innovative financial products and de-risking green investments could be launched side by side with policy and regulation updates.

Development banks and financial institutions play a crucial role in green finance by mobilizing capital, offering risk sharing mechanisms, and diverting finance flows to low-carbon activities. The announcement of Development Finance Institution (DFI) in Budget 2020-2021 is a welcome step³⁸ in this direction. Similarly, creation of a dedicated Green Bank may also help in increasing green finance flows.

2. India's vulnerability to climate change necessitates an urgent focus on adaptation finance.

India is one of the most vulnerable countries to climate change. Tracked finance towards the sector stood at USD 5 Billion in FY 2020, and was severely short of the required need— upto USD 4 trillion over the coming decade.

³⁷ Exchange rate of INR 70.90 to 1 USD taken as given by RBI for FY2020

³⁸ The DFI was announced using The National Bank for Financing Infrastructure and Development Bill, 2021. It laid out the following details:

- DFI will be initially wholly owned by the government, but its stake will be reduced to 26% later
- INR 20,000 crore has been allocated to capitalize the DFI, which is expected to create a lending portfolio of at least INR 5 trillion in about three years
- The DFI will be set up in Mumbai and will have satellite branches in different cities

- Mainstreaming adaptation requires collaboration across ministries and departments such as Ministry of Housing and Urban Affairs; Ministry of Jal Shakti (water); Ministry of Environment, Forest and Climate Change, to plan, invest, and execute projects.
 - Owing to the diversity of the country, India needs to develop adaptation investment plans at the State level. These plans would provide an estimate of finance gaps at the State level, point to priority action areas, and could guide both public and private action.
- 3. A conducive policy and regulatory environment is important to mobilize green finance and fill the current investment gap.**

It has been observed that investment seems to be highly responsive to the policy environment in India, with existing policy frameworks enabling both international and private investment. Furthering of policy to attract finance flow in mitigation and adaptation sectors will require the following:

- **Development of a Green Taxonomy**
Currently, India does not have a green taxonomy. Taxonomy can help scale up green finance by proposing a clear definition of 'green', thereby reducing uncertainty in the sector. This can help with building investor confidence and minimizing greenwashing.
- **Diversifying finance flows to different priority sectors**
The analysis clearly shows that financial flows towards clean energy were the highest— a good sign. It is, however, important that the flows increase towards decentralized energy sources if India is to meet the Panchamrit targets. Another area of potential growth is electric vehicles (EV).
- **Financing for decentralized green activities needs earlier-stage intervention**
Improvement in technology research, development and adoption; support for setting up infrastructure; and mainstreaming supply chains can help the uptake of decentralized energy sources. For example, earlier policy intervention created a strong foundation for the growth of EVs.

4. Coordinated efforts across data collection, reporting, and access are critical.

Information asymmetry is hampering investment, especially from the private sector and international sources. While the amount and availability of green finance data have improved since our initial report, major gaps still exist. Reducing information asymmetry may be achieved in the following ways:

- **Development of standardized disclosure requirements for both real and financial sectors**
While creation of a taxonomy is under the purview of the Government, disclosure requirements can be led by regulators, primarily the Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI), Insurance Regulatory and Development Authority of India (IRDA) and Pension Fund Regulatory & Development Authority (PFRDA). Recently, SEBI has introduced new requirements for sustainability reporting for listed companies — the Business Responsibility and Sustainability Report (BRSR).
- **Ensuring online availability of data**
We have acquired data with the help of Right to Information (RTI) application, which not only points to availability of data but also to the lack of ease of accessibility of the same.

The last few years have seen greater online data availability; however, it is still not at the stage where most, if not all, the data is present online.

- **Integrated domestic Measurement, Reporting and Verification (MRV) system**
MRV system can help provide a uniform framework and methodology to track finances, identify constraints and key areas in need of additional finance, as well as enhance transparency. For the public sector, this can be done through Green Budget tagging; a preliminary step towards it is the first 'Green Budget' in 2019, which included provisions for pollution and green infrastructure. However, its narrow scope needs to expand to cover other priority sectors.

4.1 NEXT STEPS FOR RESEARCH

In our last tracking report, we had listed out required next steps that included improvement in data collection methodology and more granularity. We have been able to achieve both in this report, and this has improved the numbers being reported. For the next iteration, we would aim at achieving the following:

- Devise the methodology to assess causality and policy implication of State and national schemes on market signaling and overall investment
- Build on the current study and prepare a detailed methodology and landscape to track adaptation finance in India

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6. ANNEXURE I: INDIA'S PANCHAMRIT PRINCIPLES AT COP26 AND NET ZERO

Given the urgency and the need to do more for climate change, Prime Minister Narendra Modi presented five nectar elements, or Panchamrit, at the COP26 Summit in Glasgow as India's contribution to climate action. These are:

- a) By the year 2030, India will:
 - a. Scale up its non-fossil energy capacity to 500 GW
 - b. Meet 50% of its energy requirements from renewable energy
 - c. Reduce the total projected carbon emissions by one billion tons from now
 - d. Reduce the carbon intensity of its economy by more than 45%.
- b) By the year 2070, India will achieve the target of Net Zero.

Panchamrit targets are about ensuring India does its bit towards the 1.5-degree Pathway. It is not only about achieving the targets of Renewable Energy by 2030 but also ensuring that India keeps pace with the growing energy demand to ensure Net Zero by 2070. By 2030, India targets to reduce the carbon intensity of its economy by more than 45%.

As per an ICRA report³⁹, annual renewables capacity of over 100 GW will be required every year, needing ~INR 6 trillion in investments annually till 2030. According to an [independent study](#) by CEEW, India would need cumulative investments of USD 10.1 trillion to significantly scale up generation from renewable energy and associated integration, distribution and transmission infrastructure, and achieve Net-Zero emissions by 2070. .

While there are various reports giving different estimates, one thing is evident—the quantum of investment required is huge. The investments required will not only be for proven technologies but also for funding new technologies, supporting research and development, and supporting capacity building among other things. Some areas are:

- a) EV ecosystem
- b) Energy-efficient appliances
- c) Carbon Capture and Storage technologies
- d) Development of Carbon Markets
- e) Renewable energy value chains
- f) Better disclosure mechanisms

39 ICRA. 2020. ICRA's CLIMATE SERIES - Series 1 - Green Dreams. Available at: <https://www.icraresearch.in/Research/ViewResearchReport/4117>

One of the key factors/constraints foreseen, is the quantum of financing required. While this report indicates that investment in green activities has increased, it is still far from reaching the required amount.

The paper [Mobilizing Green Finance while managing Climate Finance Risk in India](#), identifies key areas of intervention for increasing finance to green activities while managing climate-related financial risks. One of the recommendations is the role of the capital market – more specifically, the issuance of Sovereign Green Bonds. India announced the issuance of its first Sovereign Green Bond in Budget FY2022. While this is a positive step, it is also a confusing one since India does not have a green finance taxonomy. While a taskforce was set up in 2020 by Government of India to design the Sustainable Finance Roadmap of India, which also included a taxonomy, the Roadmap and taxonomy were focused on defining what would constitute as 'sustainable activities', instead of defining a green finance taxonomy. It is very important for green finance taxonomy to be developed if we are to ensure that money flows towards 'green'.

7. ANNEXURE II: GREEN BUDGET

As per the [OECD Green Budgeting Framework](#) '**Green budgeting**, means using the tools of Budgetary policy-making to help achieve environmental and climate goals. This includes evaluating environmental impacts of budgetary and fiscal policies and assessing their coherence towards the delivery of national and international commitments. Green budgeting can also contribute to informed, evidence-based debate and discussion on sustainable growth.

Green budgeting uses four key mutually-reinforcing building blocks: 1) a strong strategic framework; 2) tools for evidence generation and policy coherence; 3) reporting to facilitate accountability and transparency; and 4) an enabling budgetary governance framework (OECD, 2020a). India got its first 'Green Budget' in 2019 when the Union Budget was termed as Green on account of having provisions for pollution control and green infrastructure. This, however, is not a comprehensive way of green budgeting since it has a narrow focus. However, it did lay the foundation for adoption of green budget and for potential improvements over time.

Bihar is the first State in India to do green budgeting in a more comprehensive manner. TERI and ADRI have helped Government of Bihar identify Budget-heads mapping to SDGs, and developing standard operating procedures.

One of the key takeaways from the above is the need for green tagging. With growing evidence of the need to increase financing to green, identifying what is 'green' is not only important but crucial.

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