CPI Ownership Methodology

Linking the financial system with the real economy: The money behind investment in climate solutions and high-emission assets

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CLIMATE
POLICY
INITIATIVE

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ABOUT CLIMATE POLICY INITIATIVE

Climate Policy Initiative (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 seven offices around the world in South Africa, Brazil, India, Indonesia, the United Kingdom, and the United States.

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RELATED CPI WORKS

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EXECUTIVE SUMMARY

The financial sector has a pivotal role to play in achieving the climate change mitigation objectives of the Paris Agreement and the transition to net zero greenhouse gas (GHG) emissions. Regulators, coalitions, and financial institutions (FIs) require an informed understanding of the real-world impacts of investments in both climate solutions and high-emission assets. The challenge is to link FIs' net zero strategies and targets to their ultimate contributions to investments in the real economy.

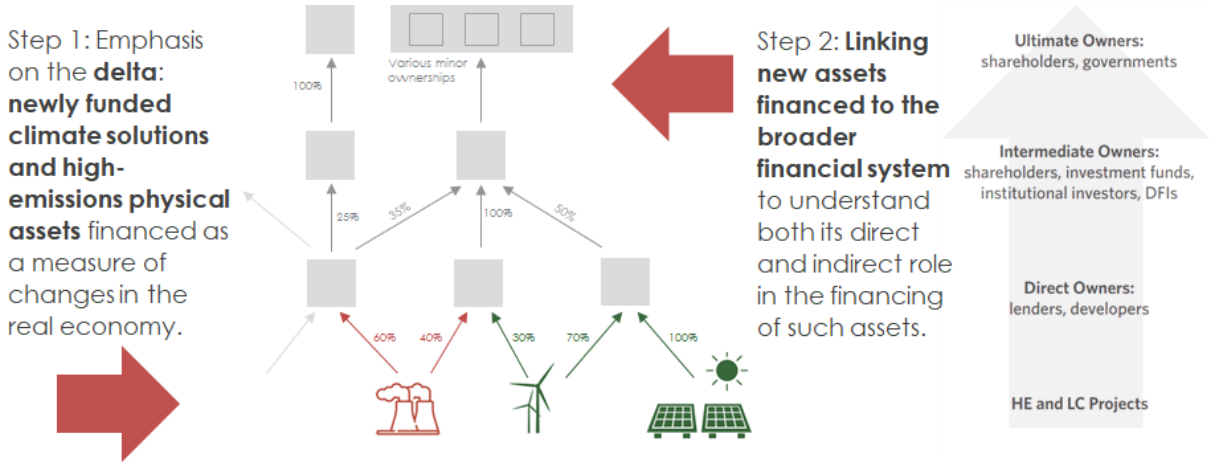
Existing assessment methodologies have some limitations:

1. **ESG metrics** face issues such as incomplete and unreliable data, greenwashing concerns, and inconsistent and non-comparable sustainability reporting.
2. **Portfolio emissions and alignment metrics** face challenges such as inconsistent carbon footprint calculations, evolving GHG standards, and incomplete emissions data. Moreover, these metrics primarily focus on existing investments and, therefore, fail to capture that divestment of non-climate-aligned assets often simply transfers them to a new owner without affecting their emissions.
3. **Self-reported data:** Most information on investment in both climate solutions and high-emission assets is partial and self-reported, raising questions over transparency and accuracy. Existing independent monitoring efforts are constrained by the data intensity of such undertakings.

A comprehensive approach is needed to accurately track progress towards net zero, supplementing current methods with more transparent and independent data. Our methodology is focused around two steps:

1. **Emphasis on new assets**: Tracking investments in newly funded climate solutions and high-emission assets can help hold financial actors accountable for the real-world impacts of their investments, which could either lock in or mitigate emissions.
2. **Financial system overview:** Traditional tracking of investments in climate-aligned projects typically only reflects direct finance. However, many major financial actors invest indirectly, holding either corporate equity in or debt of intermediary investors. To grasp a given FI's full contribution to real-world projects, both direct and indirect investments should be evaluated.

Figure E1: Attributing real economy investment to the financial system.



Drawing inspiration on existing approaches (PCAF 2022; 2°ii & PACTA 2019; Asset Impact, 2024; OECD, 2019; OECD, 2020), this methodology aims to attribute direct investments in climate solutions and high-emission assets based on various levels of equity ownership and corporate lending. This approach has several benefits:

1. It provides a more robust metric for determining the real-world impacts of financial decisions.
2. Institutions can be held accountable for their indirect as well as direct investments.
3. A detailed investment network view can highlight influential players and potential leverage points.
4. The emphasis on standardized, independent data can curb greenwashing and promote more robust reporting.

This methodology integrates the analysis of real economy impact indicators under the Net Zero Finance Tracker but can also be used by financial institutions for the self-assessment of their own contribution to low-carbon and high-emissions financing.

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1. KEY PROBLEM AND CURRENT SITUATION

There is a growing imperative to link assessments of the financial sector's progress on net zero to its tangible contributions to this transition in the real economy. The Paris Agreement—adopted in 2015 to strengthen the global response to climate change—identifies the financial system as a fundamental force in the collective, systemic effort to keep temperature rise to less than 1.5-2°C above pre-industrial levels.

The focus has increasingly shifted to how financial institutions (FIs) can achieve meaningful impacts for this transition. Ambitious targets and commitments should translate into **tangible climate-related outcomes**. This requires effective stewardship and ownership activities that influence the **real economy** through investments in projects rather than just the movement of funds within the financial system.

Despite progress in driving FIs' accountability for their actions, current efforts fail to comprehensively and accurately map how the financial system contributes to, or detracts from, the climate response in the real economy.

1. **ESG metrics** are gaining traction but face significant challenges, including incomplete and unreliable data, greenwashing concerns, and inconsistent and non-comparable sustainability reporting (Bloomberg, 2021; IISD, 2023).

2. **Portfolio emissions and related alignment metrics** assess the alignment—at the time of assessment—of already-deployed physical assets in which an organization has invested (GFANZ, 2022a), independently of who originally financed them. However, the utility of such metrics is hindered by inconsistent and evolving GHG accounting standards, incomplete emission data and a focus on existing assets (see Box A).

In addition, most tracking of investment in climate solutions and high-emission assets is largely based on data that has been self-reported by organizations that have no clear incentives for transparency. Independent attempts to track the links between FIs and fossil fuel finance are limited to a few key institutions due to the data-intensive nature of such efforts (Rainforest Action Network et al., 2022; WRI, 2022).

To better track progress toward net zero, we need more transparent and independent data that can show how FIs' net-zero efforts impact the real economy in the form of increased investment in climate solutions and decreased investment in high-emission assets. This can help policymakers and coalitions to understand the roles of different FIs in the net zero transition, and shed light on key gaps, opportunities, and specific actions that can help to spur progress. The following section outlines how this can be achieved.

Box A: Limitations of portfolio emission metrics

Portfolio emissions—the GHG emissions from FIs' lending and investment activities—are under increasing scrutiny from regulators, clients, and society. The EU mandates disclosures of financed emissions, and the US is moving toward greater climate risk disclosure (PwC, 2023).

While portfolio emissions offer valuable insights, this metric has notable methodological limitations.

First, there are significant inconsistencies in how carbon footprints are calculated (Rempel & Gupta, 2020). For instance, the Partnership for Carbon Accounting Financials (PCAF) standard, which help FIs measure and disclose portfolio emissions, allow considerable flexibility in calculation methods (Granoff & Lee, 2024). This flexibility leads to inconsistent methodologies and a lack of comparability across institutions.

Second, the evolving nature of GHG accounting standards, such as those set by PCAF, GHG protocol and SBTi makes consistent measurement challenging (PwC, 2023). As standards develop, FIs must continuously update their methodologies and baseline emissions estimates, requiring significant effort and resources and complicating reporting.

Third, emissions data is often incomplete and inconsistent, especially for certain asset classes (PwC, 2023). FIs often rely on partial data and industry estimates, which may not accurately reflect emissions, hindering reliable measurement and comparison.

Lastly, portfolio emissions focus solely on the emissions of existing assets, ignoring the broader impact that FIs have on the real economy. This narrow approach overlooks the worrying trend of divestment, where non-climate-aligned assets are simply sold by owners with stronger climate commitments to those with weaker standards in a transfer that creates no reduction in emissions (EDF, 2022).

While portfolio emissions metrics are useful for attributing historical emissions to FIs, they are less effective in monitoring how their actions are driving change.

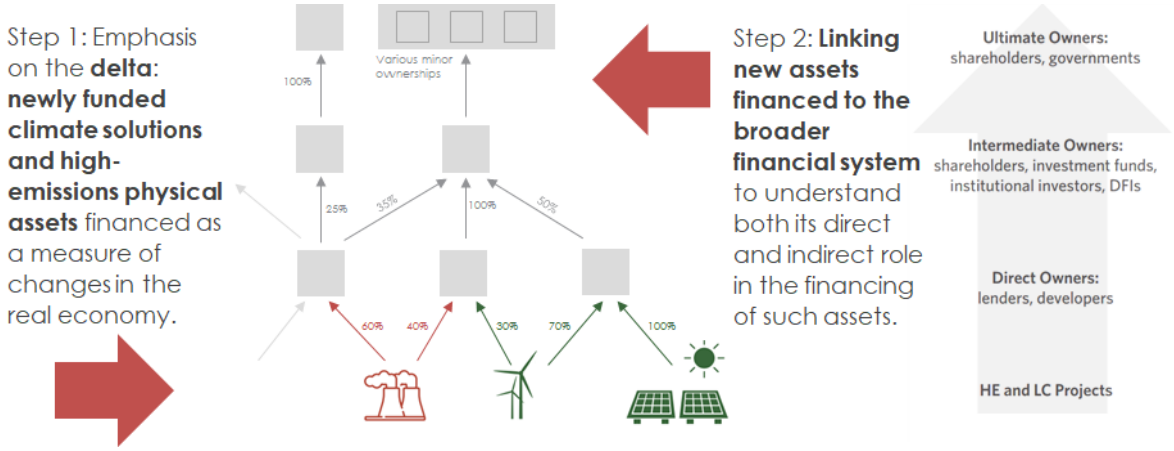
2. TWO-STEP ASSESSMENT APPROACH

The approach proposed in this methodology paper aims to address gaps in the information needed to assess financial institutions' (FIs) progress toward net zero for the benefit of regulators, coalitions, and FIs.

It consists of two key steps:

- **Emphasis on new assets**: Tracking investments in newly funded climate solutions (e.g., solar PV) and high-emission physical assets (e.g., coal power plants) as indicators of how financial entities are supporting changes in the real economy.
- **Linking new assets to direct and indirect investors** in the broader financial system (asset managers, institutional investors, banks, etc.) to understand each actor's role in the ultimate real-world investment.

Figure 1: Attributing real economy investment to the financial system.



Why the focus on new assets?

Tracking investments in new climate solutions and high-emission physical assets over a given period (usually at annual intervals) can hold investors accountable for their climate commitments and for the impacts of the newly commissioned assets that they finance (i.e., their impacts on the real economy).

Such methodology is commonly used for sectoral transition analysis. For example, trends in new renewable energy and/or new fossil fuel financing are used to track power sector progress towards decarbonization goals (IEA, 2022).

There are advantages to using the same approach to assess the net zero progress of financial actors. Examining financing for the creation of new assets or the expansion of existing ones, hones in on investment decisions that will either lock in additional emissions (in the case of carbon-intensive projects) or mitigate them (in the case of new climate solutions).

This focus on financing the creation or expansion of physical assets complements existing portfolio approaches, which emphasize ownership of pre-existing physical assets (e.g., the Paris Agreement Capital Transition Assessment [PACTA]).

However, this approach also reframes the conversation by focusing on two key strategies:

- **Pre-emptive measures**, such as exclusion lists prohibit financing of new high-emission assets.
- **Corrective measures** such as investment in climate solutions and/or the decommissioning of high-emission assets (as opposed to simply selling them to new owners).

Table 1: Comparison of assessment focus for net-zero transition planning

	Assessment focus	
	Investment in New/ Expansion of Physical Assets	**Investment in Existing Physical Assets (all assets, independent of origin)**
Use as Transition Metrics	Tracks execution of real-world transition plans by measuring investments in new climate solutions and high-emission assets.	Assesses emissions from underlying assets, the first step for financial institutions in developing climate transition plans.
Limitations	-	Does not yield execution metrics as it does not capture changes in the real economy. This metric could encourage FIs to divest high-emitting assets from their portfolios without achieving any real emissions reduction in the real world.

How can the deployment of new assets be linked to financial actors?

This step aims to understand the indirect roles of different financial system actors in the financing of new physical assets by examining the entire ownership/financing structures (including both equity and debt). For example, this could enable the tracing of a gas plant's financing back to a pension fund that holds shares in a listed utility or bank that invested in the plant.

Investment transactions in new physical assets traditionally carry only information about their direct investors (e.g., via project financing). However, direct investment represents only a small share of the investment activities of some key financial system

actors (e.g., asset managers and institutional investors), which traditionally invest in corporate equity or investment funds.

Our methodology aims to overcome this limitation by reattributing direct investment based on the following:

a) Equity/shareholder ownership (financed projects' owners-of-owners, etc.)
b) Corporate lending ownership

Ownership structures are often used to attribute the impact of investment. For example, PCAF is an industry-led initiative that standardizes the measurement and reporting of GHG emissions related to FIs' lending and investments (PCAF, 2022). PCAF derives attribution factors, calculated from the proportional lending or investment (via listed equity or corporate debt) in the borrower or investee, to allocate financed emissions. Similarly, PACTA—a tool designed to help private FIs assess the alignment of their portfolio assets with decarbonization pathways—uses ownership of existing operating assets and majority ownership of subsidiary companies to allocate emissions impacts (2°ii & PACTA, 2019). Asset Impact, which supported the development of PACTA, continues to map the physical assets with security issuers using ownership data from various third-party sources and produces key emissions indicators at the asset, company, and security levels. (Asset Impact, 2024). The OECD's Beneficial Ownership Implementation Toolkit offers a similar method to identify ownership from a tax perspective. The OECD also developed a methodology to link investors to assets through listed and unlisted funds (OECD, 2019; OECD, 2020). The UK government also uses a similar approach to evaluate the climate and development impacts of its GBP 130 million equity investment in the Climate Public Private Partnership (CP3) program.[1]

Section 5 details the steps required to attribute investment in the real economy.

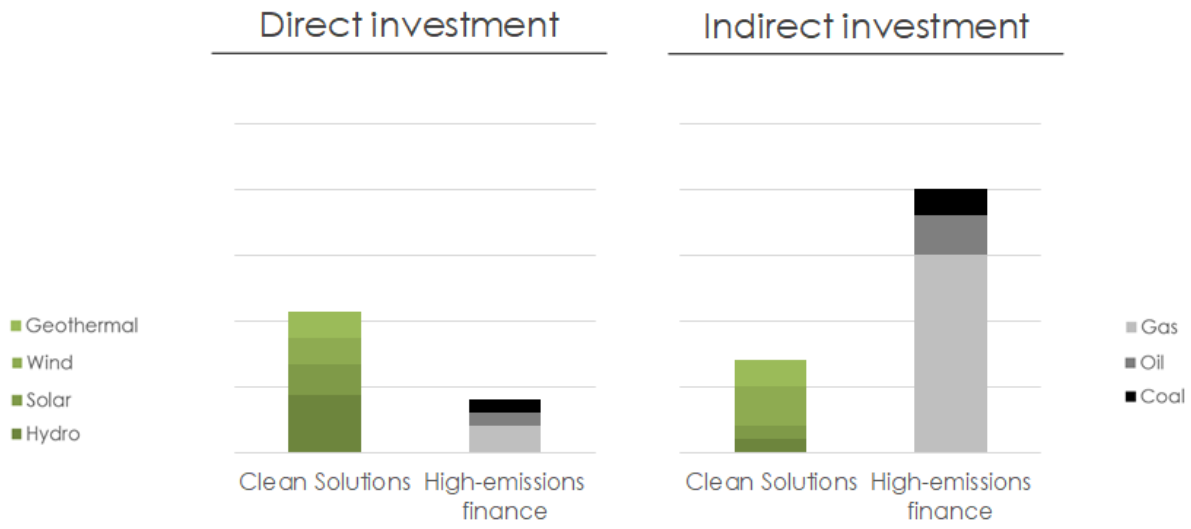
[1] CP3 is a multi-tiered investment vehicle which uses three tiers for the purposes of attribution, each representing a distinct investment and ownership structure. These are: 1) Fund-of-funds level (Catalyst Fund); 2) Investment fund level (Catalyst Fund investee funds and Asia Climate Partners), and project or company level (Individual investments by investee funds and ACP)(CPI, 2024).

3. THE UTILITY OF THE PROPOSED APPROACH

The proposed approach relies on creating a database of investors for thousands of climate solutions and high-emission assets, providing a powerful transparency tool. By understanding both direct and indirect contributions to the deployment of climate solutions and high-emission assets finance, this method measures the ability of FIs to influence the real economy as shareholders and/or finance providers. This comprehensive overview offers a more systemic understanding of investment trends in climate solutions and high-emission assets. More specifically, it helps to shed light on various aspects outlined below.

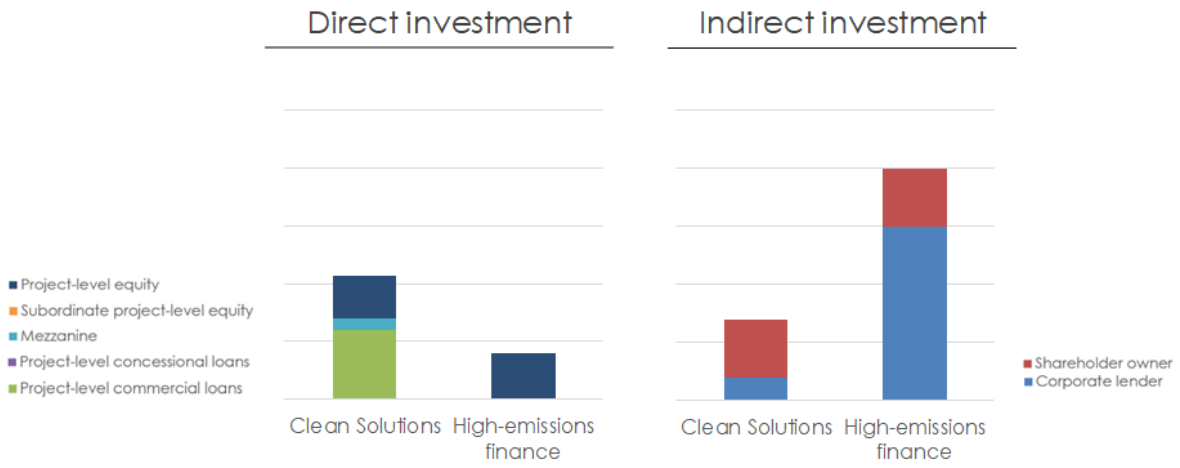
1. **The indirect roles played by various financial actors, as ultimate and intermediate owners and corporate leaders, in the creation of new climate solutions and high-emission physical assets.** The example shown in Figure 2 illustrates that this approach could reveal that an FI with more direct investments in climate solutions than high-emission assets could still be indirectly financing a larger proportion of high-emission assets as shareholder or corporate lender.

Figure 2: Clean to high-emission assets investment: direct and indirect contribution.



2. **The financial channels and instruments that can be used to adjust action.** The example shown in Figure 3 illustrates that a financial institution could be enlivened to the need to revise its corporate lending practices to achieve the highest carbon mitigation impact.

Figure 3: Clean to high-emission assets investment: direct and indirect drivers.



A better understanding of the current and potential roles of financial actors in shaping investment yields more granular insights for **policymakers** and **regulators**. Some examples of use cases are presented below.

This activity can provide a more complete trend metric showing what new physical assets FIs are financing **directly and indirectly in the real economy** through ownership or corporate lending, with related breakdowns of technology, carbon intensity, and temperature pathway alignment. This would help policymakers, regulators, financial associations, and private FIs to more **effectively target and correct misaligned investment practices by bringing to light the roles of owners and shareholders in shaping investment decision-making** and incentivizing stronger engagement (e.g., with asset/fund managers and board management).

Tracking ownership and corporate lending activity also supports the production of a **systemic view of an investors' network**, enabling them to explore their role in driving investment allocations**.** Network analysis could also highlight how **different ownership structures** of corporate utilities might impact the alignment of business decisions and investments made by those companies.

The proposed method can also help **financial coalitions** to improve transparency, ensure uniformity of data and assessment approach, and reduce reliance on self-reported data, helping to shed light on how individual FIs report progress against the financial commitments and milestones in their transition/decarbonization plans.

Examples of initiatives that could benefit from outputs and the transparency enabled by this project include:

- **The UN Secretary General's High-Level Expert Group on the Net-Zero Emissions Commitments of Non-State Entities**, which aims to establish processes for the international community to verify and account in a transparent manner non-State actors' progress towards their net zero commitments and the fulfilment of their reported decarbonization plans (UN HLEG, 2022).

- **The Race to Zero (R2Z)/GFANZ workstream on Portfolio Alignment Measurement**, which notes the importance of incorporating climate solutions into portfolio metrics and proposes providing more granular guidance on the topic of climate solutions financing in 2023, as well as highlighting the need for more guidance on emissions attribution (GFANZ, 2022a).

- **R2Z/GFANZ workstream on Real-economy Transition Plans**, which notes that to help accelerate GHG reductions in the real economy, institutions can finance and support the development and scaling of climate solutions to replace high-emitting technologies, products, and/or services, in addition to divesting or withdrawing financing from high-emitting/hard-to-abate sectors (GFANZ, 2022b).

- **R2Z/GFANZ workstream on Financial Institution Net-zero Transition Plans**, which highlights that FIs can support real-economy transition by providing financing, investment, and insurance to climate solutions to replace high-emitting technologies or services. Real-economy transition metrics should include capital invested, deployed, or committed toward climate solution businesses and projects as defined in industry guidance, and financing for high-emitting companies and assets should be vigorously scrutinized to ensure net zero alignment. The use of both metrics would also allow the development of ratios on clean energy financing versus fossil fuel financing (GFANZ, 2022c).

4. DATA SOURCES

Three main data sources are required to track project-level investment and allocate it across the financial system. These can answer the following three questions:

1. **Who is investing in new climate solutions?** CPI's Global Landscape of Climate Finance (GLCF) provides the most comprehensive overview of global climate-related primary investment, including information on the type of capital provided (equity, concessional debt, grants), investors,[2] and specific low-carbon climate-resilient technologies supported (CPI, 2023). This report uses data from multiple sources, including Bloomberg New Energy Finance, Climate Funds Update, Convergence, CPI's surveys of development finance institutions (DFIs), and the OECD's Creditor Reporting System. Project-level data for the power sector has been complemented with data from fDI, IJ Global, and the World Bank's Private Participation in Infrastructure (PPI) dataset. Expansion of ownership analysis beyond the power sector requires transaction-level data, including the names of the entities performing direct project-level investment, before it is reattributed up above the ownership chain. As the information is not always available for hard-to-trace sectors, additional asset-level datasets will need to be identified.

2. **Who is investing in new high-emission assets?** In its Paris misaligned series (2020), CPI tracked primary investment in high-emission assets flows in the power sector for the first time. Like the GLCF, figures are also based on transaction-level datasets embedding information on the type of capital provided (equity, concessional debt, grants), investors, and specific fossil fuel technologies supported. Transactions data comes from IJGlobal, the World Bank's PPI dataset, Global Energy Monitor's Global Coal Public Finance Tracker, Global Oil and Gas Extraction Tracker, and fDI. Over time we plan to expand the analysis beyond the power sector, and fossil fuel financing. This will require an in-depth analysis of what high-emissions finance constitutes across various high-emission sectors in a way that clearly distinguishes it from transition finance.

3. **Who ultimately owns both these categories of investments?** Currently, the primary source of ownership data is Bloomberg Terminal, which provides data on shareholder and debt-holder security ownership. Several other sources can potentially be used including FactSet's Ownership data, which provides institutional, mutual fund, stakeholder, and float-related share ownership information for equities and fixed-income securities worldwide from company and institutional filings, investor reports, and press releases.

[2] Currently, 86.7% of all transactions include detailed investor-level data.

5. IMPLEMENTING THE ATTRIBUTION METHODOLOGY

5.1 Implementing the methodology for indirect financing attribution

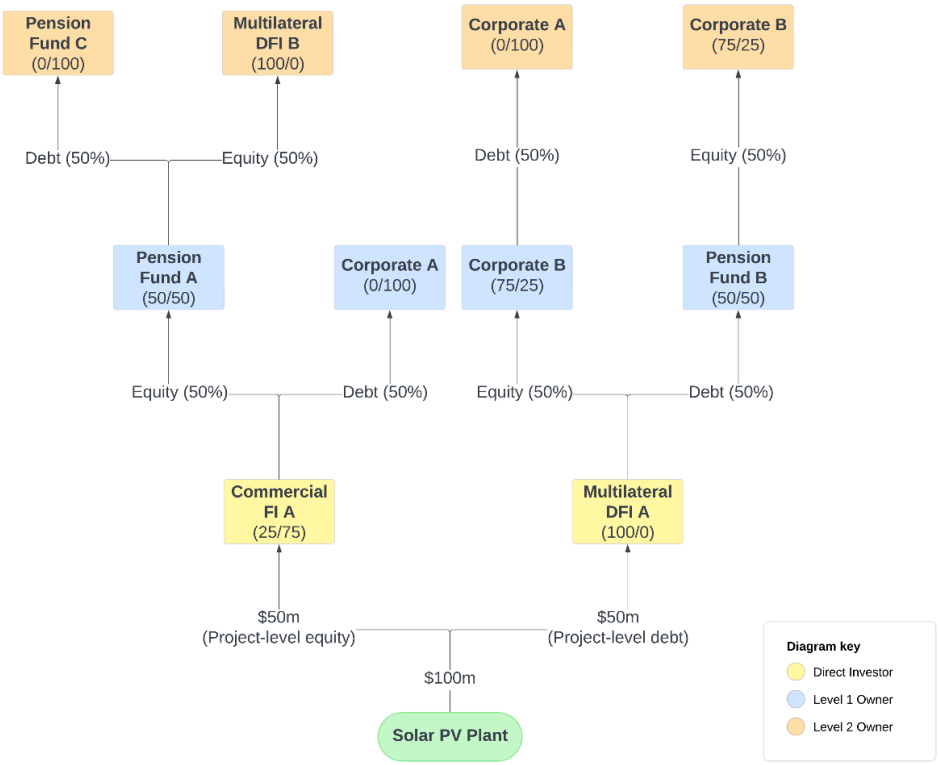
Direct financing refers to funding provided directly to high-emission assets or climate solutions. This can be in the form of grants, project-level equity, project-level debt, or concessional debt, among others. We identify direct investors and their contributions using project-level data from the sources stated in Section 4.

Indirect financing refers to investments attributed to entities one or more degrees removed from the direct investment through equity or debt ownership. Indirect investors are categorized as follows:

- **Level 1 Owners:** Hold a debt and/or equity stake in the direct investor.
- **Level 2 Owners:** Hold a debt and/or equity stake in the Level 1 owner.
- **Level 3 Owners:** Hold a debt and/or equity stake in the Level 2 owner.
- The pattern continues at subsequent levels, with each level holding a stake in the previous level.

As mentioned in Section 4, we identify indirect investors and their respective equity and debt ownership using the *Bloomberg Terminal*. Figure 4 illustrates an ownership tree for a solar power project, up to the second level of ownership.

Figure 4. Ownership tree for a Solar PV Plant, up to Level 2.



***Note**: The values shown as (X/Y) under each entity's name represent the (Book Value of Equity / Book Value of Debt), in USDm.*

Step-by-step methodology to calculate indirect financing at the entity level

For illustrative purposes, we can calculate the finance in the Solar PV project attributed to Pension Fund C (Level 2 debt owner) in the example shown in Figure 4:

Step 1. Identification of direct investors

Example (zoom in Figure 4)

- The direct investors are **Commercial FI A** and **Multilateral DFI A**. They invest USD 50 million into the solar PV plant through project-level equity and debt, respectively.
- Given that **Pension Fund C** is present in **Commercial FI A's** ownership tree, we maintain focus here.

Step 2. Capital structure analysis

The next step is to determine the book value of equity and debt for each direct investor identified under Step 1, using balance sheet data available on Bloomberg. We can calculate the equity and debt weightings for each direct investor using the following formulas:

Equity Weighting

$$\frac{\text{Book Value of Equity}}{\text{Book Value of Equity} + \text{Book Value of Debt}}$$

Debt Weighting

$$\frac{\text{Book Value of Debt}}{\text{Book Value of Equity} + \text{Book Value of Debt}}$$

Example (zoom in Figure 4)

- The book value of equity and debt for **Commercial FI A** is USD 50m.

Equity Weighting:

$$\frac{25}{25+75} = 25\%$$

Debt Weighting:

$$\frac{75}{25+75} = 75\%$$

We are occasionally unable to retrieve valid book values of debt and equity on Bloomberg for owners in our ownership data. For these owners, representing about 23% of those in our dataset, we impute the average equity and debt weighting from the owners with retrievable ratios: approximately 47.6% debt to 52.4% equity. In future iterations of the Net Zero Finance Tracker, we hope to investigate ways of more precisely estimating this ratio when raw values are unavailable.

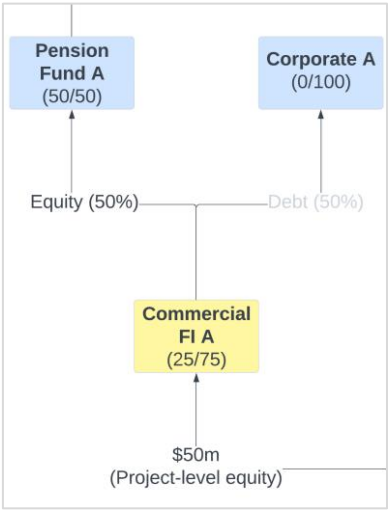
Step 3. Identification of Level 1 owners and their respective ownership stakes

Step 3 identifies entities that hold a debt and/or equity stake in the direct investors found under Step 1. We must then determine the ownership stakes the Level 1 entities hold in the respective direct investors.

The Annex details our scope of analysis, which includes investors with an ownership stake of 5% or more, allowing for a theoretical maximum of 40 investors (20 debt and 20 equity) if all top investors have a 5% stake. Additionally, if there are fewer than 10 investors with a stake above 5%, we include a minimum of the top 10 investors. Due to the generally low ownership stakes held by pension funds of interest, we make one exception to these bounds for pension funds that is described further in The Annex.

Example (zoom in Figure 4): For illustrative purposes, we disregard the upper and lower limits established in the Annex.

- According to data available on Bloomberg, **Pension Fund A holds 50% of Commercial FI A's shares**, and **Corporate A holds 50% of Commercial FI A's debt**.
- Since **Pension Fund C** is present within **Pension Fund A's** ownership tree, we maintain focus here.



Step 4. Attribution of finance to Level 1 owners

The next step is to calculate the finance attributed to Level 1 owners, using the following formulas:

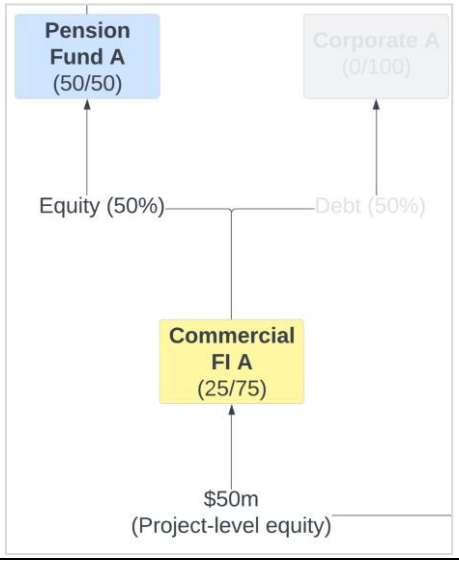
i) **Finance attributed to Level 1 equity owners**
(Contribution made by direct investor) × (Equity weighting of direct investor) × (Level 1 owner's equity stake)

ii) **Finance attributed to Level 1 debt owners**
(Contribution made by direct investor) × (Debt weighting of direct investor) × (Level 1 owner's debt stake)

Example (zoom in Figure 4):

- **Pension Fund A** is a Level 1 equity owner. Therefore, the finance attributed to it is as follows:

Finance attributed to Pension Fund A $= (50) \times (0.25) \times (0.50) = \text{USD } 6.25\text{m}$



Step 5. Attribution of finance to Level 2 owners

Next, Steps 1 to 4 should be applied to Level 2 owners.

Example (zoom in Figure 4):

- The finance attributed to **Pension Fund A** is **USD 6.25m.**
- The book value of equity and debt for **Pension Fund A** is the same. Therefore, the debt weighting is **50%**.
- Pension Fund C holds **50%** of Pension Fund A's debt.

Finance attributed to Pension Fund C $= (6.25) \times (0.50) \times (0.50) = \text{USD } 1.56\text{m}$

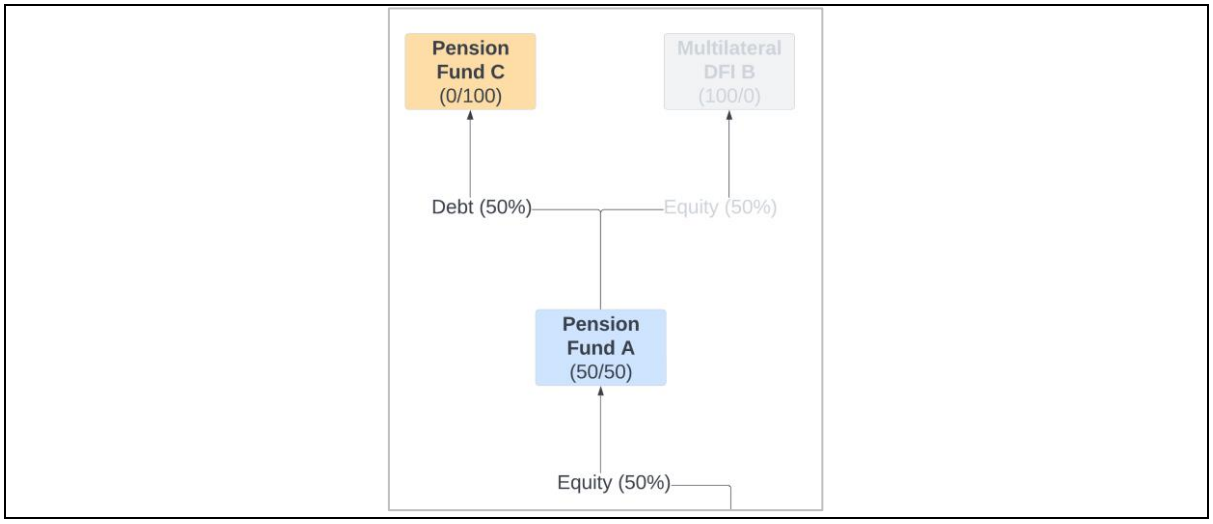
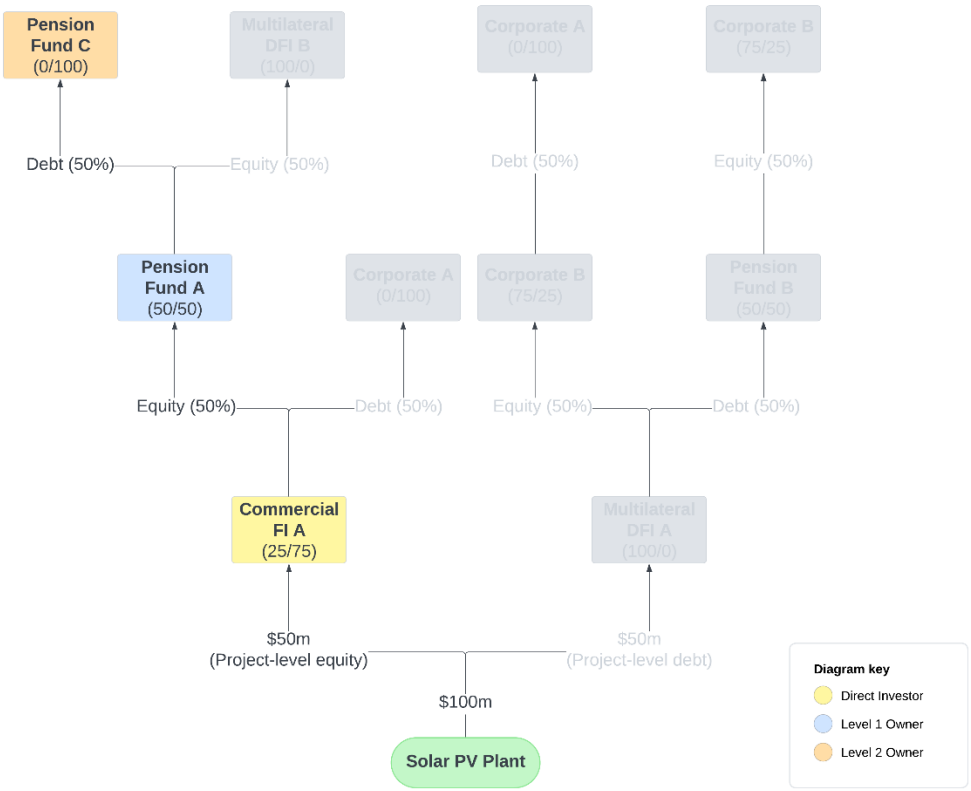


Figure 5. Visualisation of attributing finance up to Pension Fund C



In this first iteration of the ownership methodology, our analysis extends up to Level 2 owners to balance coverage with practicality. Beyond this level, the number of entities to track multiplies rapidly, creating operational constraints, while the significance of additional ownership layers diminishes. More details are provided in **Box B**.

Box B: Limits for ownership level iterations

Assessing the ownership structure of high-emission assets and climate solutions can be complex and resource-intensive, particularly as we move up the investment chain to consider additional layers of ownership.

For example, consider an entity with 20 distinct investors, the minimum established in the Annex. If each investor has 20 distinct investors of their own, we track 400 investors at Level 2. Continuing this pattern, we track 8,000 investors at Level 3. While many investors might repeat, the operational constraints and time required for manual analysis increase significantly with each additional level.

Moreover, as we move up the ownership chain, the compounding percentages result in increasingly insignificant investment attributions. Investors' ownership stakes also become progressively smaller with each additional layer. This pattern was confirmed through a sample of our data, which demonstrated that the benefits of examining further layers of ownership are outweighed by the increased computational and operational costs. Therefore, we have decided to extend our analysis only up to Level 2.

In future iterations of the methodology, we may consider expanding our scope to include more levels of ownership.

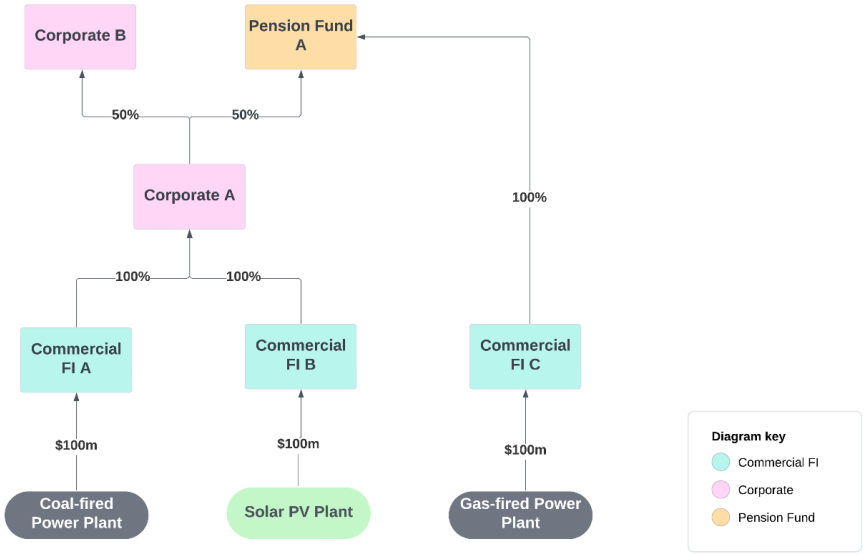
5.2 Implementing a methodology for indirect financing aggregation

The attribution methodology presented above effectively attributes finance to individual indirect investors, such as Pension Fund C in Figure 4. However, complications arise when aggregating indirect financing across certain dimensions. Such aggregation is required to discover how much indirect financing is attributed to each investor type (e.g., *all* equity investors, debt investors, pension funds, and corporates, etc.). Understanding these aggregate figures is essential for comprehensive financial analysis and policymaking, as it reveals the broader impact and distribution of investments across different categories of stakeholders involved in high-emission assets or climate solutions.

The problem arises from double counting. Following the attribution, aggregated investment across all indirect investors in the ownership chain does not equal the investments made directly in the given assets (real-economy investment). For example, in Figure 4, the investment attributed to Pension Funds A, B and C, Corporates A and B, and Multilateral DFI B would not match the USD 100 million total of direct investments made by Commercial FI A and Multilateral DFI A.

This discrepancy occurs because the attribution methodology tracks the finance enabled by an entity rather than the actual real-world investment. To address this, an aggregation approach is needed to complement the attribution methodology. By doing so, we can ensure that the investments attributed to indirect owners accurately reflect the direct investments channelled to projects. This adjustment will provide a more accurate and transparent account of investment flows, thereby enhancing our understanding of the real-world impact of these entities.

Figure 6. Ownership tree for two high-emission assets and one clean energy project, up to Level 2.



Note: For illustration, we have not distinguished between equity and debt ownership.

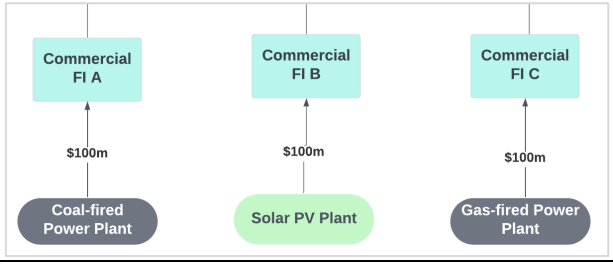
Step-by-step methodology to calculate indirect financing at the entity category level

For illustration, we calculate the finance attributed to the Corporates entity category in the example shown in Figure 6.

Step 1. Identify the direct investment(s) associated with high-emission assets and climate solutions

Example (Zoom in on Figure 6):

- Direct investments:
  - Commercial FI A: $100m
  - Commercial FI B: $100m
  - Commercial FI C: $100m



Step 2. Calculate the attribution of each direct investment across all indirect investors in the specified entity category

Using the attribution methodology, calculate the attribution of each direct investment identified in Step 1 among the indirect investors within the specified entity category.

Example (Zoom in on Figure 6):
Calculate how each direct investment identified under Step 1, made by **Commercial FI A, B and C**, are attributed among **Corporates A and B**.

Direct investment from Commercial FI A ($100m)

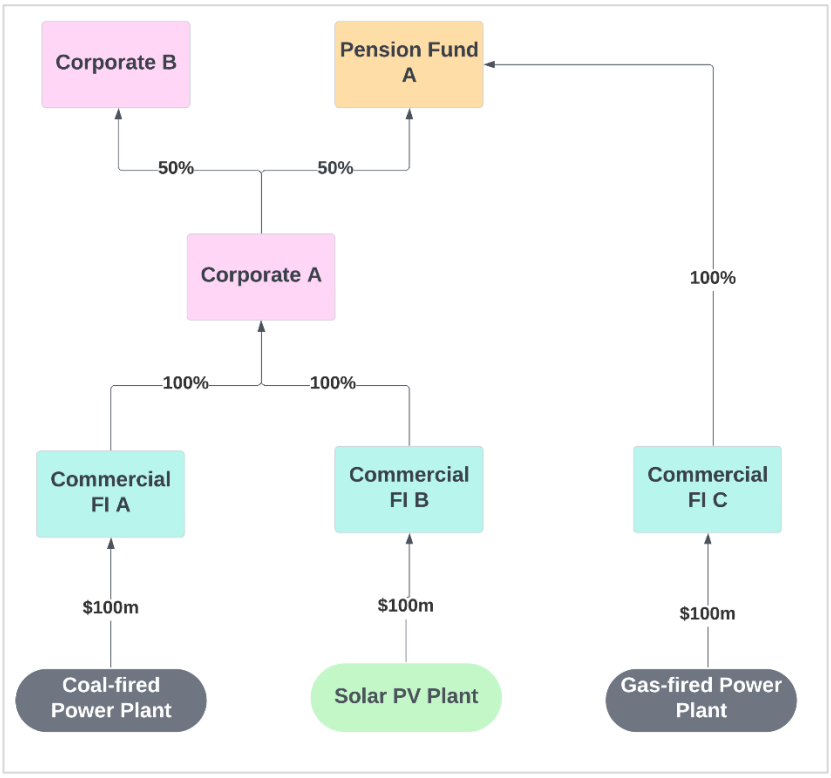
- **Finance attributed to Corporate A** $= (\$100\text{m}) \times (1.00) = \$100\text{m}$
- **Finance attributed to Corporate B** $= (\$100\text{m}) \times (1.00) \times (0.50) = \$50\text{m}$
- Total finance attributed is **$150m**

Direct investment from Commercial FI B ($100m)

- **Finance attributed to Corporate A** $= (\$100\text{m}) \times (1.00) = \$100\text{m}$
- **Finance attributed to Corporate B** $= (\$100\text{m}) \times (1.00) \times (0.50) = \$50\text{m}$
- Total finance attributed is **$150m**

Direct investment from Commercial FI C ($100m)

- **Finance attributed to Corporate A** $= \$0$
- **Finance attributed to Corporate B** $= \$0$
- Total finance attributed is **$0m**



Step 3. Calculate the indirect investment attributed across all entities

Using the attribution methodology, calculate the attribution of each direct investment identified in Step 1among all indirect investors, regardless of the entity category.

Example (Figure 6)
Calculate how each direct investment identified under Step 1, made by **Commercial FI A, B and C**, are attributed among **Corporates A and B**, and **Pension Fund A**.

Direct investment from Commercial FI A ($100m)

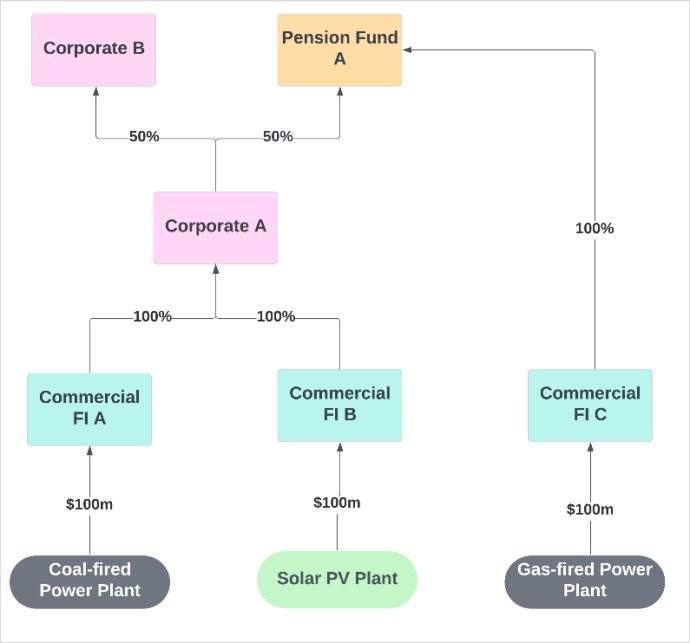
- **Finance attributed to Corporate A** $= (\$100\text{m}) \times (1.00) = \$100\text{m}$
- **Finance attributed to Corporate B** $= (\$100\text{m}) \times (1.00) \times (0.50) = \$50\text{m}$
- **Finance attributed to Pension Fund A** $= (\$100\text{m}) \times (1.00) \times (0.50) = \$50\text{m}$
- Total finance attributed is **$200m**

Direct investment from Commercial FI B ($100m)

- **Finance attributed to Corporate A** $= (\$100\text{m}) \times (1.00) = \$100\text{m}$
- **Finance attributed to Corporate B** $= (\$100\text{m}) \times (1.00) \times (0.50) = \$50\text{m}$
- **Finance attributed to Pension Fund A** $= (\$100\text{m}) \times (1.00) \times (0.50) = \$50\text{m}$
- Total finance attributed is **$200m**

Direct investment from Commercial FI C ($100m)

- **Finance attributed to Corporate A** $= \$0$
- **Finance attributed to Corporate B** $= \$0$
- **Finance attributed to Pension Fund A** $= (\$100\text{m}) \; x \; (1.00) = \$100\text{m}$
- Total finance attributed is **$100m**



Step 4. Calculate an attribution weighting specific to the entity category for each direct investment.

Divide the finance attributed to indirect investors within the entity category (Step 3) by the finance attributed to all indirect investors (Step 4).

Example (Figure 6)

Divide the finance attributed to **Corporates** by the finance attributed to **Corporates** and **Pension Funds**, specific to the direct investments made by **Commercial FI A, B and C**.

Direct investment from Commercial FI A ($100m).

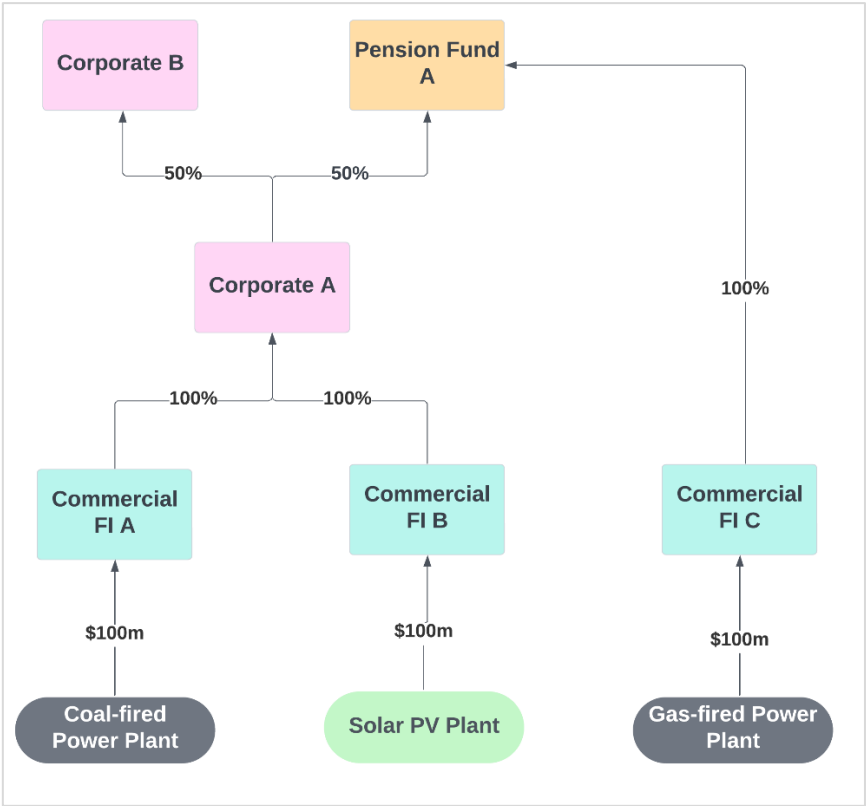
- **Attribution Weighting (CFI A; Corporates)** $= \frac{150m}{200m} = 0.75$

Direct investment from Commercial FI A ($100m)

- **Attribution Weighting (CFI B; Corporates)** $= \frac{150m}{200m} = 0.75$

Direct investment from Commercial FI A ($100m)

- **Attribution Weighting (CFI C; Corporates)** $= \frac{0m}{100m} = 0.00$



Step 5. Calculate the indirect investment attributed to the specified entity category.

Multiply the attribution weightings calculated in Step 4 with their respective direct investments.

Example (Zoom in on Figure 6):

Calculate the finance attributed to **Corporates** from the direct investment made **Commercial FI A, B and C**.

Finance attributed to Corporates from Commercial FI A's direct investment

- $(0.75) \times (\$100) = \$75m$

Finance attributed to Corporates from Commercial FI B's direct investment

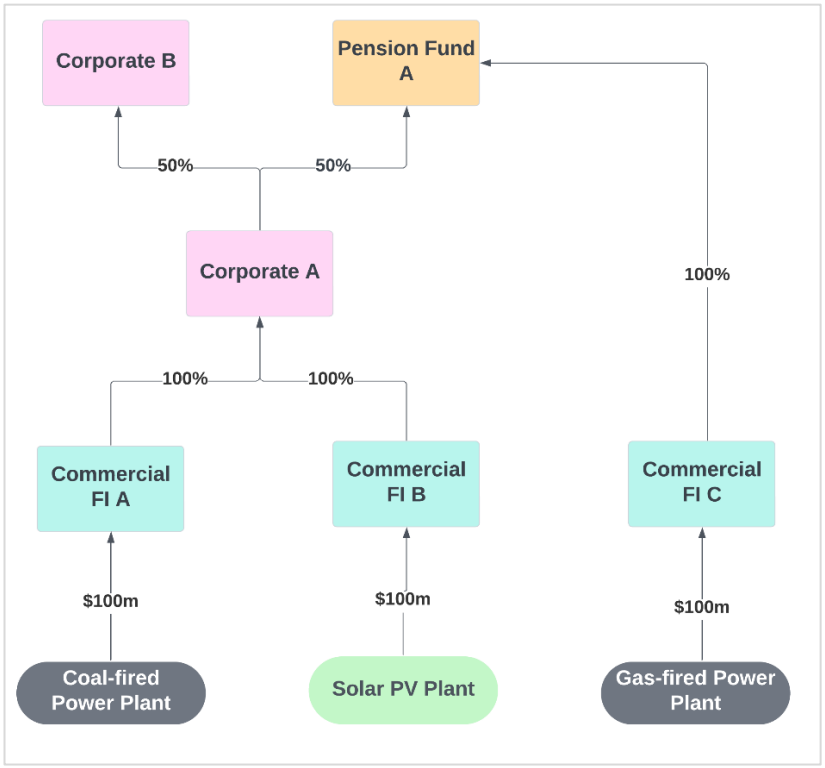
- $(0.75) \times (\$100) = \$75m$

Finance attributed to Corporates from Commercial FI B's direct investment

- $(0.00) \times / (\$100) = \$0m$

Total finance attributed to Corporates

$(\$75m) + (\$75m) = \$\mathbf{150}\boldsymbol{m}$



Following the same methodology, Pension Funds would have been attributed $150m. **This totals $300m across all entity categories, matching the real-world investment by Commercial FI A, B, and C** into high-emission assets and climate solutions.

ANNEX: SCOPE OF ANALYSIS

Our data sources include approximately 16,500 unique direct investors, each with their own network of debt and equity investors. Given the scale of this data, our approach must be streamlined and effectively balance completeness and practicality.

To achieve this, we have introduced upper and lower limits to the number of indirect investors we track per entity. The upper limit is set to prevent our analysis from being overwhelmed by an excessive number of investors, allowing us to maintain focus on the most significant stakeholders. The lower limit guarantees a minimum number of investors per entity, allowing for adequate coverage from which we can draw meaningful insights.

Upper limit:

We have decided to track only investors with at least a 5% ownership stake in an entity. This decision was informed by an extensive review of the literature and current trends in beneficial ownership disclosure standards, primarily in the context of combating financial crime, such as money laundering and corruption.

This follows the practice of the US Securities and Exchange Commission (SEC), which identifies 5% ownership as significant enough for public disclosure (Open Ownership, 2020). Moreover, this approach aligns with the ownership methodology underlying Climate TRACE, supported by Global Energy Monitor (GEM), which looks to track ownership and emissions totals by ownership of combustion power plants (e.g., coal, gas, oil and/or bioenergy).

The 5% threshold provides an upper limit of 20 investors tracked per entity. for both debt and equity investors separately. This results in a maximum of 40 investors (20 debt and 20 equity) per entity.

We make an exception to this threshold for the pension funds included in our final NZFT dashboard, which is our specific research focus this year. Pension funds have always been included in our analysis even if they own less than the 5% threshold in another entity. Given that these pension funds tend to hold ownership stakes below 5% in a wide range of entities, they would be almost entirely excluded from our analysis without this exception.

Lower limit:

We also implement a lower limit of 10 investors. This limit applies in two instances: first, when none of the investors meet the 5% threshold: and second, when fewer than 10 investors meet the 5% threshold. In both cases, we default to including the top 10 investors.

These limits apply separately to debt and equity investors, ensuring a minimum of 20 investors (10 debt and 10 equity) per entity. In future updates to our methodology, we intend to widen the scope of investors, further enhancing coverage.

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