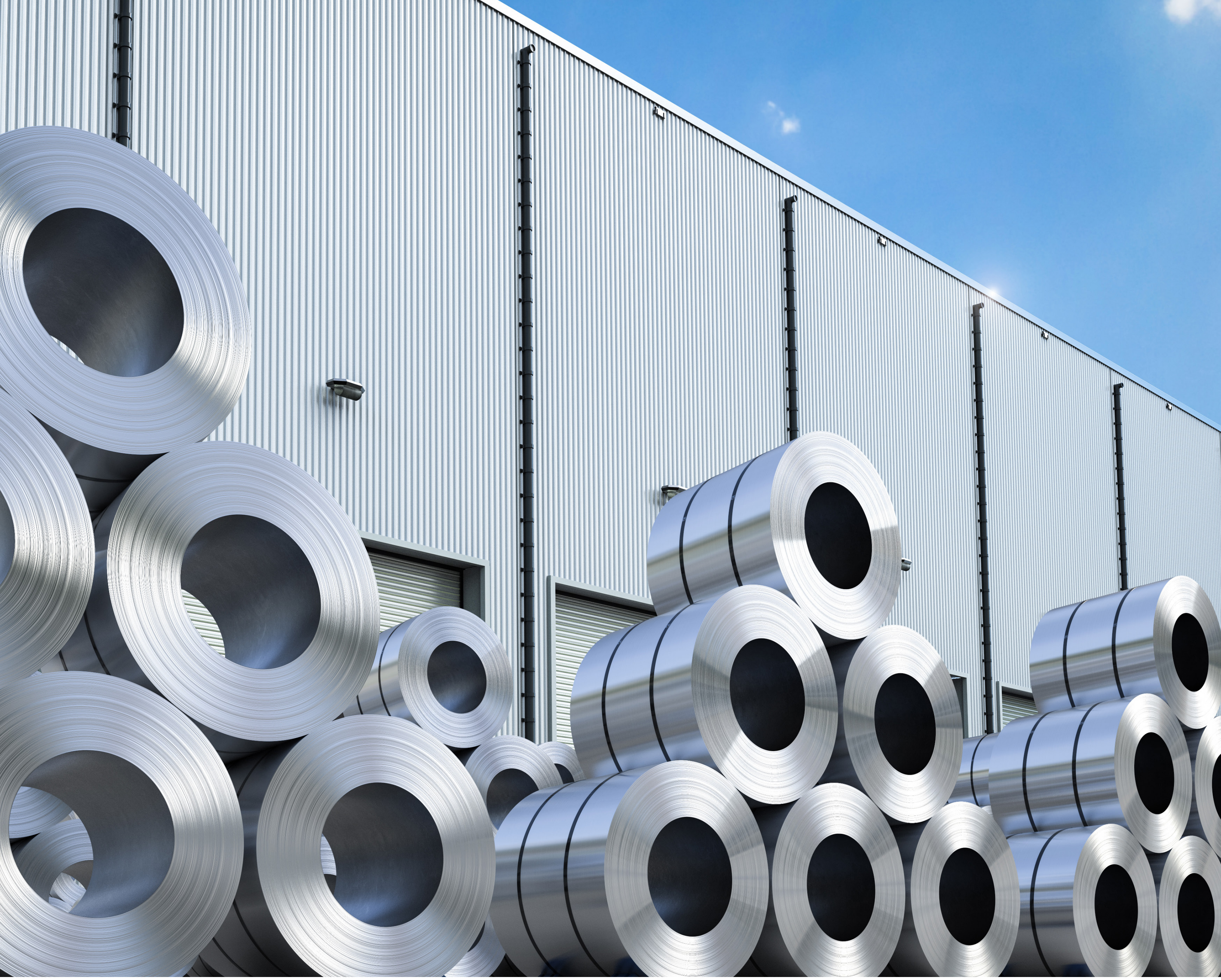

The Lab
Global Innovation Lab
for Climate Finance

FINANCING STEEL DECARBONIZATION

INSTRUMENT ANALYSIS
SEPTEMBER 2022

The Lab
Driving Sustainable Investment

Financing Steel Decarbonization

LAB INSTRUMENT ANALYSIS
September 2022

DESCRIPTION & GOAL —
Financing steel decarbonization combines technical assistance, low-cost patient capital, and implementation stage services to prepare, invest in, and de-risk decarbonization technology projects for low-carbon steel production.

SECTOR —
Heavy Industries – Iron and Steel

FINANCE TARGET —
Steel producers and ring-fenced steel decarbonization technology projects. Targeting capital deployment of USD 1 billion over five years, and additional mobilization of over USD 3.4 billion to support decarbonization of steel production in India.

GEOGRAPHY —
For pilot and full operational phase: India
Others: Poland, Romania, Bangladesh, Indonesia

The Lab identifies, develops, and launches sustainable finance instruments that can drive billions to a low-carbon economy. The 2022 Lab cycle targets four thematic areas: sustainable food systems, nature-based solutions, zero-carbon buildings, and adaptation, in addition to three geographic regions: Brazil, India and Southern Africa.

AUTHORS AND ACKNOWLEDGEMENTS

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SUMMARY

Steel is a high emission- and investment-intensive sector. It contributes to about 10% of India's total emissions, further expected to grow rapidly as demand for steel in the country increases by three to four-fold by 2050 (TERI, 2020). Steel is also a hard-to-abate sector – requiring deployment of a wide range of technologies, many of which are in pre-commercial stages of development, like green hydrogen and carbon capture. Adopting these low-carbon technologies (LCTs) will require close to USD 200 billion globally until 2050, plus an additional USD 2 trillion in necessary infrastructure (Mission Possible Partnership, 2021). Such large-scale investments would rely on a strong enabling ecosystem, and the deployment of de-risking measures.

Financing Steel Decarbonization (FSD) mechanism can promote the adoption of a diverse range of LCTs for decarbonizing the steel sector. It consists of two legally and financially separate entities – the Steel Decarbonization Financing Facility (SDF), a blended debt fund that will invest nearly USD 1 billion in investments over 5 years to support the deployment of commercially available technologies and commercial pilots of new and innovative technologies; and the Steel Decarbonization Initiative (SDI), a service company that will provide critical end-to-end support to steel companies for de-risking and implementing their low-carbon projects. The SDF will be complemented by a technical assistance facility providing technical support to companies.

This instrument meets all four of the Lab endorsement criteria:

- **Innovative:** First-of-a-kind climate-impact and return-oriented mechanism for a hard-to-abate sector that can catalyze deployment of a wide range of low-carbon technologies. It can deliver up to 250 $MtCO_2$ in emissions savings. The mechanism achieves this by enabling access to low-cost patient capital and non-financial de-risking services in the form of technical assistance, impact monitoring, reporting and verification, and market integration support.
- **Financially Sustainable:** SDF's technology fund incorporates 50% private commercial capital from the beginning. Due to a short 5-year horizon, SDF will retain its capital structure during the investment period. Subsequent funding beyond this period, or replications of the fund may target a higher share of commercial capital, owing to technological improvements and favorable market-policy conditions. As a service company, SDI's business model is self-sustaining during the operational period.
- **Catalytic:** Since SDF only invests to cover the incremental cost of technology adoption, with the remainder financed by traditional private sources, the fund has a high catalytic potential. For every USD 1 invested by the SDF, it can mobilize USD 3.4 in additional private investments and mitigate about 0.25 at the cost of abatement of about 4 USD/tCO_2. In terms of public capital, every USD 1 could mobilize USD 7 in private capital and mitigate about 0.5 tCO_2. Mechanism is also replicable across geographies and other hard-to-abate sectors.
- **Actionable:** FSD can provide end-to-end solutions for decarbonizing steel sector, and the mechanism has strong support from industry and investors alike. Reaching operational phase can take at least 2 years. The main challenges include developing a pipeline of investable projects, in time to receive investments; periodic access to the large volumes of concessional finance required to capitalize the fund; and demonstrating sufficient demand for low-carbon steel.

Next steps: Following Lab endorsement, the proponents Smartex and NREL will prioritize fundraising for setting up the mechanism and starting the pre-operational phase which will include the development of a pipeline of projects for investments by SDF and market development activities for delivery of services by SDI.

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CONTEXT

Decarbonizing steel requires deployment of a wide range of technologies, many not yet commercially feasible. Adoption of these technologies can negatively impact the steel industry's competitiveness.

Steel is a highly emission-intensive sector, contributing to about 7% of global emissions (Energy Transitions Commission, 2018). In India, the world's second-largest steel producer, the steel sector's share in total energy-system emissions is about 10%, with the absolute emissions expected to grow rapidly as industrialization and urbanization drive the demand for steel in the country to increase by three to four folds by 2050 (TERI, 2020). Therefore, alignment with the global climate target of limiting global warming by 1.5-2 °C, and with India's national target to achieve net-zero by 2070, will require the steel sector to take imminent steps to transition to low-carbon pathways.

As a hard-to-abate sector, steel decarbonization requires deployment of a wide range of technologies, many new and innovative like green hydrogen and carbon capture, which are at large-scale demonstration stage, have crossed major technical barriers, but have not yet made market entry emerging markets. In India, even commercially available technologies remain under-utilized, resulting in an emission-intensity of production much higher than the global average (2.5 tCO_2/tcs compared to global avg. of 1.85 tCO_2/tcs). And lastly, steel is an investment-intensive sector – adoption of crucial LCTs will require huge amount of investments, close to USD 200 billion globally until 2050, plus an additional USD 2 trillion in necessary infrastructure (Mission Possible Partnership, 2021). Such large-scale investments need a strong enabling ecosystem, consisting of the right policy and market conditions, as well financial and non-financial de-risking measures.

There is growing momentum towards steel decarbonization from all key stakeholders including producers, buyers, and investors. From the producer side, Indian companies like TATA Steel and JSW Steel are leading the way in low-carbon development (the latter recently raise USD 1 billion in sustainability-linked bonds). Furthermore, the recently launched SteelZero initiative aims to mobilize demand for low-carbon steel on the buyer side, whilst the largest global investors in the sector have formed the Steel Climate Aligned Working Group to address critical issues related to flow of transition finance to the sector.

Recognizing the scale of the challenge and leveraging on the opportunities, Financing Steel Decarbonization, an idea proposed by Smartex and NREL, addresses several financing and ecosystem-level barriers to decarbonizing steel, by providing steel producers and LCT projects access to affordable and patient capital, along with a range of services for project development and implementation.

Table 1: *Indian steel sector in context*

Parameter	Unit	World	India
Total steel sector emissions	$MtCO_2$/year	~ 2300	~ 300
Sector's share of total energy system emissions	%	7%	~10%
Average emission intensity of steel production	tCO_2/tcs	~1.85	~2.5
Average per capita consumption of steel	Kg	229	74.7

Source: (Energy Transitions Commission, 2018), (IEA, 2020), (Ministry of Steel, 2021), Interviews.

CONCEPT

1. INSTRUMENT MECHANICS

Financing Steel Decarbonization combines technical assistance, low-cost long-term financing, and critical implementation-stage support to de-risk and unlock investments in technologies required for decarbonizing steel production.

Financing Steel Decarbonization (FSD) will be the first climate-impact and return-oriented mechanism to promote adoption of a wide range of low-carbon technologies (LCTs) in the hard-to-abate steel sector. The FSD mechanisms consists of two entities – the Steel Decarbonization Financing Facility (SDF), and the Steel Decarbonization Initiative (SDI), a service company. SDF consists of a blended debt fund that will invest nearly USD 1 billion over 5 years into both commercially available technologies and new and innovative technologies. The SDF will also host a Technical Assistance (TA) Facility that will enable provision of technical support for project preparation to steel companies through grants, and in turn create a pipeline of bankable projects for the SDF. SDI will provide critical end-to-end support as a service to steel companies for developing and implementing decarbonization projects.

As seen in **Figure 1**, the FSD mechanism consists of two legally and financially separate entities – SDF with a TA Facility and a Technology investment Fund (the Fund), and the service company SDI. The mechanism will work across 2 stages:

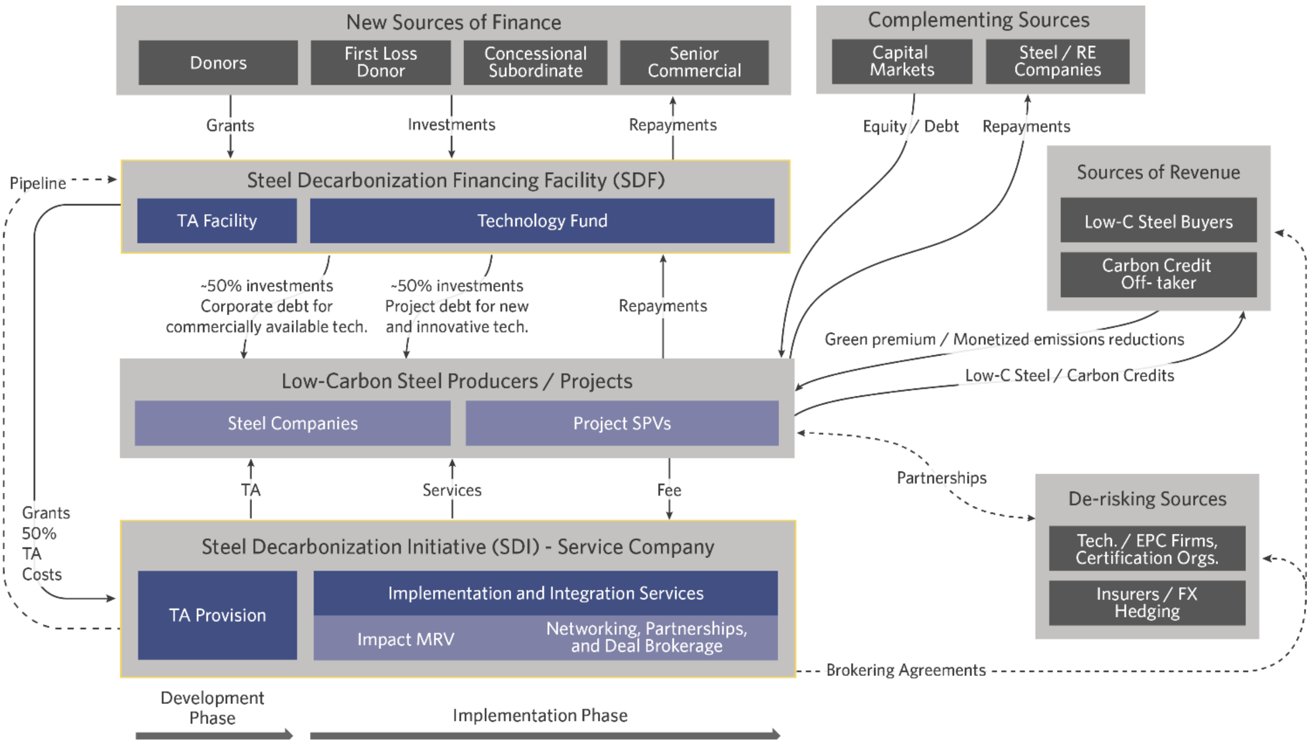
Project Development Stage: The primary goal of this phase is to improve bankability of projects and make them investment-ready for SDF and other investors. To do so, SDF's TA Facility, funded by grants from donor contributions, will contract SDI to provide TA to project sponsors - steel companies or other private players like energy companies, depending on the technology (TA includes activities such as technical feasibility studies). Grants will cover 50% of the TA costs, and the project sponsor will cover the remainder. SDI may contract international or local entities for the provision of TA through re-granting, based on evaluation of TA requirements and upon the project sponsor's request.

Project Implementation Stage: During this phase, an investment-ready project will receive funding from the SDF's Technology Investment Fund and/or other investors. Once operational, the project will receive implementation support from SDI. The Fund will have two key investment criteria. First is additionality: SDF would invest only in low-carbon projects which would otherwise not be viable with traditional funding sources. Second, the fund will partially cover only the incremental cost of adoption of the LCTs.

The Fund, capitalized with equal amounts of concessional and commercial capital, will invest up to USD 200 million per year in debt and offer two credit lines. About 50% of the funds would be allocated for commercially available technologies (CATs) to improve existing steel production facilities. The other 50% will support commercial pilots of new and innovative technologies (NITs). Investments in CAT projects will be on-balance sheet long-term debt (patient capital) to steel companies at near commercial rates to cover between 25% - 75% of the technology costs. Investments in NIT projects will be long-term project debt at concessional rates to ring-fenced special purpose vehicles (SPV), such as a green hydrogen plant, with SDF covering up to 100% of the SPV's debt requirements. The remaining financing needs of the technology and the production facility would be covered through traditional sources, i.e., project sponsor(s) and capital markets.

Analysis shows that the risk appetite of the SDF improves significantly by (a) blending concessional and commercial capital, and (b) including CATs in the portfolio. This allows the fund to invest in risky technologies at highly competitive rates. **Over a five-year investment horizon, SDF would invest about USD 1 billion and mobilize an additional USD 3.4 billion in investments for production of lower-carbon steel in India.**

Figure 1: *FSD instrument mechanics*



SDI will be a one-stop service provider to steel companies. Depending on the needs and the development stage of the project, the services provided by SDI will include (but not limited to: (a) technical assistance; (b) impact monitoring, verification and reporting (MRV) to investors; (c) facilitation of off-take agreements for steel companies with customers of value products including low-carbon steel, captured CO2 and carbon credits; (d) a platform for networking and partnering with wider ecosystem players that would play a critical role in de-risking projects. These essential bespoke services by SDI will be bundled to mitigate investment risks and promote stakeholder transparency. These services are explained in greater detail below.

1.1.1 KEY STAKEHOLDERS

1. **Donor** grants will capitalize SDF's TA Facility and will be blended with the concessional and commercial tranches in the Fund, taking a first-loss position to enhance the risk-appetite of the Fund.
2. **Concessional investors** will take a junior position in the Fund and will act as anchor investors to de-risk investments for, and crowd in private investors. Concessional capital will provide the Fund to invest in a mix of LCTs that would otherwise not have access to patient capital at competitive rates, at scale. Concessional investors

include development finance institutions, multi-lateral and bi-lateral development banks, government agencies, etc.

3. **Private investors** will take a senior position in the Fund and includes investors demanding returns at commercial or near commercial terms, such as private sector arm of multi-lateral development banks and impact-oriented institutional investors.
4. **Project sponsors** will be equity providers of the decarbonization project. Depending on the technologies' characteristics, they could be the steel company itself, or other private players. In case of CATs, the sponsor is likely to be steel companies. In case of NITs, the sponsors may vary. For instance, a green hydrogen plant may be sponsored by a renewable energy company, or by a consortium of steel companies (in an industrial hub), wherein each company is an off-taker of hydrogen.
5. **Sources of revenue** for steel companies include mainly steel buyers. Price support may be required to bridge the differential between the market price of steel and the higher price of low-carbon steel. Therefore, the instrument targets three market segments that can offer price support for low-carbon steel: exports subjected to a carbon border adjustment; domestic public procurement; and private steel buyers willing to pay a 'green premium'. The need for green premium would decline over time due to learning effects as the technology matures and its costs decline, which can be built into the off-take agreements.

The other potential source of revenue is sale of carbon credits to off-takers in international voluntary carbon markets. However, this revenue stream relies on methodologies for issuing carbon credits from steel decarbonization projects, which currently do not exist (expected by 2025) and are therefore not accounted for in the financial models.

1.1.2 SDF FINANCING STRUCTURE BASED ON TARGET TECHNOLOGIES

Financing terms offered by SDF will depend on the technologies' characteristics such as maturity (indicated by technology readiness level (TRL)) and financing structure expected by the investors. These terms are detailed below. Further information about steel production routes, decarbonization technologies and TRL is provided in **Annexure 1**. Note that the Fund would need to prioritize between projects competing for funds, based on criteria that could include several parameters like CO2 abatement potential, cost of CO2 abatement, etc. Such a criteria is yet to be defined and will be part of the Fund development process.

Table 2: *SDF financing structure based on decarbonization technology characteristics.*

Investment Case	Sample List of Technologies	Financing Structure
Commercial Pilots for New and Innovative Technologies [TRL 7 – 9]	• Top Gas Recycling Blast Furnace with/without Carbon Capture • Green hydrogen in Direct Reduction of Iron • Green hydrogen injection in Blast Furnace	• SDF allocation ~ USD 100 million/year • Project debt at 10.5%- and 16-years tenor, wherein SDF covers debt requirement of SPV (e.g., green hydrogen plant), assuming 60% debt in SPV capital structure. • Remainder financed by sponsor and capital markets

Deployment of Commercially Available Technologies [TRL 10 – 11]	• Coke Dry Quenching • Pulverized Coal Injection • Waste Heat Recovery • Top Pressure Recovery Turbine • Coal Moisture Control	• SDF allocation ~ USD 100 million/year • On-balance sheet debt at 5.5%- and 12-years tenor, wherein SDF covers 25% - 75% technology costs. • Remained financed by sponsor and capital markets

Source: Lab Analysis

1.1.3 SERVICES OFFERED BY SDI

Based on the demands of industry and investors, SDI has been designed to provide a range of non-financial services to steel companies that would improve the overall risk-return profile of the projects, making them investable and operationally sound. These services include:

Table 3: *SDI's services value added*

Stage	Service	Description and Value Added
Project development	Technical Assistance (TA)	• TA services include techno-economic feasibility studies, environmental and social impact assessment, financial modeling and structuring, investment proposals, etc. • TA reduces early-stage investment risks and supports developing a pipeline of bankable projects.
Project implementation	Impact monitoring, reporting and verification (MRV)	• Impact MRV service would include installation of systems for monitoring progress on emissions reductions from steel production, third-party verification through external review, and reporting progress to stakeholders. • MRV process will be based on national or internationally recognized steel-sector specific framework for measurement and disclosure of emissions (for instance, the Sustainable Steel Principles developed by the Center for Climate Aligned Finance (ING et al., 2022)) in-line with committed emissions targets (targets could be linked to financing like in case of sustainability-linked bonds). • Impact MRV will increase transparency and help unlock climate investments for steel sector.
	Networking, partnerships and deal brokerage	• Platform for project sponsors to engage with the wider ecosystem including funders, research institutions and think-tanks, standard-setting organizations, etc. • Facilitating agreements between steel producers and key entities that improve the risk-return profile of projects: o Steel buyers – to arrange long-term offtake agreements with built-in price premiums o EPC firms – for equipment guarantees o Technology providers – for access to new and innovative low-carbon technologies. o CO2/H2 buyers – to arrange long-term offtake agreements for captured CO2 / produced green H2 o Insurance firms – for insurance products related to technology, infrastructure, and credit. o Hedging facilities – to mitigate currency risks

2. INNOVATION

FSD will be the first mechanism for a hard-to-abate sector that can catalyze deployment of multiple low-carbon technologies, by providing access to patient low-cost capital and critical non-financial de-risking services, while supporting development of the wider industrial ecosystem.

2.1 BARRIERS ADDRESSED: UNLOCKING FLOW OF TRADITIONAL AND CLIMATE FINANCE FOR STEEL DECARBONIZATION TECHNOLOGIES

FSD can address several major hurdles to adopting LCTs for in the steel sector.

Table 4: *Barriers addressed by FSD*

Barriers	Solution – Value Added by FSD
Traditional Barriers to Investments in LCTs	
Steel is a commodified sector and a competitive market, which prevents large investments in capital-intensive LCTs. Moreover, such investments may lead to an increase in steel production cost, which harms the competitiveness of the adopter in a market with very limited or no proven demand to procure low-carbon steel at a green premium.	FSD addresses this barrier on two fronts: i) SDF provides companies access to patient, low-cost capital, improving the payback period of investments. ii) SDI brokers long-term off-take agreements between steel companies and buyers from private/public sector with built-in premiums to mitigate off-taker risk.
Limited internal funds and access to external sources of finance at favorable terms for: i) Small steel producers to invest in CATs for improvements of existing facilities, and, ii) Large steel producers to invest in demonstration and commercial pilots of NITs.	SDF addresses this barrier by providing steel companies access to external climate-focused funds at highly competitive terms for covering (partial) costs of the LCTs. In case of NITs, SDF will target India's leading steel players with access to sufficient internal funds and appetite to allocate resources to risky technologies.
Climate Investment Barriers	
Lack of a pipeline of bankable projects. Steel sector has several decarbonization levers and LCT options. Since the steel sector is in a nascent stage in its low-carbon transition, there is limited clarity on decarbonization pathways, especially in the local and regional contexts. Hence the lack of a pipeline of projects.	SDI addresses this barrier by partnering with: i) Industry associations, think tanks and research institutions like NREL to identify technologies feasible in the national (Indian) and sub-national (states) context; ii) Reliable local reliable entities for provision of TA for project preparation, and development of a pipeline for SDF's climate investors.
Lack of an enabling environment and coordination between de-risking measures. India lacks a strong policy-market enabling environment and coordination between entities with distinct roles in the system, which are both instrumental for the successful deployment of decarbonization solutions.	SDI addresses this barrier by building a networking platform, and enabling steel companies to form partnerships and agreements with ecosystem enablers – market players, financial services providers, etc. However, FSD mechanism will not directly address the lack of enabling policies for steel decarbonization in India.
The ability to demonstrate climate impact of investments. Climate investments generally require the investees to monitor and report on	SDI will address this barrier by providing impact MRV services to steel companies, in exchange for a fee, allowing them to report their emissions

the progress made on their commitments. Implementing methodologies and processes to demonstrate climate impact of investments in steel production is a challenge.	reductions to investors (SDF and others). SDI will conduct MRV processes based on standardized methodologies.

2.2 INNOVATION: A MULTI-PRONGED APPROACH TO ADDRESS DECARBONIZATION CHALLENGES FOR A HARD-TO-ABATE SECTOR

A comparative analysis of FSD against existing financial instruments was performed. These instruments were selected if they: focused on heavy industries, or steel sector, or low-carbon technologies in emerging markets. The analysis reveals that FSD is a unique instrument with a high degree of innovation with the following differentiators:

Focusing on steel, and India: FSD is the first instrument to target mobilization of private capital for decarbonizing steel, a hard-to-abate sector. Moreover, FSD targets India, the second largest steel producer globally, and a developing country with relatively riskier investment environment than developed markets with sophisticated financial markets.

Focusing on supporting steel companies and not technology start-ups: Several investment vehicles target technology start-ups that will commercialize the LCTs required for heavy industries, like green hydrogen and carbon capture. FSD on the other hand focuses directly on financing technology adopters – steel companies and other private industry players.

Combining investments with critical non-financial services: FSD goes beyond financing and includes early-stage TA support and implementation-stage support.

Targeting both financial returns and climate impact: FSD has the ability to support a diverse set of LCTs, while delivering not only financial returns to investors, but also CO2 mitigation, creation of higher-quality green jobs and support for transition away from coal.

2.3 CHALLENGES TO INSTRUMENT SUCCESS

There are a few important risks to instrument success that must be considered. These risks and their management strategy is described in the table below.

Table 5: *Key risks to FSD's long-term success and their mitigation strategies*

Risk Description	At Risk Entity	Risk Management Strategy
Market Risk: Low market demand, and availability of price support for low-carbon steel.		
Lack of availability of long-term price support for costlier low-carbon steel due to limited demand, and public and private sector's willingness-to-pay a green premium.	**SDF, SDI**	SDI to establish partnerships with existing global and domestic demand-side initiatives such as SteelZero that are working towards mobilizing private sector commitments to procure low-carbon steel.
		SDI to create an online portal for low-carbon steel supply, procurement and matchmaking.
		SDI to support steel companies in brokering long-term off-take agreements with built-in green premiums, even before steel production begins.

Financing Risk: Access to large volumes of grants and concessional capital in a fund structure		
SDF requires large volumes of concessional capital to be pooled together, which may be difficult to access in the absence of favorable policy and fiscal support. Moreover, funders may prefer to invest on a project-by-project basis rather than pooling their resources in a fund structure.	**SDF**	SDI will develop an investable pipeline, backed by strong sponsors, for SDF's investors by the time of fundraising, through partnerships with industry players, which will attract investors. SDF's value to investors is in creating a diversified portfolio of assets. Investment through a fund structure will ensure low-transaction costs and a diversified portfolio for SDF's investors.
Financing Risk: Timely and adequate access to grants and early-stage equity to operationalize SDI		
Raising adequate funds (in the form of grants and equity from venture capital) for SDI in time for delivery of services to low-carbon steel projects may be a challenge in scaling operations.	**SDI**	The first step to address this challenge is to raise initial start-up seed capital in grants, establish SDF's TA Facility and access SDF's TA funds to prepare projects for investments by SDF. This would operationalize SDI and allow it to invest resources to raise follow-on equity from other sources like angel investors and VC firms.
Project Risk: Limited interest from steel producers to invest in new and innovative technologies		
Firm-level issues such as limited internal resources, macro-level issues such as recession, market-level issues such as volatility in steel and commodities markets, and technology-level issues such as access to proven NITs and capacity to transfer technology, may limit the ability of Indian steel companies to invest in LCTs, especially NITs, leading to an inadequate pipeline of investable projects for SDF, and loss of business opportunity for SDI.	**SDF, SDI**	Key risk mitigation strategy is for SDI to partner with, and SDF to fund Indian steel companies with internal time-bound climate targets, strong balance sheets with access to considerable internal resources, and international operations. Proponents have identified JSW Steel and TATA steel, two of the largest Indian steel makers and global leaders in sustainable development, as the prime candidates for NIT pilots.
Credit Risk: Higher than expected defaults from borrowers		
Market risk (above), construction delays, technology/equipment failure, volatility in commodities markets, and unsuitable general macro-economic environment may lead to higher-than-expected defaults by steel companies or project SPVs.	**SDF**	Most of the risks will be addressed through SDI's services. First, TA will ensure that investments are made in a sound business case. Second, SDI will ensure that steel companies partner and form agreements with steel buyers to mitigate some of the market risks, with capable EPC firms to mitigate technology-risks, and with financial services firms to mitigate financial risks.

3. IMPLEMENTATION PATHWAY AND REPLICATION

Early access to seed capital would be an important factor in establishing SDI and SDF, and subsequent delivery of technical assistance to develop a pipeline.

Target Market: FSD targets India, world's second largest steel producer. Indian steel sector has a higher-than-average emission intensity of steel production and therefore has a large potential for deployment of best available CATs. India is also home to steel companies like JSW Steel and TATA Steel, which have adopted targets to achieve an emission intensity on par with world average by 2030 and are willing to lead the transition to sustainable production of steel through adoption of NITs. See **Annexure 1** for more details on Indian steel sector.

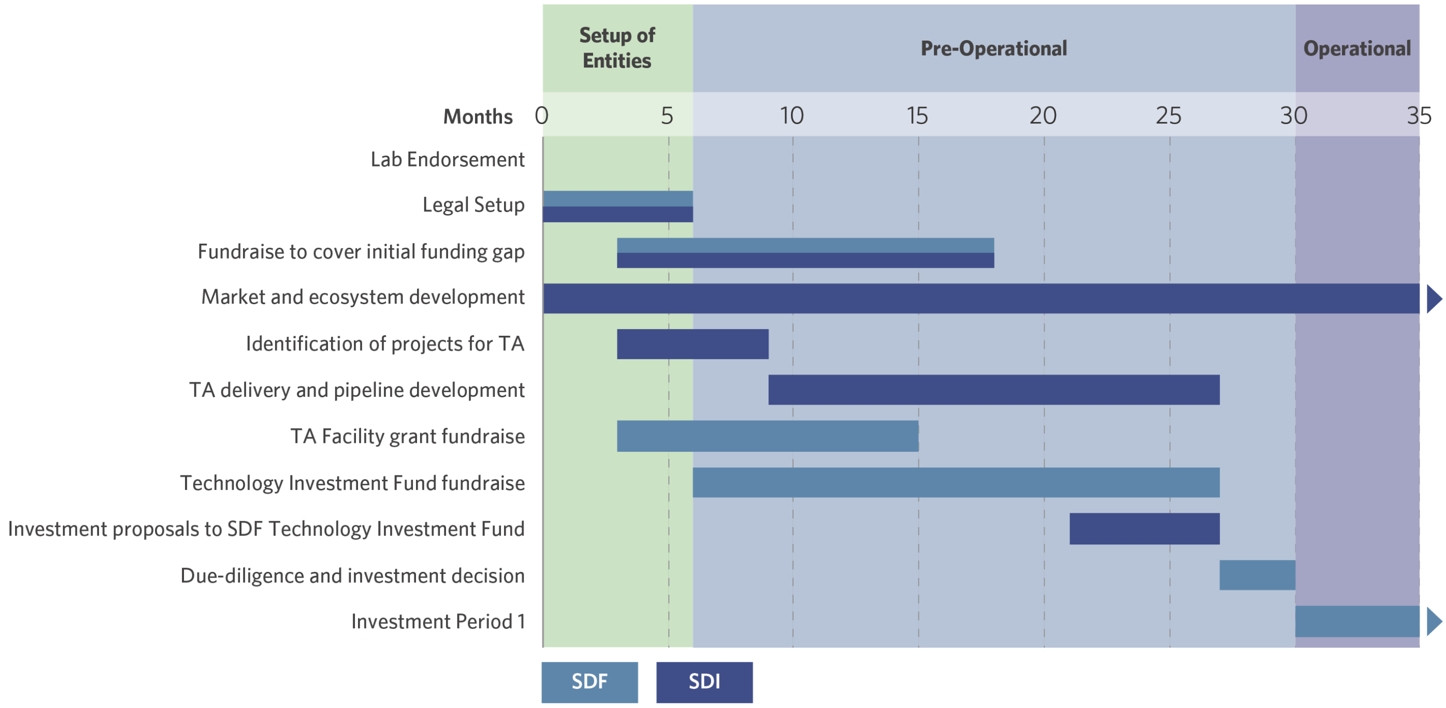
Milestones: Figure 2 below shows the implementation pathway for FSD, starting from the Lab endorsement up to beginning of SDF's first investment period. As two legally and financially independent entities, SDF and SDI are mutually reinforcing, but free to conduct business activities as per individual charters. However, in the period leading up to the first investment period, close collaboration would be required to demonstrate synergy and the overall functioning of the FSD mechanism. Key milestones during this period are:

- **Legal establishment** of both entities within six months.
- **Initial fundraise** to cover the initial funding gap of SDI and SDF (see capital requirements below) within 18 months and capitalize SDF's TA Facility within 15 months.
- **Developed pipeline** for investments with TA support, within 27 months.
- **Fundraise** to capitalize SDF's Technology Investment Fund for first period of investments, within 27 months.
- **Investments:** SDF to conduct due-diligence and make investment decisions for the first period based on the proposals received from SDI or others, from month 30 onwards.

Capital requirements: Based on detailed financial modeling of SDF and SDI:

- **SDI:** Total funding gap for SDI, prior to commencing its operations, i.e, prior to delivery of services and generation of positive cash flow, is estimated at USD 22.4 million. It includes cost of establishment, personnel, technology development, market development and overheads. This funding gap is expected to be bridged using USD 4 million in grants (non-repayable / reimbursable) and USD 18.4 million in private equity.
- **SDF:** Total funding gap for the establishment and pre-operational phase of SDF before the investment period is estimated to be USD 5 million. This includes the cost of establishment, personnel, and fundraising. This funding gap is expected to be bridged by reimbursable grants, paid back to donors from the profits generated by the fund. In addition, SDF's TA Facility would need to be capitalized by USD 10 million in grants.

Figure 2: Implementation pathway leading up to SDF investments



Replication: The FSD mechanism can be replicated in other hard-to-abate sectors like cement, fertilizers and chemicals, and in different geographies. A basic condition for replication is the presence of steel companies which are actively looking for resources and support to decarbonize. Replication would require minimal contextual modifications to the operational mechanism. The fund structure may vary depending on the targeted technologies and investment risks.

Based on the Fund's success, SDF may continue its investments beyond the five-year period, with adjustments to its capital structure and investment thesis. For instance, increasing the share of private commercial capital, or adjusting lending rates in light of reductions in technology costs and mitigation of investment risks. As a service company, SDI has highly scalable and replicable model.

4. FINANCIAL IMPACT AND SUSTAINABILITY

4.1 QUANTITATIVE MODELING

Quantitative modeling was performed to assess the financial feasibility and the impact of both SDF and SDI. Detailed financial models were developed and a cash flow forecasting approach was used to determine the financial parameters of both entities. Sensitivities of financial outcomes to certain variables such as investor hurdle rates, lending rates and default rates were also analyzed. Key modeling assumptions are summarized in **Table 6**. See **Annexure 2 and 3** for further information on modeling assumptions and sensitivity analysis.

__Table 6:__ Key financial modeling assumptions for SDF and SDI

Category	Dimension	Description
Steel Decarbonization Financing Facility (SDF): TA Facility and the Technology Fund		
SDF's TA Facility Structure and Capitalization	Capital structure	Grants (repayable or non-repayable)
	Facility size	USD 10 million per year (5% of Technology Investment Fund size).
SDF's Technology Investment Fund Structure and Capitalization	Fund type and investment horizon	Blended debt fund with two downstream credit lines. 5-year investment period.
	Capital structure	Concessional Equity (50%); Commercial Debt (50%)
	Investor hurdle rates	Concessional equity (7%); Commercial Debt (11%)
	Fund size	USD 196 million per year with annual funding commitments from investors. Overall, USD 980 million over 5 years.
	Management fee	1.25% of assets under management
SDF's Technology Investment Fund Financing Terms	Credit Lines (Downstream)	Credit Line I: corporate debt for commercially available technologies (CATs). Credit Line II: project debt to SPVs for new and innovative technologies (NITs).
	Allocation of funds	CAT Credit Line I: USD 94 million per year NIT Credit Line II: USD 102 million per year
	Technology/Project Cost Coverage	CAT Credit Line I: 25% - 75% of CAT cost NIT Credit Line II: up to 60% of NIT cost (assuming NIT project debt to equity ratio of 60:40)
	Lending terms	CAT Credit Line I: interest rate 5.5%, 12 years tenor, one year grace period NIT Credit Line II: interest rate 10.5%, 16 years tenor, three-year grace period
	Default rates	CAT Credit Line I: 0.2% NIT Credit Line II: 0.95%
Steel Decarbonization Initiative (SDI)		
Development stage services	Services offered	Technical assistance for project preparation
Implementation Services	Services offered	Impact monitoring, verification, and reporting (MRV)
	Fee structure	Recurring fee to cover ongoing costs of impact MRV for total production capacity in SDI's portfolio
Ecosystem Integration Services	Services offered	Platform for networking, partnerships and deal brokerage
	Fee structure	One-time registration fee for the platform One-time fee at the time of brokerage of agreements
Investor Terms	Equity investor hurdle rate	15%
Market Share	Market captured	10% of India's total steel production capacity within ten years from start of operations.

Source: Lab analysis

Based on these assumptions, the outcomes of key financial parameters are listed in **Table 7**.

Table 7: *Key financial and business parameters of SDF and SDI (at current assumptions).*

Category	Dimension	Description
Steel Decarbonization Financing Facility (SDF): TA Facility and the Technology Fund		
SDF's Technology Investment Fund	IRR	Concessional Equity (9.5%); Commercial Debt (13.3%); Portfolio (11.4%)
	Guarantee against defaults to commercial investors	Guarantee against 15% default rate from year 5 onwards.
Steel Decarbonization Initiative (SDI)		
Technical assistance services	Fee for technical assistance	None. Costs covered through grants from SDF's TA Facility.
Implementation Services	Fee for Impact MRV	Recurring fee of USD 2.5 per tonne of steel production capacity per year
	EBIT Margin	19%
Ecosystem Integration Services	Fee for networking, partnerships and deal brokerage	One-time fee of 2.5% of the total value of sale of steel at the time of brokerage of agreements
	EBIT Margin	85% - 95% (increases with volume of sales)
Financial Parameters	Total Funding Gap and Funding Sources	USD 22.4 million. Sources required: USD 4 million in grants, USD 18.4 million in equity.
	Valuation: VC Equity Share	30.5%
	IRR	40%, over a 20-year operational period

Source: Lab analysis

As evident from the tables above, the Fund starts with 50% capitalization from private commercial investor and can deliver a high rate of return to its investors, despite allocating half the funds towards risky NITs. There are several reasons why this is expected:

- SDI's services like technical assistance and brokerage of agreements greatly mitigate investment risks like technology-, developer-, off-taker, and market-risk.
- Blending commercial debt with grants and concessional equity lowers the overall cost of capital and improves the risk appetite of the Fund to invest in NITs.
- Allocating ~50% of the funds towards low-risk and low-return CATs de-risks the entire portfolio, allowing the Fund to invest into high-risk, high-return, and high-impact NITs.
- Every year, the fund does a few large-ticket-size loans resulting in low transaction costs. Furthermore, since the borrowers are either large steel companies with strong balance or ring-fenced project entities sponsored by project developers with industry experience and track record, the default rates are expected to be very low (< 1%).

As for SDI, the EBIT margin is much higher for deal brokerage services (~90%) since these services are low in capital intensity, high in scalability and entail low overheads. Impact MRV is relatively more resource intensive and is expected to have an EBIT margin of ~20%.

4.2 PRIVATE FINANCE MOBILIZATION AND REPLICATION POTENTIAL

4.2.1 COMMERCIAL CAPITAL SHARE IN SDF'S TECHNOLOGY INVESTMENT FUND

SDF's Technology Investment fund has a short investment period of just five years and its capital structure already starts with 50% commercial capital – made possible due to several de-risking measures discussed above. If the Fund invests in NITs as proposed, the capital structure of the Fund is not expected to change over its investment period. This is because firstly, the bulk of the Fund's cash flow and hence the data on performance of the assets would materialize after the investment period. Secondly, the NITs that SDF would invest in are not expected to be mature enough in a short five-year timeframe to attract significantly higher shares of commercial capital. Blending with concessional capital would be needed.

Notwithstanding, similar funds in the future or subsequent fundraising by SDF after year five can target a larger share of commercial capital. This could be possible due to technological learnings and cost reductions, increasing investor confidence, improved market conditions, increased ambitions of steel companies to shift to low-carbon production and the potential introduction of favorable policy support from the government.

4.2.2 ADDITIONAL PRIVATE CAPITAL MOBILIZATION BY SDF AND SDI

SDF investments partially cover the incremental cost of adopting LCTs and the remainder of the investments come from other private sources such as project sponsors, capital markets, and other private players. Therefore, SDF's investment fund has a significant catalytic potential to mobilize additional investments. Mobilization of additional private capital depends mainly on these factors: type of technology (CAT vs. NIT) and its financing structure (on-balance sheet vs. project debt), and investments in existing (brownfield) or new steel production facilities (greenfield).

Table 8 below shows key assumptions used to estimate private capital mobilization by SDF. **Figure 3** shows the capital mobilization by technology type, i.e., for a single investment case, and mobilization achieved by the SDF overall investments. **As per the analysis, every USD 1 of blended and public capital invested by the Fund mobilizes an additional USD 3.4 and USD 7.5 in private investments, respectively.**

Table 8: *Private capital mobilization by SDF (see Annexure 1 for more details on technologies).*

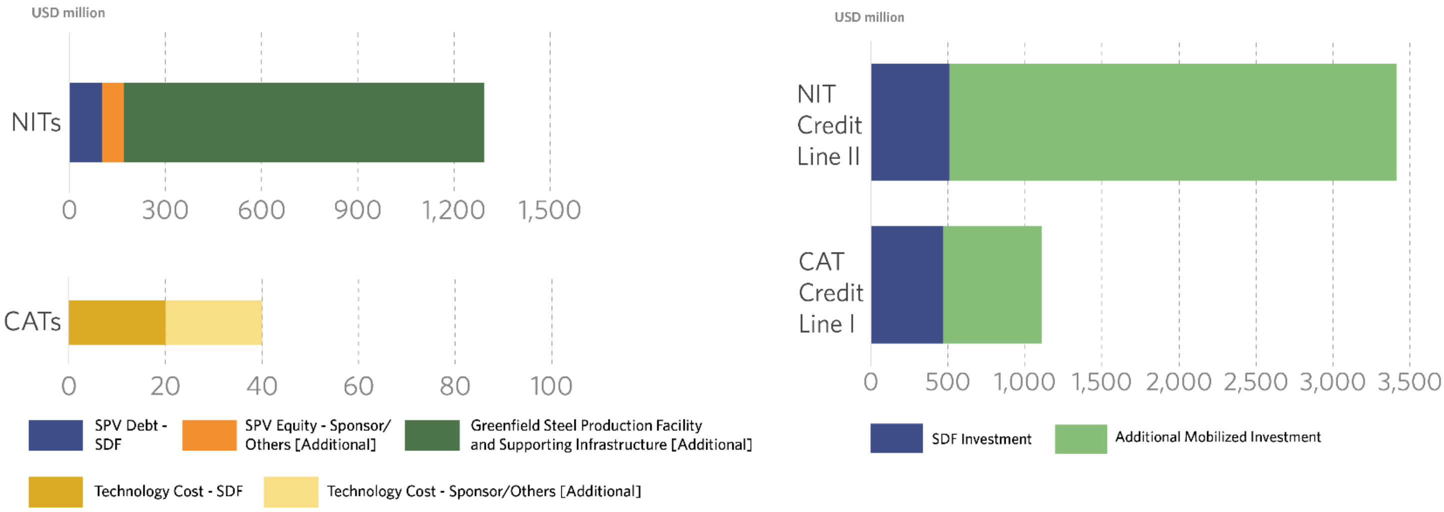
Component	CATs	NITs
Technology-level		
Sampled Technologies	CDQ, PCI, WHR, TRT, CMC	TGR-BF w/ CC, 60%-H2-DRI-EAF
Technology/SPV investment	USD 40 million per MTPA	USD 170 million per MTPA
Total steel facility capital investment (average)	N.A (assumed improvement in existing facilities only)	USD 1226 million per MTPA production capacity.
SDF investment	USD 20 million (avg. 50% of technology investment cost)	USD 102 million (60% of SPV investment cost)
Additional private capital	USD 20 million	USD 1124 million for greenfield and USD 70 million for brownfield.[1]
Mobilization factor	1	11 (for greenfield), 0.67 (for brownfield)

[1] Calculation of mobilization factor for greenfield case considers indirect additional investments in steel facility and supporting infrastructure. In case of brownfield, only direct investments in the technology are considered because of the complexities involved in estimating indirect investments.

Portfolio-level		
Total SDF Investments	USD 470 million	USD 510 million
Total additional private capital	USD 470 million	USD 1451 million (assuming 50% in greenfield facilities)
SDF's blended capital mobilization factor	**3.5** (USD 3373 million mobilized through USD 980 million in investments)	
SDF's public capital mobilization factor	**7** (USD 3838 million mobilized through USD 466 million in public funds)	

Source: *Lab analysis. Data on investment costs obtained from* (CEEW, 2021; Fan & Friedmann, 2021; Fischedick et al., 2014; He & Wang, 2017; Monika Draxler et al., 2021; Santis et al., 2021; Trinomics, 2021)

Figure 3: *technology-level (left) and portfolio-level (right) private capital mobilized by SDF*



5. ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT

On average, Financing Steel Decarbonization mechanism can reduce the emission intensity of steel production by 25%, mitigating up to 250 MtCO2 emissions from Indian steel sector, against baseline.

5.1 SECTORAL IMPACT

Analysis shows that over its five-year investment period, **SDF can target reduction in emission intensity of 10 to 30 MTPA of steel production capacity in India[2],** depending on the number and size of investee companies and projects**.** Assuming capacity utilization of 75%, over the lifetime of the steel production facilities (without refurbishing), this translates to a **cumulative production of lower-carbon steel between 145 Mt to 408 Mt.**

[2] Relative decarbonization achieved (% reduction against baseline) will be much higher if the funds are deployed towards a smaller production capacity (one 1 MTPA plant adopts five CATs), than if the funds are deployed towards a larger capacity (five 1 MTPA plants adopt one CAT each); even though the total absolute reduction in emissions against baseline is equal in both cases.

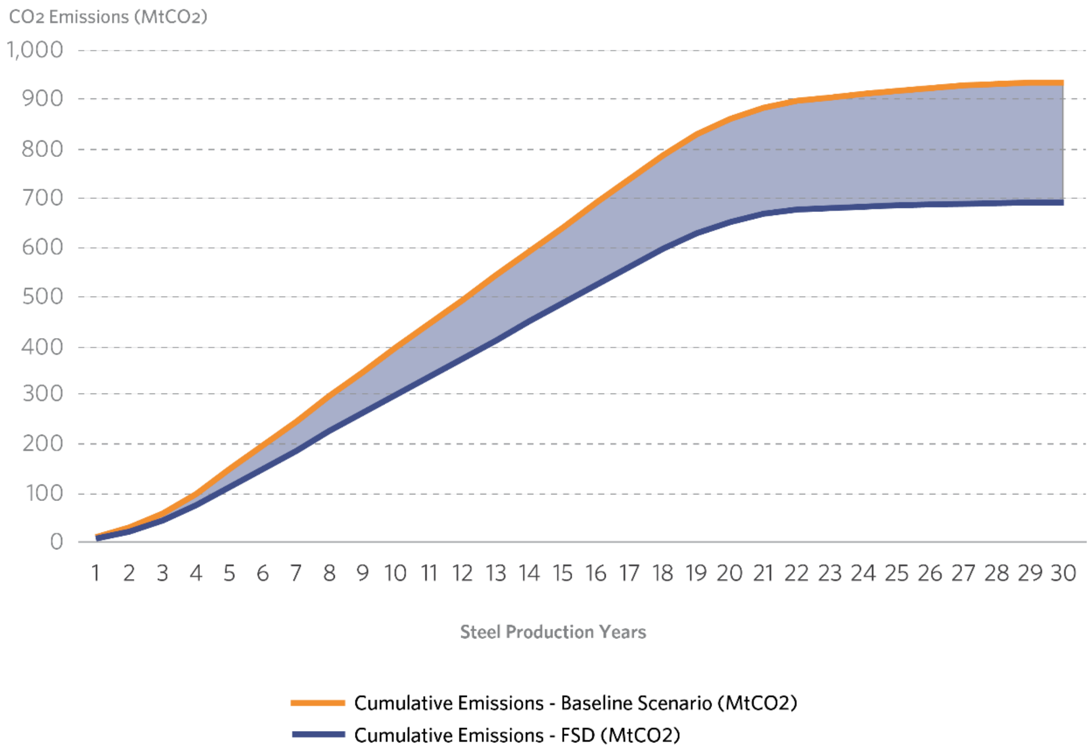
SDI, on the other hand, aims to capture 5% of India's steel market (by production capacity) within first 5 years of commencing operations, delivering tailor-made services to a cumulative capacity of 13.5 MTPA. In 10 years, SDI aims to capture 10% of the market, serving up to 36.5 MTPA of steel production capacity, provided India's total installed capacity and demand for low-carbon steel production grow at an expected rate of 8-9% per annum.

5.2 ENVIRONMENTAL IMPACT

FSD mechanism has a direct impact on the emission intensity of steel production through the SDF and an indirect impact through SDI. **Figure 4** shows the cumulative CO2 emissions from 20 MTPA (between 10 - 30 MTPA as discussed above) of steel production capacity in the baseline scenario, and in an SDF scenario with funding support for the adoption of LCTs. Based on the analysis of investment required per technology, CO2 abatement potential of technologies, and total investments by SDF, it is estimated that **SDF can deliver direct emission savings of up to 250 MtCO2 against baseline**, as shown in the figure. This is equal to an estimated 25% reduction in emission intensity of steel production (this would vary depending on target capacity. For a 10 MTPA target and a 30 MTPA target, the reduction in emission intensity could be 50% and 15% respectively, while the cumulative emissions savings remains the same).

In terms of the environmental impact of investments, emissions savings translate to about **0.25 tCO2 mitigated for every USD invested by SDF, and 0.47 tCO2 mitigated for every USD of public finance invested by SDF.** Furthermore, with current assumptions, **SDF can offer a cost of abatement as low as USD 4/tCO2.**

Figure 4: *Environmental impact of FSD mechanism's SDF.*



5.3 SOCIAL AND ECONOMIC IMPACT

FSD mechanism will support several development goals:

SDG 8 [Decent Work and Economic Growth]: Promotes creation of green jobs and sustainable growth of the steel sector, a backbone of any developing economy.

SDG 9 [Industry, Innovation and Infrastructure]: Supports sustainable growth of the steel industry, catalyze innovation in new and innovative technologies, promote growth of nascent industries (such as green hydrogen and carbon capture), strengthen associated supply chains, enables development of new supporting infrastructure including renewable energy and pipelines for transport of clean fuels.

SDG 12 [Responsible Consumption and Production]: Promotes domestic production and international consumption of low-carbon steel and associated low-carbon technologies.

SDG 13 [Climate action]: Deliver substantial direct mitigation of CO2 emissions over the lifetime production from steel facilities that adopt LCTs.

SDG 17 [Partnerships for the Goals]: Contributes towards development of a domestic enabling ecosystem required to enable steel sector's transitions by bringing together and building partnerships between key stakeholders from industry, government, and the financial sector.

NEXT STEPS

Following Lab endorsement, Smartex will prioritize fundraising for setting up of SDI and SDF and starting the pre-operational phase which will include development of pipeline of projects for investments by SDF and market development activities for delivery of services by SDI.

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ANNEXURE

1. INDIAN STEEL SECTOR OVERVIEW

1.1 INDIAN STEEL SECTOR

Table 9: Overview of Indian Steel Sector

Assumptions	Value
Market Structure	
Public companies market share	20%
Private companies market share	80%
Supply and Demand	
Total steel production capacity (2022)	142 MTPA
Consumption of finished steel (2020)	97.5 MTPA
Cumulative Aggregated growth Rate in Installed Capacity (2016 – 2020)	4.85%
Steel production capacity target as per National Steel Policy (2017)	300 MTPA
Distribution of Production Capacity	
Blast Furnace	80.8 MTPA (60 units)
Basic-Oxygen Furnace	55.2 MTPA (18 units)
BF-BOF share in total production	47%
Direct Reduced Iron (DRI)	51.5 MTPA (312 units) Of which, 37.74 MTPA is coal-based 11 MTPA is gas-based
Electric Arc Furnace + Induction Furnace	87 MTPA (50 EAF units and 999 IF units)
DRI-EAF share in total production	26%
DRI-IF share in total production	27%
Imports/Exports	
Export of finished steel (2021-22)	12.3 MTPA
Major exporting partners	Nepal, Italy, Belgium, USE, Spain, others
Import of finished steel (2021-22)	4.3 MTPA
Major importing partners	South Korea, China, Japan, others

Sources: (IBEF, 2021; International Trade Administration, 2019; Ministry of Steel, 2017, 2020; TERI, 2020)

1.2 SAMPLED STEEL DECARBONIZATION TECHNOLOGIES

Note that the technologies listed here have been selected from a larger set of technologies that may be applicable to the sector. This list is by no means exhaustive.

Table 10: List and description of sampled steel decarbonization technologies.

Category	Technology	Route	Details
Commercially Available Technologies (CATs) **TRL 10 – 11**	**Pulverized Coal Injection (PCI)**	BF-BOF	PCI is a process of injecting large volumes of pulverized (fine) coal granules into the blast furnace as a supplementary carbon source, reducing the need for coke production.
	Coke Dry Quenching (CDQ)	BF-BOF	Alternative technology to wet quenching of coke (when it comes out of the coke ovens) and uses inert gas to dry cool coke instead of water, which results in lower CO2 emissions and thermal energy losses (thermal energy can also be recovered to be used for steam/electricity production).
	Top-gas Recovery Turbine (TRT)	BF-BOF	Generates electric power using the heat and pressure from blast furnace top gas.
	Waste Heat Recovery (WHR)	BF-BOF, DRI-EAF	Recovers sensible heat from sinter cooler, coke oven, oxygen converter (in BF-BOF route) or DRI unit (in DRI-EAF route) to generate steam, electricity, preheating raw materials (iron ore), or sold in the market.
	Coal Moisture Control (CMC)	DRI-EAF	Minimizing coal moisture content using heat exchanger to bring down overall heat losses from using high moisture coal as fuel/feedstock.
	Renewable Energy (RE) with Battery Energy Storage Systems (BESS)	BF-BOF, DRI-EAF	RE with or without BESS can meet between 30% to 75% of the electricity requirements of steel production facility and reduce dependence on captive thermal power plants.
New and Innovative Technologies (NITs) **TRL 7 - 9**	**Top-Gas Recycling Blast Furnace (TGR-BF) with Carbon Capture**	BF-BOF	A Top Gas Recycling Blast Furnace (TGR-BF) can be used instead of a traditional BF to recycle sensible heat from the off-gases (top-gas) for reuse in the BF. TGR-BF also produces a CO2 enriched top-gas for a more efficient CO2 capture via. post-combustion carbon capture technologies from existing or new plants to reduce CO2 emissions to a large extent.
	Smelting Reduction (HIsarna) with Carbon Capture	BF-BOF	Smelting reduction can produce liquid hot metal (pig iron) directly from raw materials, i.e., iron ore and coal, removing several pre-processing steps (such as production of coke) and is therefore much mor efficient than traditional iron-making process. The process also uses pure oxygen in the BF. This combined with elimination of pre-processing steps means that the

			BF is a single-point source of CO2-enriched off-gases and is therefore highly suitable for integration with carbon capture.
	Green Hydrogen Injection in BF	BF-BOF	Pure hydrogen can be injected into the BF to partially substitute for coal/coke as the reducing agent. However, operational requirements and design considerations of existing BFs currently limit the rate of H2 substitution between 5-15%.
	Green Hydrogen use in DRI	DRI-EAF	Green H2 (H2 produced using renewable energy) can be used a reducing agent in the DRI unit, as a substitute for coal or natural gas. Grey H2 is already used to some extent in the gas-based DRI-EAF plants, which utilize syngas (mixture of H2 and carbon monoxide, formed using NG or methane) as the reducing agent. Technically, existing facilities (and any new DRI units) can be shifted to entirely to use green H2.

Source: Lab analysis

2. MODELING

2.1 TECHNOLOGY CAPITAL INVESTMENT AND ABATEMENT POTENTIAL

Table 11 below lists the capital investment and CO2 emission reduction potential (against baseline of 2.5 tCO2/tcs) of sampled steel decarbonization technologies. These figures are used to estimate the size of the fund and its potential impact on the Indian steel sector.

Table 11: Approximate capital investment and emissions reduction potential of sampled steel decarbonization technologies

Technology	Capex	CO2 emission reduction potential
Pulverized Coal Injection (PCI)	15 USD/t pig-iron	6%
Coke Dry Quenching (CDQ)	51 USD/t coke	2.4%
Top-gas Recovery Turbine (TRT)	2 USD/W	1.6%
Waste Heat Recovery from Sinter Cooler in BF-BOF	7 USD/t sinter	1%
Waste Heat Recovery from DRI unit for power generation	3.75 USD/t pig-iron	14%
Waste Heat Recovery from DRI unit for Iron ore preheating	0.5 USD/t pig-iron	14%
Coal moisture Control	0.15 USD/t	3%
Top-Gas Recycling Blast Furnace (TGR-BF) with Carbon Capture	100 USD/tcs (TGR-BF)	22% (TGR-BF)

	150 USD/tcs (TGR-BF with carbon capture)	53% (TGR-BF with carbon capture)
Smelting Reduction (HIsarna) with Carbon Capture	Data unavailable	20% (HIsarna) 80% (HIsarna with carbon capture)
10% Green Hydrogen Injection in BF	N.A (assumed off-take model)	14%
10-60% Green Hydrogen use in DRI	N.A (assumed off-take model)	65% - 80%
100% Green Hydrogen use in DRI	200 USD/tcs (for electrolyzer, storage and fuel cell)	95%

Sources: (CEEW, 2021; CEMCAP, 2019; Draxler et al., 2021; Fan & Friedmann, 2021; Fischedick et al., 2014; Monika Draxler et al., 2021; TATA Steel, 2019; TERI, 2021; Trinomics, 2021)

2.2 SDI BUSINESS MODEL ASSUMPTIONS

Table 12 below list the main assumptions and estimates used to develop SDI's business model, including projections for India's steel market, target market projections based on estimation of deployment of decarbonization technologies, and estimation of costs of delivery of services to steel companies.

Table 12: SDI business model assumptions.

Assumptions	Value
India's Steel Sector	
Current production capacity (2022)	142 MTPA
Capacity growth rate (with target of 300 MTPA by 2030 as per National Steel Policy)	8.7%
Decarbonization Technologies Adoption	
Current adoption of best available CATs (%)	10% of total production capacity (2022)
Projected adoption of best available CATs (%)	100% by 2070 (as per India's net-zero target) with a linear adoption rate of 5%.
Current adoption of NITs (%)	0% of total production capacity (2020)
Projected adoption of NITs (%)	100% by 2070 (as per India's net-zero target) with a linear adoption rate of 10%.
Target Markets for SDI Services and Market Share	
Target market segment for Impact MRV service	Total installed capacity that adopts either or both CATs and NITs
Target market for Deal Brokerage and Networking Platform service	New (incremental) capacity that adopts NITs (typically steel companies would not require external services to adopt CATs)
Assumed SDI market share	25% in both market segments
Cost Estimates for Provision of Services	
Impact MRV: initial cost estimate for delivery of service to 1 MTPA capacity	2 USD million / MTPA

Impact MRV: estimated increment in costs with total capacity serviced	Costs increase is directly proportional (1:1) to total steel capacity serviced by SDI
Deal brokerage and networking platform: Initial cost estimate for delivery of services to 1 MTPA capacity	1.8 USD million / MTPA
Deal brokerage and networking platform: estimated increment in costs with new (incremental) capacity serviced	Costs increase in a ratio of 0.5:1 to new (incremental) capacity serviced by SDI

Source: Lab analysis

3. SENSITIVITY ANALYSIS

3.1 SDF'S FINANCIAL PERFORMANCE

Here we analyze the variation in SDF's key financial parameters: Net Present Value (NPV) of commercial tranche, NPV of concessional tranche, and the portfolio internal rate of return (IRR). Several input variables have been considered. The baseline values of the input variables used for the sensitivity analysis, are the same as the current modeling assumptions as listed Table 5 of the main text. Table 13 below shows the relative change in financial parameters (target variables) against the baseline values, for a given range of variation in input variables.

Table 13: Sensitivity of SDF's financial parameters to key input variables. Highlighted cells show baseline values use as current modeling assumptions.

Target Variable: IRR – SDF Commercial Debt (Senior) Tranche				
	Input Variable: Hurdle Rate Commercial Debt (%)			
Input Variable: Share of Concessional Capital in the Fund (%)		9%	**11%**	13%
	25%	10.6%	12.6%	14.3%
	50%	10.7%	**13.3%**	15.9%
	75%	10.7%	13.3%	16%
Target Variable: IRR – SDF Commercial Debt (Senior) Tranche				
		Input Variable: Default rate for Credit Line II (NITs) (%)		
Input Variable: Default rate for Credit Line I (CATs) (%)		**0.95%**	10%	20%
	0.2%	**13.3%**	13.3%	12.2%
	5%	13.3%	13.17%	11.5%
	10%	13.3%	12.78%	10.6%
Target Variable: IRR – SDF Concessional Equity (Junior) Tranche				
		Input Variable: Hurdle Rate Concessional Equity (%)		
Input Variable: Performance Fee (% of excess returns) – concessional trance		5%	**7%**	9%
	0%	9.5%	**9.5%**	9.5%
	5%	9.1%	9.2%	9.2%
	15%	8.2%	8.4%	8.7%
Target Variable: IRR – SDF Concessional Equity (Junior) Tranche				
		Input Variable: Default rate for Credit Line II (NITs) (%)		
		0.95%	10%	20%
	0.2%	**9.5%**	4.2%	-0.5%

Input Variable: Default rate for Credit Line I (CATs) (%)	5%	7.9%	2.9%	-1.1%
	10%	6.3%	1.9%	-1.6%
Target Variable: Portfolio IRR – SDF				
		Input Variable: Management Fee (% of assets)		
Input Variable: Performance Fee (% of excess returns) – concessional tranche		0.25%	**1.25%**	2.25%
	0%	12.2%	**11.4%**	10.7%
	5%	12%	11.2%	10.6%
	15%	11.6%	10.9%	10.2%
Target Variable: Portfolio IRR – SDF				
		Input Variable: Lending Rate Credit Line II (NITs) (%)		
Input Variable: Lending Rate Credit Line I (CATs) (%)		7.5%	**10.5%**	13.5%
	4.5%	9%	10.9%	12.9%
	5.5%	9.5%	**11.4%**	13.4%
	6.5%	10%	12%	14%

Source: Lab Analysis

3.2 SDI'S FINANCIAL PERFORMANCE

A similar exercise was performed for SDI with SDI's NPV as the target variable and the components of the fee structure as input variables. Table 14 presents the analysis.

Table 14: Sensitivity of SDI's financial parameter to key input variables. Highlighted cells show baseline values use as current modeling assumptions.

Target Variable: EBIT Margin for Deal Brokerage and Networking Platform Services					
	Input Variable: Deal Brokerage Fee (% of value of sales)				
	0.5%	1.5%	**2.5%**	3.5%	4.5%
EBIT Margin (%)	50%	83%	**90%**	93%	94%
Target Variable: EBIT Margin for Impact MRV Service					
	Input Variable: Impact MRV Fee (USD per tonne capacity serviced)				
	0.5	1.5	**2.5**	3.5	4.5
EBIT Margin (%)	-307%	-36%	**19%**	42%	55%