

# Measuring and Evaluating the Development Impacts of Climate Investments

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## ABSTRACT

The Climate Investment Funds (CIF) makes catalytic investments in clean technologies and renewable energy projects to spur technology scale-up and market transformation in low- and middle-income countries – paving the way for sustainable development, decarbonized economic growth, and a just energy transition. Beyond greenhouse gas emissions reduced or avoided, development impacts (DIs) – also known as “co-benefits” – can be a core benefit of climate finance. However, these impacts are often not understood, planned for, or tracked in implementation. This mixed-methods evaluation confirms the inextricable link between climate finance and DIs, identifies important barriers and enablers to achieving DIs, and addresses how investors can plan for, measure, and estimate DIs.

This evaluation identifies over 60 DIs that can be realized through interventions supported by climate finance. It organizes these DIs into a new Climate Finance DI Taxonomy around four main DI categories – social, economic, environmental, and market development – and 11 subcategories. Example DIs include energy access, energy security, employment, income, and health impacts. Through analysis of the CIF portfolio and 13 original case studies of CIF projects, the evaluation identifies and describes many of these DIs and their impact pathways in detail. It shows how modeling can be used to assess high-priority DIs, including energy-enabled economic impacts and energy-enabled air quality/human health impacts.

The evaluation finds that fully realizing climate finance DIs requires intentional project design, delivery, and estimation or measurement. It provides lessons and tools to help investors consciously plan for DIs when designing programs/projects in order to maximize total program/project benefits.

## Introduction

With \$12.5 billion pledged, CIF is one of the largest active climate finance mechanisms in the world, with 10 programs and 362 projects across approximately 80 countries.

To develop a better understanding of the links between climate finance and development, CIF commissioned a mixed-methods evaluation of four programs: the Clean Technology Fund (CTF), the Scaling Up for Renewable Energy Program (SREP), the Pilot Program for Climate Resilience (PPCR), and the Forest Investment Program (FIP).<sup>1</sup> This evaluation expands the evidence base on the DIs that are linked to climate finance, strengthens the case for more ambitious climate action, and enables key decision-makers to make more informed and impactful decisions that can lead to broader and more inclusive development.

The evaluation addresses four questions:

1. What are the primary DIs that the CIF portfolio – and by extension, other climate finance – may contribute to, and through which impact pathways or modalities?
2. What are the key DI results and achievements that CIF's investments have contributed to? What have been the main challenges or unintended impacts?
3. What tools and models are available to better measure and estimate the DIs of climate finance – at different stages of the investment lifecycle?

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<sup>1</sup> While the evaluation findings are informed by all four programs, this paper focuses on the results for CTF and SREP.  
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4. What are the drivers and constraints that influence the extent to which CIF investments contribute to DIs? How can climate finance programs maximize their contributions to DIs?

## Methodology

The evaluation combines quantitative and qualitative methods, and three levels of evaluative activities: a secondary information review, a portfolio-level analysis and cataloguing of modeling tools, and 13 original project-level case studies:

- **Secondary information review of global climate finance programs to establish a library of evidence-based links between climate finance interventions and DIs.** The evaluators reviewed and synthesized existing evidence and lessons on DIs in the literature, for both CIF programs and external climate finance programs. The team coded and analyzed 35 CIF-related reports and 24 external reports to identify common patterns of interventions and impacts across different types of programs (e.g., utility-scale renewable energy projects, distributed energy resources projects, etc.), including barriers identified and addressed. The results provide a common framework for analysis for a more comprehensive understanding of the range of potential DIs resulting from CIF investments or from other climate finance portfolios. As further explained below, the common analysis framework includes a taxonomy of DIs and DI impact pathway illustrations that show different levels of development impacts in the sequence in which they often occur.
- **CIF modeling and portfolio analysis to test the application and relevance of advanced modeling approaches to estimate DIs that are difficult to directly observe or measure.** This level of the evaluation focused on two key areas: first, a review of earlier testing by program staff of portfolio-level economic modeling approaches, which included employment factor and input/output modeling approaches; and second, an in-depth review of another 20 modeling approaches that CIF (and other climate funders) could potentially use to assess other types of DIs that do not lend themselves well to direct observation, such as health outcomes or productivity improvements. This analysis provides a high-level assessment of the suitability of 14 priority DIs for estimation using advanced modeling approaches and, for a subset of DIs, recommendations on which modeling tools could be suitable for climate investors such as CIF. The evaluators focused on three high-priority DIs: (1) improved air quality and resulting health benefits from reduced (or avoided) fossil fuel combustion; (2) increased climate resilience in agriculture, including increased abilities to cope with shocks, reduced losses from climate events, and increased agricultural productivity; and (3) increased energy-enabled economic output, including direct, indirect, and induced employment and income. Modeling methods included input/output and computable general equilibrium (CGE) modeling for economic benefits, use of LEAP-IBC for air quality and associated human health benefits, and the InVEST model for ecosystem services benefits.
- **CIF country program and project-level analysis (via 13 case studies), to test how different measurement and modeling approaches can yield new insights on DIs for climate finance.** The evaluation uses case study methods to generate new evidence and learning on the DIs— whether measured, modeled, or potential—of climate projects. The 13 case studies employ the detailed impact pathways from the secondary information review and, in some cases, the modeling approaches identified from the modeling analysis. They use both qualitative and quantitative methods, such as stakeholder interviews, analysis of project documents, and secondary data sources. Two types of case studies are included: 1) eight “light-touch” studies based on secondary data sources and targeted interviews, and 2) five “deep-dive” case studies that collected new primary data and applied innovative assessment methods, including modeling, and thus help to expand the evidence base for priority DI areas. The case studies represent a balanced mix of CIF

projects by geography, technology, sector, program, and multilateral development bank (MDB) partner. Table 1 summarizes basic information on each case study.

Table 1. Overview of DI Case Studies

CASE STUDY DETAILS							DI CASE STUDY COVERAGE					
No.	COUNTRY	CIF PROGRAM	MDB PARTNER	CASE STUDY TYPE	SECTOR	INVESTMENT IN	SOCIAL	ECONOMIC	ENVIRONMENTAL	MARKET DEVELOPMENT	CROSS-CUTTING-GENDER	CROSS-CUTTING-CAPACITY
1	Bangladesh	SREP	World Bank	Light-Touch	Renewable Energy	Rooftop solar for factories	◆◆	◆	●	◆		
2	Bangladesh	PPCR	World Bank	Deep-Dive	Agriculture	Coastal embankment improvements	◆◆	◆◆	◆◆	●		●
3	Brazil	FIP	World Bank	Deep-Dive	Agriculture	Low-carbon / sustainable agriculture	●	◆	◆	◆	◆	
4	Brazil	FIP	Inter-American Development Bank (IDB)	Light-Touch	Forestry	Macauba value chain development	●	◆	●	◆		
5	India	CTF	Asian Development Bank (ADB), World Bank	Light-Touch	Renewable Energy	Utility-scale and rooftop solar and transmission	◆	◆◆	◆	◆	●	
6	Indonesia	CTF	ADB, World Bank	Deep-Dive	Renewable Energy	Upstream and downstream support for geothermal	◆◆	◆◆	●	●	◆	●
7	Indonesia	FIP	ADB, World Bank	Light-Touch	Forestry	Sustainable forest management	◆	●	●	◆	●	
8	Kenya	SREP	World Bank	Light-Touch	Renewable Energy	Mini-grid electrification in rural areas	◆	◆	◆			
9	Morocco	CTF	African Development Bank (AfDB), World Bank	Light-Touch	Renewable Energy	Utility-scale concentrated solar power plant	◆◆	◆		◆		
10	Nepal	SREP	World Bank	Deep-Dive	Renewable Energy	Expansion of off-grid biogas	◆◆	◆	●	◆	●	◆
11	Niger	PPCR	World Bank	Light-Touch	Agriculture	Climate resilience interventions	◆	●	◆		●	
12	Thailand	CTF	ADB	Deep-Dive	Renewable Energy	Utility-scale wind power generation	◆◆	◆◆	◆	◆◆		●
13	Türkiye	CTF	World Bank	Light-Touch	Renewable Energy & Energy Efficiency	Small-scale renewables and energy efficiency	●	◆◆	◆	◆◆		

Legend: ◆ At least 1 DI in this category quantitatively assessed ● At least 1 DI in this category qualitatively assessed

Examining DIs in aggregate is challenging, as the impacts are sectorally and geographically diverse, grounded in the nuances of the country and sectoral contexts, and require a range of methods to analyze them. Still, by combining case studies, a modeling/portfolio analysis, and secondary information, this evaluation generated new insights that are relevant for CIF and other climate funders.

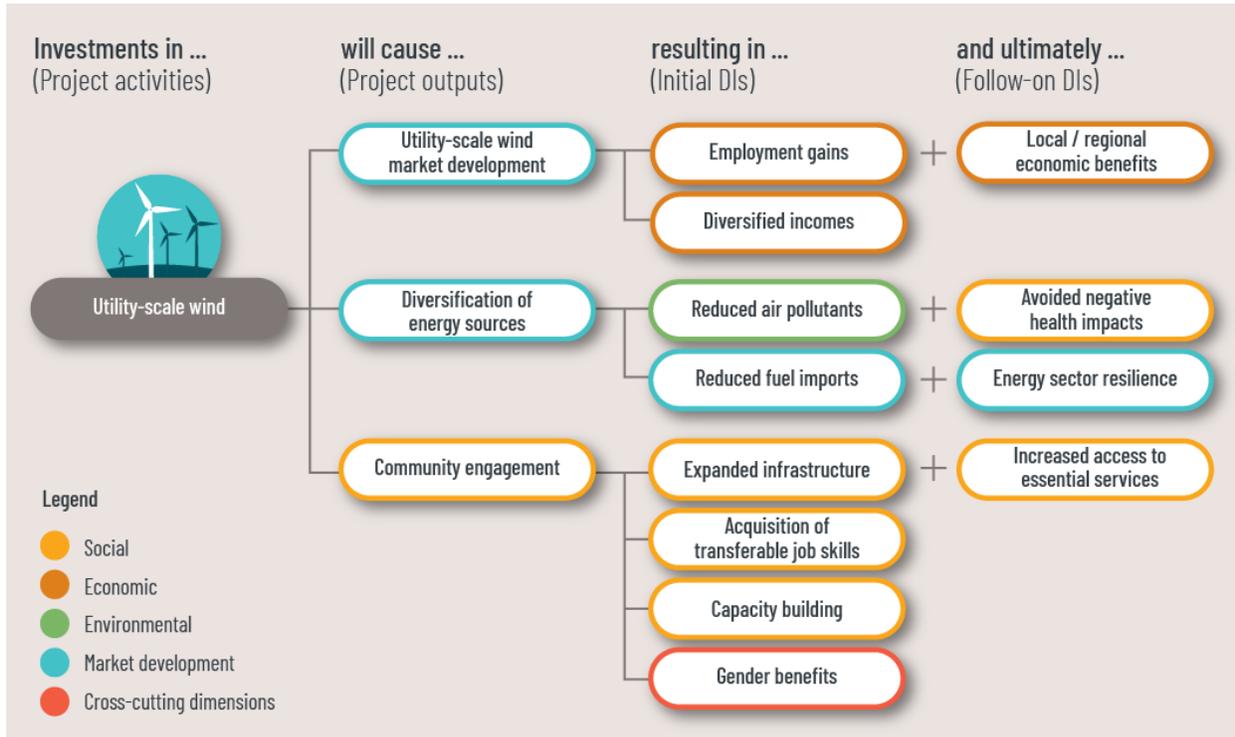
## DI Taxonomy and Impact Pathways

The secondary information review identified over 60 DIs that can be realized through interventions supported by climate finance. For ease of further reference, these DIs were organized into a new Climate Finance DI Taxonomy around four main DI categories — social, economic, environmental, and market development — and 11 subcategories, in addition to two crosscutting dimensions that are relevant across all DI categories: 1) impacts on women and other vulnerable or excluded populations, and 2) built capacity. Several aspects of inclusivity and justice are also included as specific DIs under market development, where they were identified in the secondary review.

Table 2. Climate Finance DI Taxonomy

<b>SOCIAL</b>	<b>ENVIRONMENTAL</b>
<b>1. Livelihoods, wealth, and quality of life</b>	<b>6. Natural resources</b>
Increased or diversified income	Reduced air pollutants
Wealth generation	Improved water quality
Recognition of tenure rights	<b>7. Ecosystem and biodiversity</b>
Increased access to markets	Improved legal / regulatory framework
Acquisition of transferable job skills	Improved forest management planning
Improved working conditions	Enhanced forest stocks
Increased ability to cope with shocks	Increase in sustainable land use
Reduced losses from extreme climate events	<b>8. Soil and crop productivity</b>
Increased capacity of local institutions	Increased productivity of agriculture
Community engagement / collaborative implementation	Improved soil health
<b>2. Health and safety</b>	Reduced use of inputs or natural resources
Increased food security	<b>MARKET DEVELOPMENT</b>
Reduced illegal activity	<b>9. Competitiveness and industrial development (all sectors)</b>
Avoided negative health impacts from fossil fuels	Increased small and medium enterprises (SMEs) in the market
<b>3. Essential services</b>	Improved integration / connectivity of systems
Increased access to electricity (households / businesses)	Supply chain development
Increased electricity reliability / decreased outages (households / businesses)	Maturation of market structures
Reduced costs of essential services (households / businesses)	Increased technology adoption
Increased access to public transportation	Expanded access to capital
Increased access to water or improved reliability	Reduced operating costs (e.g., energy)
Increased access to healthcare / medicine	Increased affordability of low-carbon technologies
Increased access to infrastructure	Increased / diversified product offerings
Increased access to education	Reduced trade imbalance
<b>ECONOMIC</b>	More projects / products meeting international standards
<b>4. Employment opportunities</b>	Improved legal / regulatory framework, capacity, governance
Increase in direct employment (permanent [perm] or temporary [temp])	<b>10. Energy sector security and resilience</b>
Increase in indirect employment (perm / temp)	Increased market entrants
Increase in induced employment (perm / temp)	Increased local energy generation
Increased earnings from employment (all types)	Reduced transmission / distribution line losses
<b>5. Economic value add (GDP)</b>	Diversification of energy sources
Increased economic outputs	Increased sector integration
<b>CROSS-CUTTING DIMENSIONS</b>	Increased financial stability
<b>Inclusion and empowerment</b>	Reduced fuel imports
Gender inclusion, impacts on women and girls	Increased regulatory / governance capacity
Vulnerable populations and local stakeholders impacts	Improved planning for shocks and stresses
<b>Capacity</b>	<b>11. Inclusiveness and justice</b>
Built capacity (within specific stakeholders)	Inclusiveness and energy justice
	Inclusive business models (e.g., women, others)
	Inclusive regulation (e.g., women, others)

While the DI taxonomy provides a baseline reference for the range of DIs that can be realized through climate finance activities, the impact pathways developed for this evaluation (and tested/validated in the 13 case studies) illustrate how different types of climate investments can lead to different DIs. Figure 1 illustrates how investments in utility-scale wind projects in Thailand lead to increased wind market activity and development, thereby producing DIs such as employment opportunities and local and regional economic benefits.



**Figure 1.** Impact Pathways for Utility-Scale Wind Energy Development in Thailand

### Portfolio-level Results

The secondary review also assessed which DIs were most frequently referenced in the 59 external and internal reports: the top DI subcategories were “Livelihoods, Wealth, and Quality of Life,” “Essential Services,” “Employment Opportunities,” and “Energy Sector Security and Resilience.” To help CIF identify the DIs that are the most relevant for its programs, as well as those that would lend themselves well to further research and tools development, the entire CIF investment portfolio of 249 projects was reviewed to locate all documented references at the project level to the list of 62 DIs. As Table 3 shows, a range of DI subcategories and cross-cutting dimensions are frequently referenced in more than 50 percent of investments across the four CIF programs, and all 11 subcategories are mentioned in CIF investments. The most frequently identified DIs within CIF’s clean energy development portfolios (CTF and SREP) are inclusive employment opportunities, access to essential services, competitiveness and industrial development, and energy sector security and resilience.

Table 3. DIs Identified in the CIF Portfolio

DI SUBCATEGORY	CTF (N=93)	SREP (N=40)	FIP (N=43)	PPCR (N=73)
1. Livelihoods and wealth	49%	18%	65%	40%
2. Health and safety	17%	35%	0%	41%
3. Essential services	51%	88%	5%	36%
4. Employment opportunities	62%	60%	26%	8%
5. Economic value added (Gross Domestic Product [GDP])	43%	30%	65%	14%
6. Natural resources	3%	3%	0%	22%
7. Ecosystem and biodiversity	16%	5%	30%	10%
8. Soils and crop productivity	1%	3%	56%	41%
9. Competitiveness and industrial development	66%	88%	9%	14%
10. Energy sector security and resilience	59%	80%	7%	8%
11. Inclusiveness and energy justice	35%	65%	42%	18%
Gender inclusion / impacts on women	25%	73%	44%	70%
Local stakeholders' inclusion / impacts	0%	0%	56%	60%

Legend: Percent of projects that mentioned one or more DIs in this subcategory.

50-100%	25-49%	1-24%
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The primary benefits from CTF and SREP projects flow from new renewable energy capacity, which paves the way for competitiveness and industrial development, and additional DIs. The subset of CTF and SREP projects that were examined in the case studies resulted in extensive new renewable capacity, including over 4,000 MW of solar parks and 400 MW of rooftop solar in India, 1,815 MW of new geothermal capacity in Indonesia, 80 MW of rooftop solar in Bangladesh, and 88.5 MW of new wind capacity in Thailand. Across these three projects, new renewable capacity installed under CIF-funded projects totals over 6,383 MW.

The development of new renewable energy capacity was associated with improved competitiveness and industrial development. In India, Morocco, Bangladesh, and Thailand, for example, projects funded by CIF acted as successful demonstrations that subsequently attracted private capital to establish and expand renewable energy markets. Other notable DIs include employment, expansion of electricity to new households and businesses, and health benefits from reduced air pollutants. Examples are provided in the following section of this paper.

To estimate the economic DI contributions of CIF's investments, such as economic value added and jobs supported, a portfolio-level assessment was conducted using the Joint Impact Model (JIM). The JIM is an input-output (I-O) modeling tool that relies on multipliers to estimate the effects of an initial change in economic activity across an economy. The economic modeling performed shows that CIF investments are expected to contribute substantially to employment and to add tens of billions of dollars in economic value to local economies throughout the lifetime of projects. Estimated impact contributions include:

- Direct impacts of USD25 billion in economic value added by investment projects and their clients

- Indirect impacts including 2.1 million annual short-term jobs (“person-years of employment”<sup>2</sup>) and USD20.6 billion in economic value added through project supply chains.
- Induced impacts of 1.6 million annual short-term jobs (“person-years of employment”) generated by spending of wages generated in direct or indirect project activities.
- Energy-enabled impacts of 637,000 annually recurring jobs and USD4.3 billion in annual recurring economic value added from increased economic output due to increased power generation.

## Case Studies

All 13 cases studies identified numerous impact pathways and DIs that could be assessed, using qualitative and quantitative research techniques or project-specific modeling. From the over 60 DIs identified in the taxonomy, the case studies identified key DI results for more than 20 different DIs — spread evenly across all four key DI categories. The examples below provide short summaries of two case studies: utility-scale wind in Thailand and geothermal projects in Bangladesh.

### Utility-Scale Wind in Thailand

Thailand set a national target of 3,002 MW of installed wind power capacity by 2036 to diversify the country’s energy mix. To support this target, CIF funded the successful construction of two utility-scale wind-power facilities: Theppana (7.5 MW) and Subyai (81 MW). CTF provided a total of \$4 million in funding for the Theppana plant and \$30 million for the Subyai facility, with additional support from ADB and the Bank of Ayudhya.

The CTF-funded projects were the first movers for utility-scale wind power in Thailand. CTF support was important in overcoming the financial and regulatory barriers that had prevented earlier wind-power activities and in facilitating future investments in wind power. Figure 1 (presented above in the ‘DI Taxonomy and Impact Pathways’ section) shows the impact pathway for the CTF projects in Thailand. Some of the key DIs included:

- **Market development:** Installed wind power capacity has increased from less than 10 MW in 2008 to 1,510 MW in 2020. This expansion would not have been possible without demonstration of the financial viability of wind power and adaptations to the regulatory environment that were facilitated under the Theppana and Subyai projects. These first-mover utility-scale wind power projects paved the way for future projects.
- **Employment gains:** Combined, the two CIF-financed facilities created 669 construction jobs and 38 permanent positions.
- **Income diversification:** Local farmers leased land to the plants, earning higher rents than the expected returns for farming cassava, helping to localize the economic benefits of the wind projects in the surrounding communities.
- **Diversification of energy sources:** The two plants provided an alternative to imported natural gas or coal generated energy and helped unlock the potential for future wind projects.
- **Expanded infrastructure:** Construction efforts included expansion of community-accessible roads and improvements to water management systems.
- **Acquisition of transferable job skills:** Both facilities offered opportunities for local residents to gain skills related to wind power operations through scholarships and internships. The Theppana plant trained four plant operators.

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<sup>2</sup> “Person-year of employment” refers to one person employed full time for one year. It is often used for construction jobs, which may be temporary. For example, if a project has a construction duration of two years and supports 50 person-years of employment, this is equivalent to employing 25 people on a full-time equivalent basis for two years.

- **Community engagement:** The projects invested in local infrastructure and sponsored a variety of corporate social responsibility activities to benefit and engage the local community.
- **Health benefits from reduced air pollution:** The expansion of renewable wind energy displaces the emission of air pollutants from natural gas and coal, which can cause adverse health impacts. To understand the economic benefits of these avoided health impacts, economists may apply the value of statistical life (VSL). The health benefit measured with the VSL of the Theppana and Subyai facilities alone is estimated at \$1.46 million – and the potential benefits if Thailand meets its national wind energy goals are substantially larger.
- **Capacity building:** CTF and ADB provided technical expertise to increase the capacity of Thai financial and regulatory institutions with regards to wind power and renewable energy.

As shown in Figure 1, market development from the CTF utility-scale wind projects in Thailand resulted in significantly more health benefits from reduced air pollutants. CIF's concessional finance reduced the risk for first-mover, utility-scale wind projects in Thailand and demonstrated their financial viability. This, in turn, helped overcome the reluctance of domestic financial institutions to provide loans for these projects. Several privately funded, large-scale wind projects were installed after the initial demonstration projects without the need for concessional finance from CIF or an MDB. Resulting DIs, including reduced emissions and the health benefits of reduced air pollution, would likely have not been achieved in the same timeframe or at the same scale without the first-mover CIF-funded facilities.

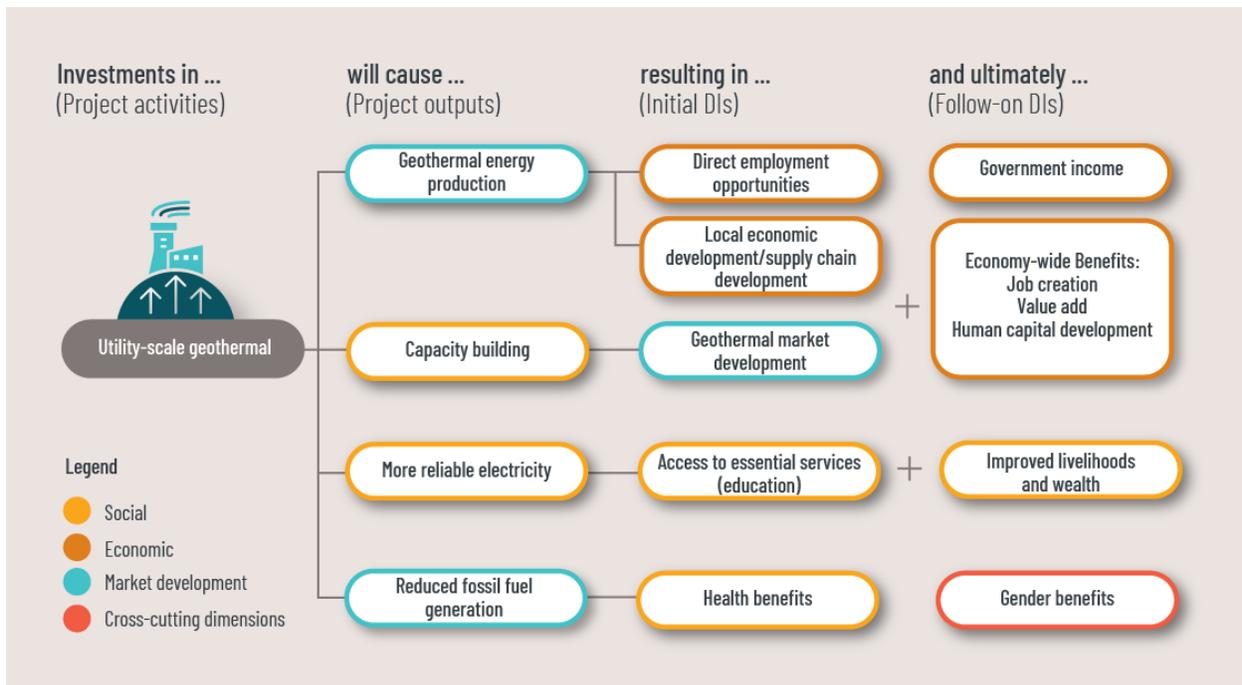
## Geothermal in Indonesia

For more than a decade, CIF investments have supported geothermal energy development in Indonesia through upstream (de-risking exploration and drilling) and downstream (geothermal project development) projects. CIF's \$483.25 million for Indonesia's geothermal development brought in \$3.97 billion in cofinancing and will mobilize additional commercial capital. Concessional finance provided by CIF lowered the cost of capital and helped make the projects competitive. MDB and CTF funds also helped to provide financial certainty and market confidence. Actual and forward-looking geothermal capacity expansion in Indonesia supported by CIF amounts to 1,815 MW, of which at least 320 MW were completed at the time of writing.

Figure 2 shows the impact pathway for DIs from the CTF-funded geothermal projects in Indonesia. Some of the main DIs included:

- **Geothermal market development:** Through geothermal investment funded by CIF, North Sulawesi exceeded Indonesia's national target of 23 percent renewable energy capacity nationwide by 2025. In addition, the project significantly reduced systemic power shortages and regular blackouts that previously plagued the region.
- **Job creation:** The geothermal projects supported by CIF directly created or will create an estimated 4,350 long-term jobs, and indirectly support more than 27,000 jobs. Most of these jobs are during the construction phase of development, although some are operational jobs.
- **Economy-wide impacts:** The geothermal projects supported by CIF have economy-wide impacts estimated at \$107 million per year.
- **Education and human capital:** Expanded access to electrification, and more reliable electricity, facilitates increased access to education, and increased human capital valued at approximately \$27 billion.
- **Health benefits:** Reducing reliance on fossil fuels for electricity generation, including diesel generators for backup power, produces health benefits of over \$2 billion.
- **Other DIs:** Additional benefits of geothermal market development include local economic development and development of local supply chains, increased government revenues, improved

access to public services and infrastructure, and capacity building benefits including improved local government coordination, and improved policy and regulatory environment.



**Figure 2.** Impact Pathways for Geothermal Energy Development in Indonesia

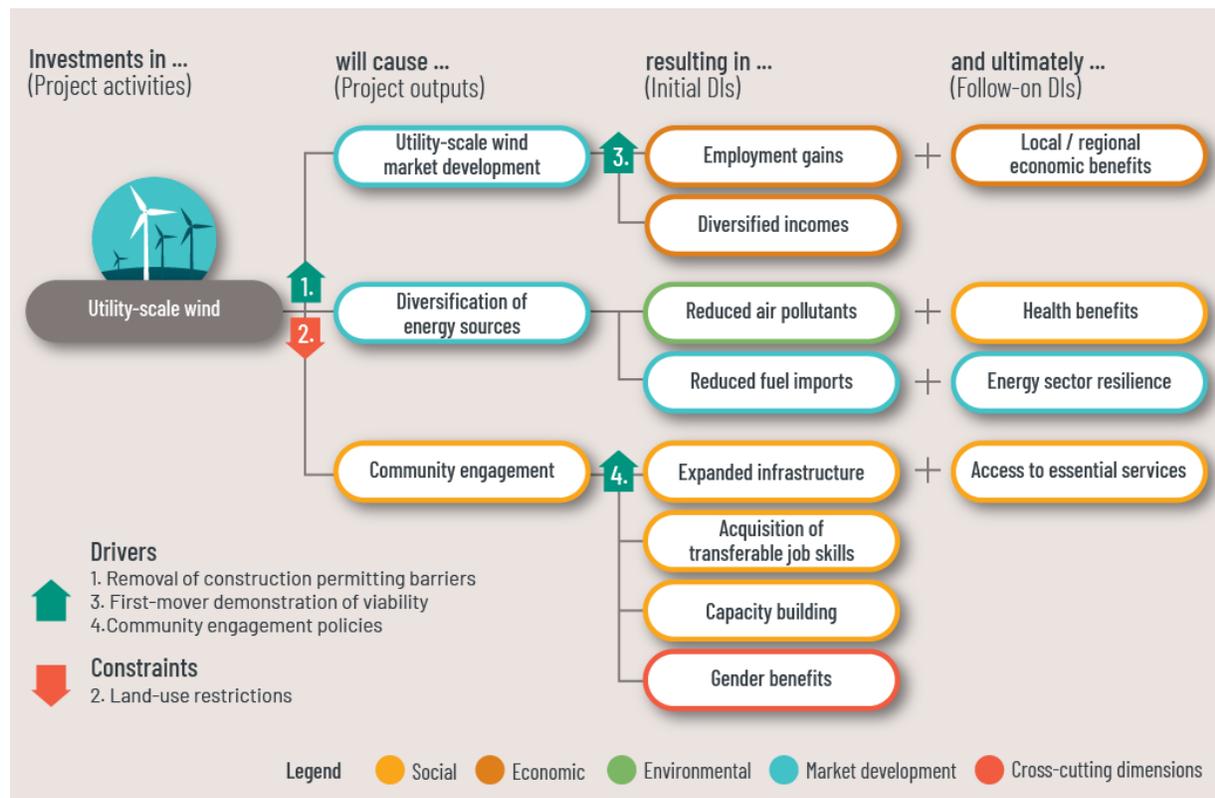
### Drivers and Constraints

Progress toward achieving DIs through climate finance is facilitated or impeded by drivers and constraints at different levels of the project’s implementation and impact pathway. The evaluation identifies six main types of drivers and constraints: institutional, financial/investment, workforce/capacity development, technical/infrastructure, social inclusion, and programmatic/program management.

Drivers and barriers strengthen or weaken the impact pathways to influence the achievement of DIs. They can influence any point of the impact pathways, from successful overall project implementation (which is generally a prerequisite for achieving any DIs), to the granular delivery of a specific DI. Because successful project design, implementation, and scale-up are usually necessary (though not always sufficient) for achieving DIs, these drivers and barriers were identified as important influencers of the achievement and magnitude of DIs across case studies. Drivers and barriers that relate to the granular delivery of a specific DI may be found further down the impact pathway.

Figure 3 shows how these drivers (as indicated by green, upward arrows) and barriers (as indicated by red, downward arrows) affect the DI pathways for utility-scale wind power in Thailand. The placement of “removal of construction permitting barriers” (green arrow) and “land use restrictions” (red arrow) at the beginning of the DI pathways shows how fundamental they are to the achievement of DIs. In Thailand, utility-scale wind power faced regulatory barriers that prevented the construction of wind turbines and thus the achievement of any resulting DIs. The project’s coordination with the Government of Thailand was a key driver of the removal of permitting requirements for tall structures that had barred turbine construction (for both CIF-funded demonstration projects and subsequent replication projects). However, uncertainty about restrictions on wind facilities leasing land designated for agricultural

purposes (on land owned by Thailand’s Agricultural Land Reform Office) remains a barrier to the construction of wind facilities and the realization of resulting DIs.



**Figure 3.** Drivers and Barriers in the Impact Pathway for Utility-Scale Wind in Thailand

As shown further along the impact pathway, community engagement policies (green arrow) directly influence the achievement of community engagement and resulting DIs such as acquisition of transferable job skills and capacity building. For example, the successful installation of wind turbines would not in itself have resulted in the acquisition of transferable job skills or capacity building benefits, absent effective community engagement policies.

The existence of drivers and barriers further along the impact pathway demonstrates their path dependencies, and how some types of DIs may only be realized, or others only maximized, if they are intentionally built into the project design, execution, and monitoring.

The analysis of drivers and constraints across the CIF case studies illuminated important design considerations and lessons on how to more effectively convert potential DIs into realized DIs:

- **DI drivers and constraints require intentional and early considerations in project design and implementation.** As can be seen in the Thailand utility-scale wind case and others, if drivers and constraints appear in the early stages of impact pathways, proper attention in the planning stages will have a strong influence on the achievement of the DIs that follow.
- **Institutional drivers and constraints play a key role in DI realization, regardless of sector.** Institutional drivers – whether involving the government or the private sector, regulatory frameworks, or others – were observed in 10 of 13 case studies. Projects that successfully aligned the interests of the government, the private sector, and local stakeholders (such as the Thailand

utility-scale wind case) were able to unlock higher DIs, through increased relevance, responsiveness, and buy-in.

- **Using innovative climate finance structures can overcome constraints associated with technical or financial elements of risk perception and drive enhanced economic DI results.** Climate finance models that incorporate concessional/innovative structures and help to de-risk a market for private investment or demonstrate business model viability were identified as key drivers of economic DI results in several case studies. These models facilitated future market expansion beyond CIF's involvement, thus scaling the DI achievements. For example, concessional finance reduced the risk for first-mover, utility-scale wind projects in Thailand and demonstrated their financial viability. This, in turn, helped overcome the reluctance of domestic financial institutions to provide loans for these projects. Several privately funded, large-scale wind projects were installed after the initial demonstration projects without the need for concessional finance from CIF or an MDB. Resulting DIs, including reduced emissions and the health benefits of reduced air pollution, would likely have not been achieved in the same timeframe or at the same scale without the first-mover CIF-funded facilities.
- **Social inclusion and meaningful community engagement are both first-order DIs and key drivers that help ensure that other economic and social DIs are achieved and equitably distributed.** Where local norms may discourage the participation of certain groups, an even more careful contextual analysis of these types of constraints may be needed. For example, in the Brazil sustainable agriculture case study, local implementers were able to navigate constraints associated with conservative farming communities to achieve good rates of technology adoption and a range of impacts. The project incorporated women's empowerment objectives and activities, which in addition to increasing the economic wellbeing of women, also had a positive influence on the speed of implementation, thereby accelerating the achievement of additional DIs.
- **Capacity-related activities and outcomes are key drivers of a variety of DIs, including competitiveness and industrial development, employment, and earnings.** Capacity constraints impacted 10 of the 13 case studies. Technical assistance, training, and capacity building to facilitate local workforce participation are key drivers of employment gains, the development of local supply chains, and increased/diversified income in several case studies. Capacity building is often a key requisite to achieving these distributed impacts – meaning impacts that affect vulnerable or traditionally excluded groups; thus, it needs to be factored into project budgets and funding plans.
- **Adequate technology and physical infrastructure can be an important driver of DIs, while their absence can be a constraint.** Technical constraints were identified in five of 13 case studies, such as power grid limitations in India and Bangladesh; however, in some instances, these constraints may have been beyond the scope of the projects to address. The introduction of new technologies can also be undermined by unexpected performance issues (as in the Bangladesh coastal agriculture case study) or it can have an unplanned influence on other DIs, such as lowering employment numbers due to increases in productivity, thus resulting in less employment creation than may have been anticipated.

The impact pathways identified and substantiated through this evaluation could be used to identify the drivers needed to achieve DIs – particularly those that have been identified as local priorities. This would help climate investments to identify the most important DIs through diagnostic work and investment planning, then progressively work back to what energy source/adaptation response would meet those development needs, and perhaps consider other factors, such as alternative ownership, the distribution of benefits, and empowerment of communities.

## Conclusions

Climate action and development are inextricably linked, and CIF's programs are designed accordingly, aiming to help countries achieve low-carbon, climate-resilient and inclusive growth through targeted climate investments. Yet, even though development impacts are understood to be a core benefit of climate finance – and this evaluation finds compelling evidence of them in CIF's portfolio – DIs are not always discussed in the planning of climate projects or included in monitoring and evaluation. Through intentional planning and tracking of DIs, there may be opportunities to achieve even greater impacts.

Progress toward achieving DIs through climate finance investments is facilitated or constrained by drivers and barriers at different levels. Because of these drivers and barriers, converting potential DIs to realized DIs requires intentional project design and implementation, starting in the early stages. Concessional climate finance and innovative financing models that de-risk investments and demonstrate successful financial/business models can strengthen and enable deeper market development and economic DIs than would otherwise be achieved. This evaluation provides lessons and tools to help investors to consciously plan for DIs when designing programs/projects.

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