Catalysing Green Opportunities: Integrating Environmental Risks to Address Climate Goals

Guidebook for investors and lenders

cKinetics
Accelerating Sustainability

SHAKTI
SUSTAINABLE ENERGY
FOUNDATION

Disclaimer

About cKinetics

cKinetics is a mission driven Sustainability Insight, Innovation & Capital Advisory Firm. We work with businesses, investors, industry groups as well as thought leaders to continually generate market insight and catalyze change. cKinetics leverages thought processes for accelerating sustainable business and investing practices that include: (a) Closed loop systems, (b) Decentralized production and consumption, and (c) Resource conservation.

About Shakti Sustainable Energy Foundation

Shakti Sustainable Energy Foundation works to strengthen the energy security of India by aiding the design and implementation of policies that support renewable energy, energy efficiency and sustainable transport solutions.

Research Team

Anushua Chowdhury, Sakshi Bahl, Upendra Bhatt

Context for the guidebook

India is estimated to require nearly USD 95 to 125bn annually through 2033 for actions on climate mitigation. This entails investment to support transition of existing sectors into green and nurturing emerging sectors and technologies in areas such as electric vehicles, green buildings, renewable energy, waste and water resources. Public finance will continue to play a key role in supporting this transition – addressing around 20% of the total investment needs. However, in order to ensure a timely response to climate change, private sector will need to play a leading role. The conventional approach of the financial sector needs to change. Lenders and investors need to take bold actions and prepare their portfolios for these changes by assessing environmental performance of their portfolio companies and undertaking conscious effort to direct investment into climate positive activities.

Globally, investors are becoming increasingly conscious of the impacts of climate change, seeking higher exposures to green/climate-friendly opportunities while closely monitoring the impact of environmental considerations on their existing portfolios and investment strategies. Proactive action to recognize and manage these environmental risks is therefore necessitated for domestic financial institutions as well that are looking to tap into the investment pools of international investors.

This guidebook complements the reports 'Catalysing Private Capital for Green Investments in India[1]' and 'Building a Consensus on the Definition of Green Finance'[2] aimed to support greening of India's financial system. It is designed to provide a flexible, non-prescriptive guidance for financial institutions (investors and lenders) helping them realize potential to climate-align activities, consider 'green' as a core dimension to business strategy and taking a deeper view of environmental risks beyond compliance.

The guidebook seeks to help differentiate green finance[3] from the conventional approaches of Sustainable and Responsible Investments (SRI), and acquaint the audience on evaluating environmental performance and integrating it in the investment evaluation process. This will help recategorize, prioritize and thus reorient capital flow into climate-aligned sectors.

[1] shaktifoundation.in/report/catalysing-private-capital-for-green-investments-in-india/?psec=MTY1#MTE2MDM=
[2] shaktifoundation.in/report/building-a-consensus-on-the-definition-of-green-finance/?psec=MTY1#MTE2MDM=
[3] While Climate/Green Finance hold their differences, these terms have been bucketed together for the purpose of this guidebook

Contents

1 Scaling-up green investments for achieving low-carbon growth

Even as India has initiated a series of actions for transitioning to low carbon, it needs USD 1.6tn between 2020 and 2033 to achieve its climate mitigation target.

It is expected that driven by policy push, regular market growth and the pace of flows from conventional capital sources, investment into 'green' areas is likely to be USD 685bn through 2033–leaving a cumulative financing gap of little over USD 910bn. Thus, it is critical to tap into additional private capital sources to ensure accelerated funding flows for supporting India's low-carbon transition.

Increasing awareness on the materiality of environmental risks has prompted a set of investors to integrate these considerations alongside social and governance parameters into investment processes (collectively referred to as ESG integration[4]). This community of investors, widely recognized as Sustainable and Responsible Investors (SRI), driven by asset owner mandates, greater regulatory scrutiny and investor demand are looking to balance their portfolios and therefore viewed as a good source of capital needed for meeting India's environmental objectives.

With international investors becoming increasingly conscious of climate risks, the financial institutions in India are expected to face demands from these investors to move beyond the conventional approach, and measure and report environmental impact of their activities.

Given the changing outlook of the international investor community and policy push, it is estimated that additional capital of nearly USD 637bn can be attracted into the country through 2033. However, this would require concerted action and preparedness, and also the domestic financial institutions would need to take bold actions to support this green transition.

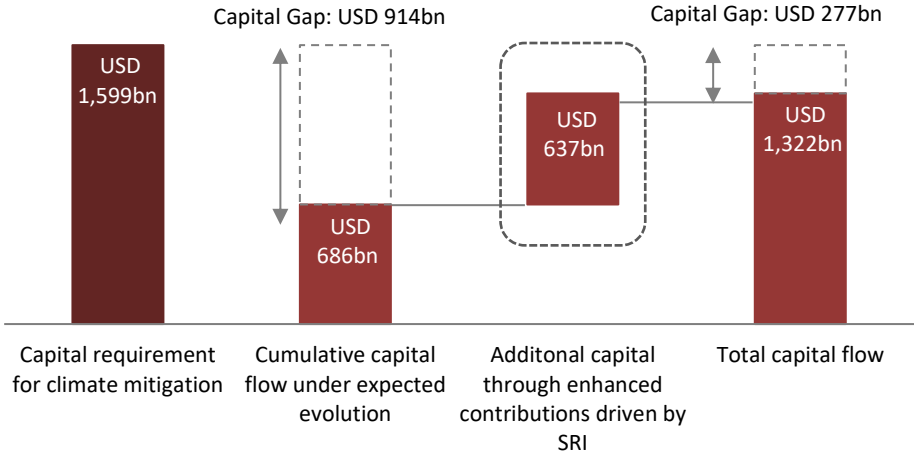


Figure 1: Capital flow for climate mitigation targets through 2033[5]

[4] ESG integration involves the consideration of ESG risks and opportunities as part of the investment decision making process

[5] Catalyzing Private Capital for Green Investments in India (cKinetics, 2019)

1.1 Green tagging and attribution: Key to catalyzing capital flows into green areas

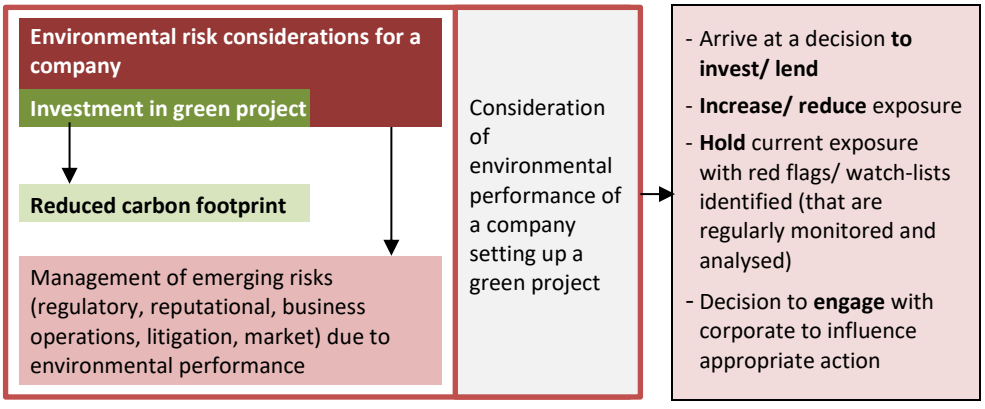
Green tagging of capital flow into business activities is a first step to review current status and identify green investment gaps**. The complexities associated with ascertaining capital flow aligned to low-carbon objectives results primarily from a lack of clarity in consistently identifying such activities. Over a period of time, this can impede accurate tracking and thus limit the requisite flow of capital into green sectors**. Prospective and current investments therefore need to be categorized according to a common understanding of 'green'.

This guidebook provides a comprehensive framework to accurately tag different projects /assets as green. In case of debt, use of proceeds is generally well-defined (barring working capital lines) and attribution of capital invested by the financial institutions into 'green' and 'non-green' is relatively straightforward.

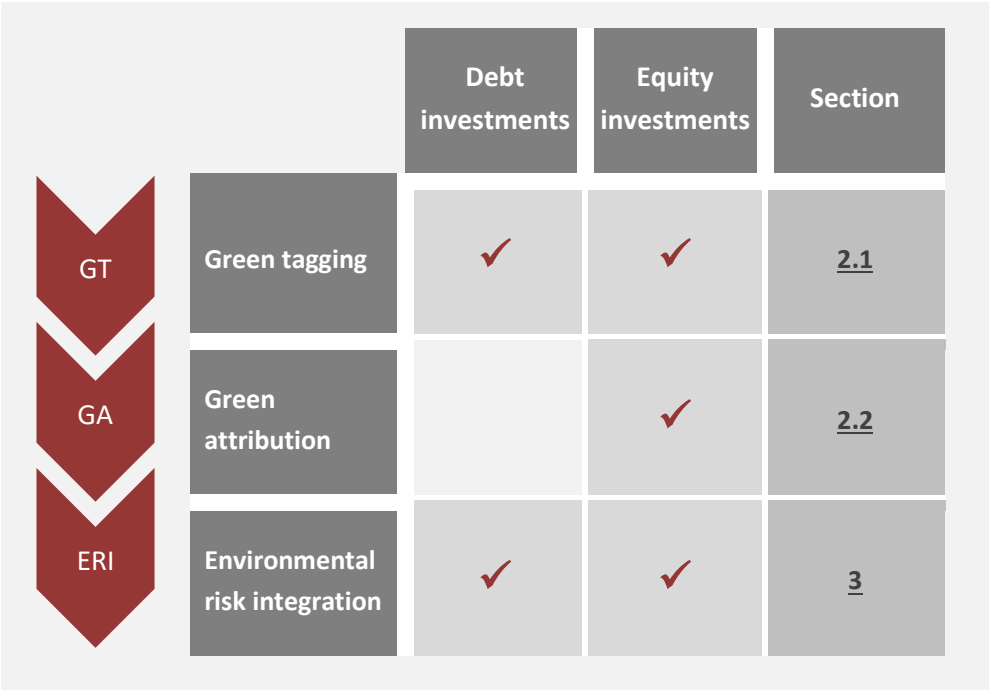
However, in case of equity, particularly in cases where the infusion is into companies with operations across different sectors, the attribution can be a bit challenging. The attribution is further complicated in case of companies where setting-up green assets is not core to the business model and/or does not contribute to revenue generation. For instance, an energy-efficient green campus set-up by an educational institute will not generate revenue by itself but it is an indicator of a green initiative. In such a case, green attribution by investors will help recognize and thus promote green actions by companies***. Equity investors can attribute or define such % of the investment made in an investee company as green as is equivalent to the proportion of the green assets in the overall asset base*** of the investee company.

1.2 Fostering long-term sustainability of green investments through environmental risk assessment

Integration of environmental risks for a company's operations is critical for a balanced assessment of medium- and long-term impact on investments. It is critical to assess this not just in context of environmental dimensions associated with the project (if funding for a project) but also to ascertain company-level risks from across its entire set of operations. For instance, if a company's operations are stalled due to non-compliance of environmental related mandates, its green projects are likely to be jeopardized as well.



In summary, this guidebook is designed to support and catalyze successful transition of the financiers and lenders towards enablers of a low-carbon economy. An overview of the different sections of the guidebook is presented below.



		Debt investments	Equity investments	Section
GT	Green tagging	✓	✓	2.1
GA	Green attribution		✓	2.2
ERI	Environmental risk integration	✓	✓	3

2 Green tagging and attribution

As highlighted in the previous section, green tagging is an important tool for directing capital into green areas.

A well-defined and commonly accepted framework helps in framing a common understanding and reducing the related subjectivity, which may otherwise result in capital flowing (perhaps inadvertently) into non-green areas.

For instance, as indicated in the illustration below, a thermal power project having environmental clearances and complying with environmental norms of India's Central Pollution Control Board (CPCB) may get *screened in* by an investor applying ESG integration strategy. However, such a project cannot be tagged as green/ climate-aligned because it neither reduces carbon emissions nor considers climate-related risks given that CPCB norms for the industry only cover particulate matter, sulphur dioxide, nitrogen oxides and mercury.

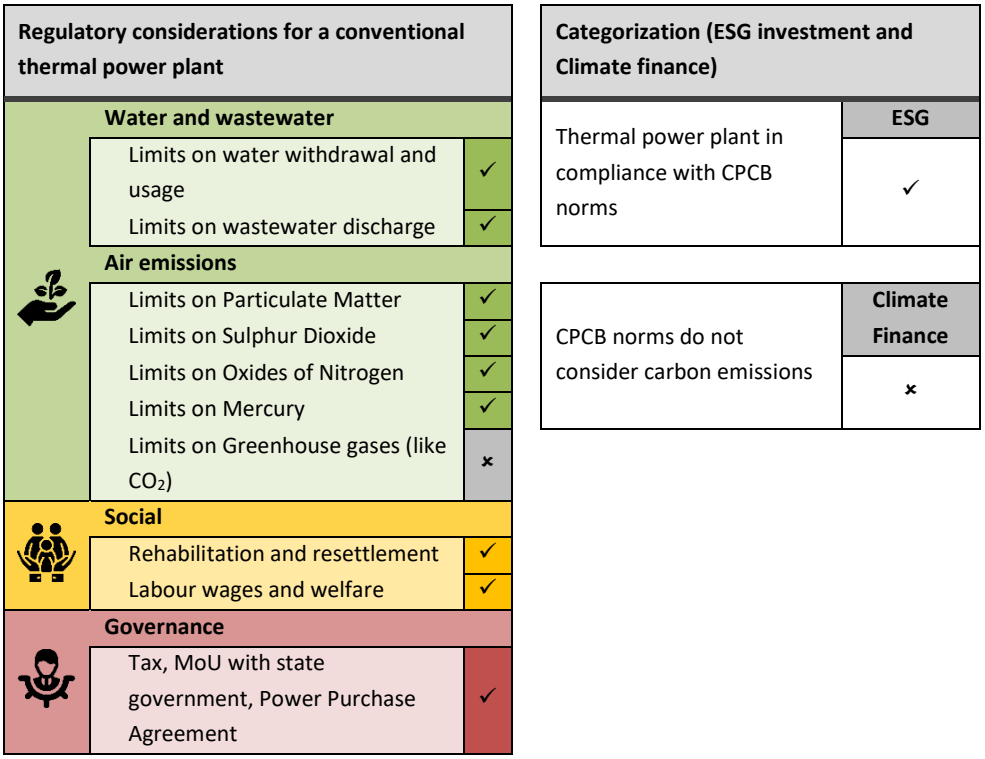


Figure 2: Differentiating climate finance and ESG integration

It is thus important that investors and financiers carefully analyze the environmental considerations, particularly climate-related footprint. To enable the same, a standardized categorization framework is deemed a key necessity.

2.1 Green tagging

The green finance taxonomy for India[6] can be used as a framework for evaluating eligibility of an activity as 'green'. The taxonomy is guided by the following three principles:

1. Promotion of activities that align to broader environmental sustainability goals – these cover protection and conservation of natural resources, clean and efficient use of energy, waste reduction, pollution control and sustainable biodiversity management
2. Alignment to an outcome-linked approach that measures ***net contributions*** over the lifetime of a project. An outcome is considered green if:
    a. The output creates climate positive results
    b. It can indicate a demonstrable and measurable change from the base case[7]
3. Alignment of financial sector to national environmental objectives to govern the flow of resources towards climate positive outcome-aligned sectors

In addition to these guiding principles, the taxonomy enables a sectoral view to identifying 'green' economic activities. A summary representation of the sectors under the green finance taxonomy is presented on the page overleaf.

A lender providing project or corporate level financing can apply the taxonomy (further detailed at the sector, sub-sector and activity level in Annexure 1) to identify and tag activities as 'green'.

For investors, use of the green finance taxonomy is relevant for identification of green asset base of an investee company for attribution of investments.

[6] Building a Consensus on Definition of Green Finance (cKinetics and CPI, 2019)
[7] Represents the starting point against which future performance can be measured

Clean Energy	Energy Efficiency	Clean Transportation	Green Buildings	Sustainable Agriculture and Land Use	Waste & Pollution Control	Water Use & Conservation	Climate Adaptation
Wind	Process efficiency	Vehicles	New buildings	Ecological Protection	Waste water treatment	Water Conservation	Disaster monitoring, warning and emergency response system
Solar	Bulk energy services	Key components	Renovation, upgrade and modernization of existing building stock	Biodiversity	Sludge in waste water	Rural drinking water safety	Flood mitigation
Small hydro	Product		Alternative construction materials	Forestry Development	Air pollution	Urban water conservation	Hygiene emergency
Tidal	Process/ Technology			No-till farming	Municipal Solid Waste (MSW)	Water conservation	Epidemic disaster
Geothermal				Organic agriculture	Soil pollution	Waste water methane	Forest protection
Biomass energy				Integrated pest control (IPM)	Tailings and Associated Mine	Waste water – sludge used as fertilizer	Drought management
Nuclear				Precision farming	Industrial Solid Wastes, Exhaust Gas, and Effluent	Inputs manufacturing	Public health management
Smart grids				Animal husbandry and Fishery	Renewable energy waste resource	Supply chain	Food security
Green energy corridors				Agro-forestry	Electromechanical Products	Raw materials manufacturing	Manufacturing devices
EV charging infrastructure				Conservation and management of wet lands	Co-generation		Raw materials manufacturing
Transport Infrastructure				Farming equipment and pesticide	Environmentally sustainable products		Storage and distribution
Facilities				Raw materials	Resource-efficient packaging and distribution		R&D
Clean coal technologies				Storage and Distribution	Manufacturing devices and equipment		Disaster monitoring, warning and emergency response IT system
Renovation & Modernization (R&M) of thermal power technologies				IT Development and Services	Raw materials manufacturing		
Generation equipment					Storage and Distribution		
R&D for RE equipment, EE products					R&D		
Renewable energy (solar) appliances & products							
Systems and equipment for Delivery Asset							
Energy Storage							

Legend

Assets	Projects/processes/activities that are already low carbon or enable low carbon performance
Implementation Practices	Practices/techniques/solutions that are considered green due to their impact on the environment
Manufacturing & R&D	Creation of products/activities that are deployed into green projects/processes

Figure 3: Green Finance Taxonomy[8]- summary representation

[8] Building a Consensus on the Definition of Green Finance (cKinetics and CPI, 2019)

The flowchart indicated below builds on the green finance taxonomy to identify activities/ assets that can be categorized as climate-positive.

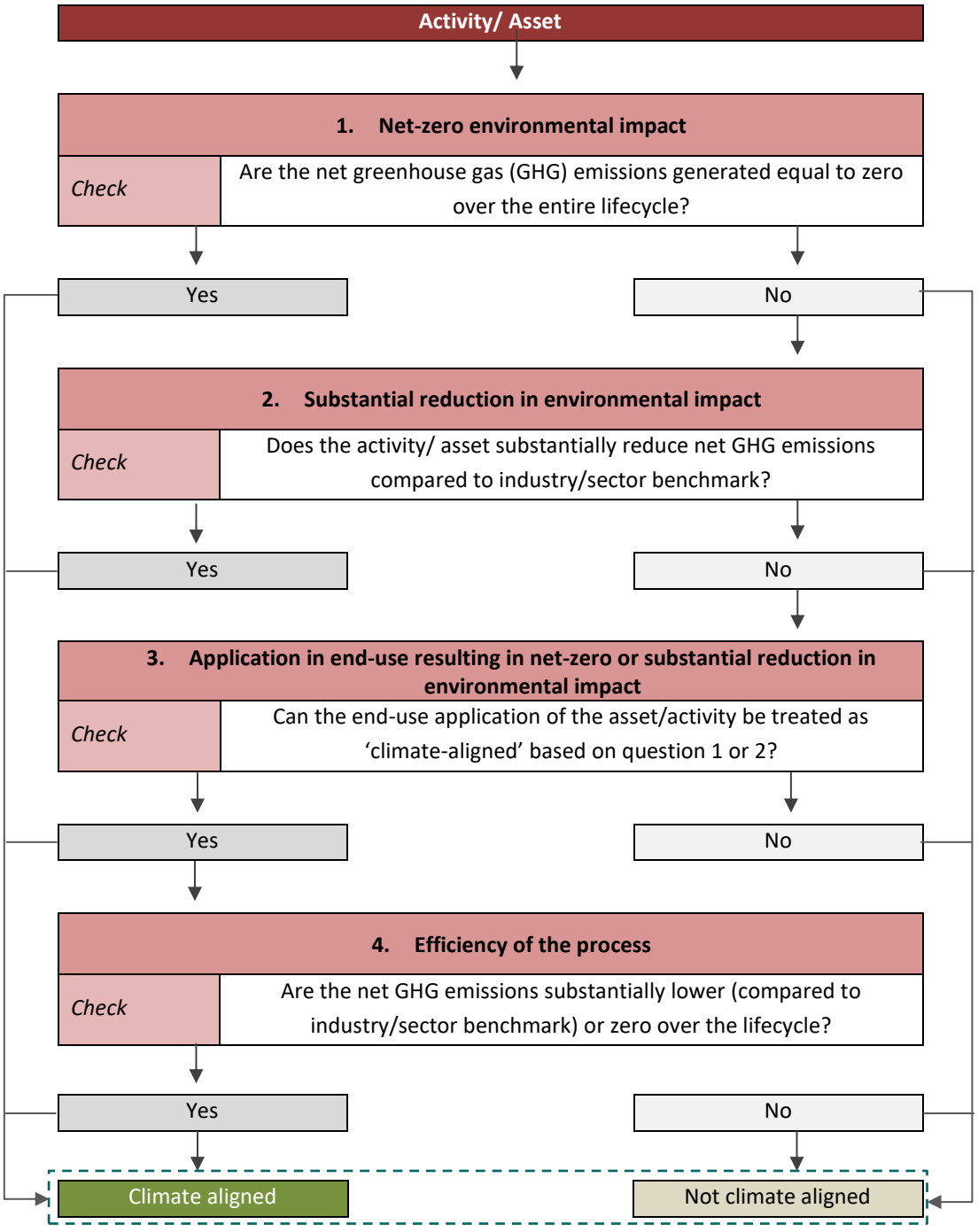


Figure 4: Flowchart to tag assets and activities as 'green'[9]

[9] Net GHG emission is one, but not the only metric to measure impact

2.2 Green attribution

Capital flow into activities with defined use of proceeds (as in case of debt) can be tagged and completely attributed as 'green' using the green finance taxonomy for India. However, it may get tricky for investors buying securities of a company that are not pure-play green companies (in which case complete investment cannot be considered as green). An equity investor can seek data from a company on its green assets as a function of the net asset block, or itself green tag the asset base using company disclosures.

The flowchart below suggests a process that can be followed by investors for green attribution of portfolio.

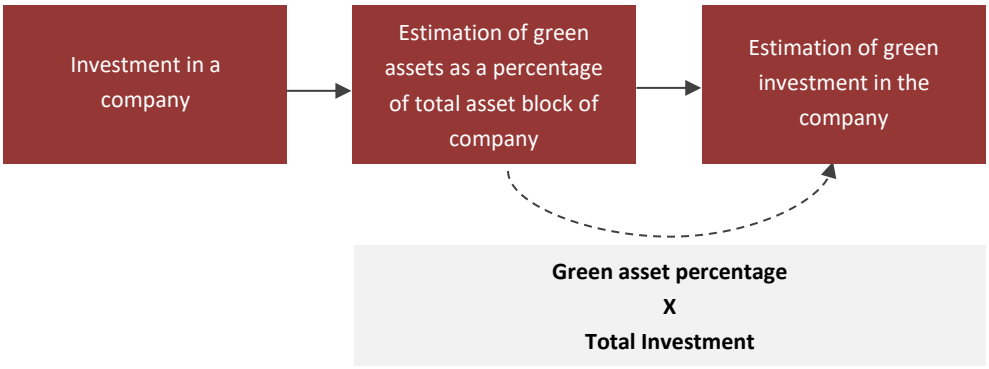
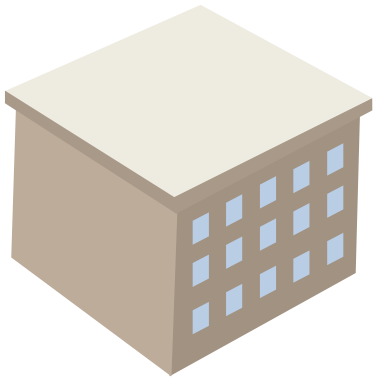


Figure 5: Green attribution of investments in a company

An IT company wants to reduce its carbon footprint

The building is modernized and made carbon neutral



Loan: USD 8mn

Building asset value/ Total assets: 10%

An IT company raises loan for developing a green building (say, LEED certified) from a bank. Considering the activity is aligned to the green finance taxonomy, the **entire loan amount** (USD 8mn) can be considered 'green'.

Continuing with the above example, if an **equity investor** had to estimate its green investment, it can be prorated based on the percentage exposure of green assets in the company's total assets. Therefore, an investor having invested USD 10mn in the company can characterize 10% of their total investment or USD 1mn as green.

3 Environmental risk integration

Environmental mismanagement by a company can pose risk to the overall investment performance. Increasingly, international investors are recognizing the need to integrate such parameters in order to improve climate resilience of their investments. Within India, the concept is relatively nascent with very few financial institutions adopting a strategy to integrate environmental risks into investment processes. However, with increasing focus around climate issues globally, the tide is expected to turn in the domestic market as well. Integration of environmental parameters will not only improve investment resilience but also attract capital infusion from international asset owners like pension funds and sovereign wealth funds that are already aligning to climate resilient strategies.

The process of integration may vary across different sectors but the fundamental objective remains centered on understanding environmental risks and their implication on financial performance.

The following section details out steps required to assess the environmental risks associated with a company (even the ones with a green footprint).

Approach

Assessment of environmental risk of a company entails the following steps:

a) Identification of material environmental risks for a sector
b) Assessment of the performance of company on these material environmental risks compared to the peer group

An 'E Risk Score' calculated from the above steps can be factored into the financial forecasts and/or company valuation. Each environmental risk identified as material, needs to be accorded a risk weightage. Thus, the implication of environmental performance would help in framing a comprehensive view on a company's economic moat[10] in the long-term, without over-relying on the brand name or strong heritage it may currently have.

The diagram on the page overleaf illustrates the process of integration of environmental risk score in the investment process.

[10] Economic moat refers to a company's ability to maintain a competitive advantage over its rivals and thus protect its long-term profitability and market share.

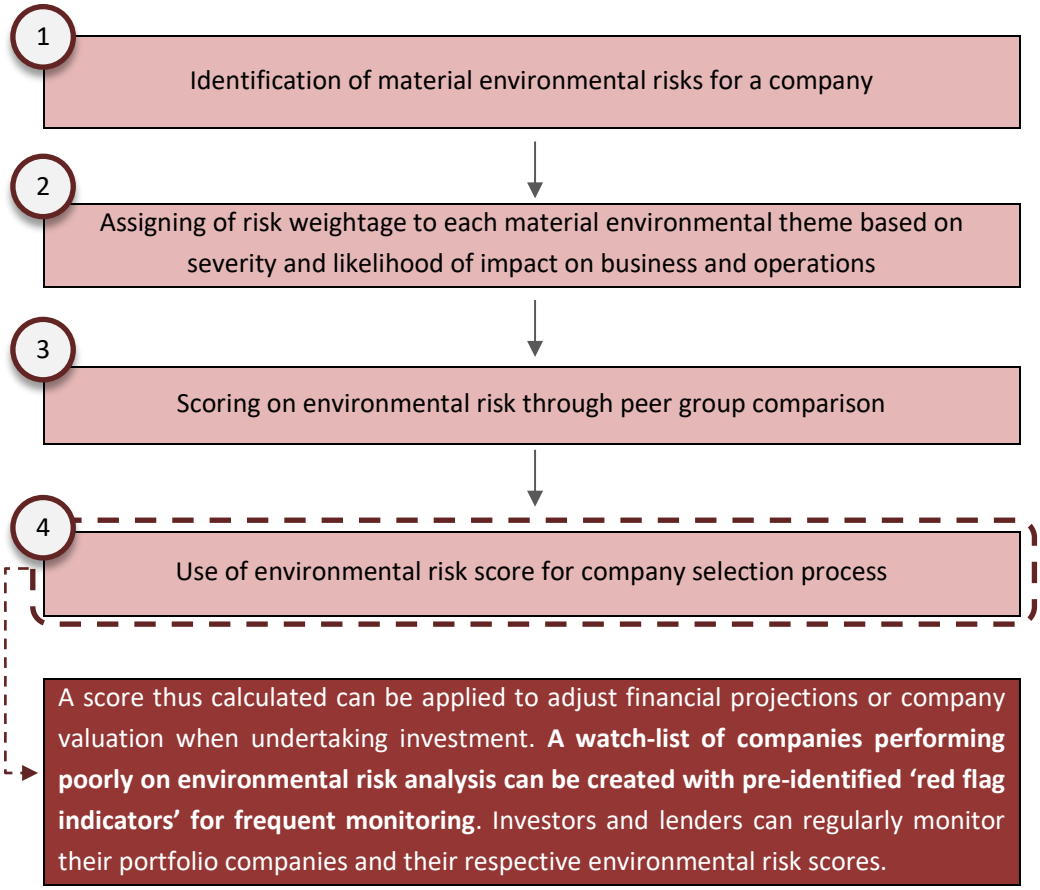


Figure 6: Flowchart for integration of environmental dimensions in portfolio selection process

Step 3.1: Materiality mapping

Materiality mapping refers to the identification of environmental risks that are expected to affect the continuity and financial performance of a company. Materiality is highly industry-specific and can also vary based on factors such as location/ region of operation, type of product and applicability of environmental regulations. Sustainability Accounting Standards Board[11] (SASB)'s materiality map is a widely used framework for gauging the materiality of potential risks for an industry (and thus applicability to a company depending on the dominant activity /product focused on by a company). Annexure 2 presents the SASB materiality map (environmental parameters) for 11 key sectors.

Step 3.2: Assigning risk weightage

Material environmental themes identified using SASB materiality map need to be accorded a risk weightage based on the product of the following two factors:

- **Severity**- An identified environmental risk represents varying implications on the business and operations. Therefore, a risk weightage (say 0.25 -Low to 1 -High) helps align the associated consequences of a given environmental parameter
- **Likelihood**- The probability of occurrence of an environmental risk is also an important aspect to factor in. The same can be represented in terms of whether

[11] www.sasb.org

the probability of occurrence is remote (say 0.25 score) or highly likely (say 1 score).

Step 3.3: Relative scoring of environmental risks

Performance of a company in its operating environment as compared to the peer group is also helpful to gauge relative preparedness and can be used to arrive at a relative score (as indicated in figure 7).

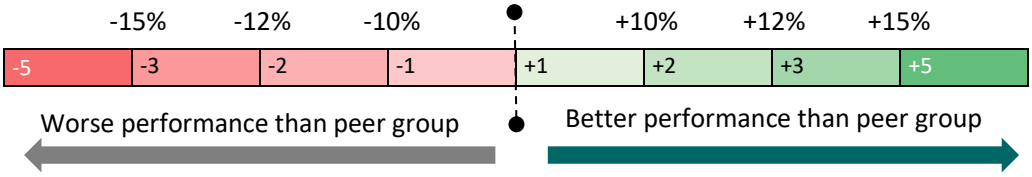


Figure 7: Scoring based on peer comparison

Step 3.4: Estimating the 'E Risk Management Score'

The composite 'E Risk Management Score' will be a weighted average of the material environmental risks (derived from Step 3.2) and the relative score (derived from Step 3.3).

The company valuation models and financial forecasts can be adjusted to reflect the expected impact of environmental risks based on the 'E Risk Management Score'. Annexure 3 enlists questions on the key material environmental themes that can be used as a matrix for assessing the 'E Risk Management Score'.

The illustration on the page overleaf provides a walk-through on the process of estimating the 'E Risk Management Score'.

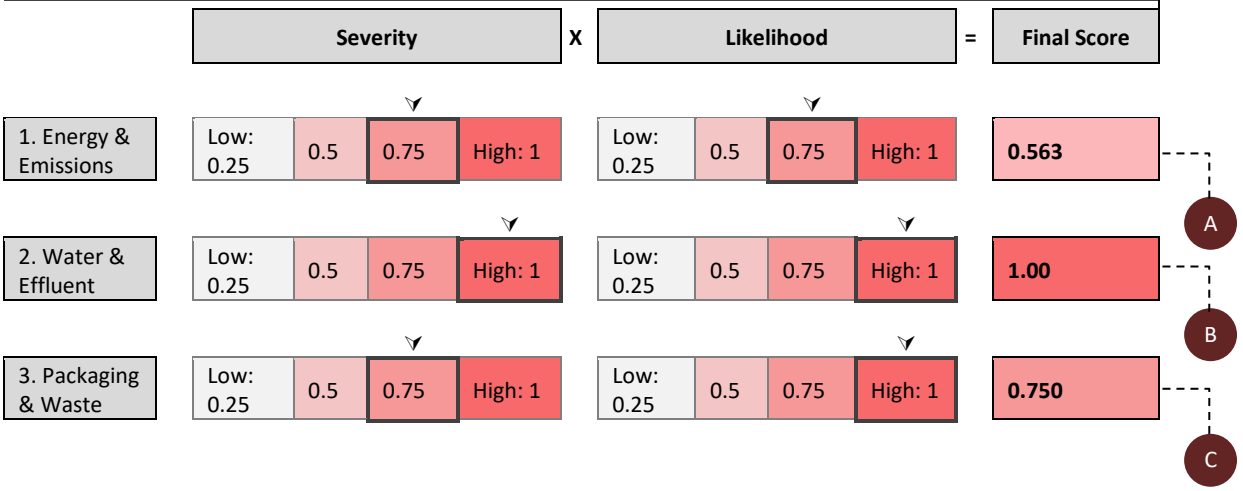
Illustration (Company A- Food & Beverage Industry)

Company A
Sector: Food & Beverage

Step 3.1: Materiality mapping

1. Energy & Emissions	Climate change may have huge implications for the business operations, due to the dependency on agricultural produce, which is vulnerable to extreme weather conditions. Company A, a food & beverage producer, requires thermal energy for process heat and cooling. Reduction in specific energy consumption and adoption of on-site renewable energy presents opportunity for the company. Further, steps to reduce carbon footprint aligned to 2°C goals should be taken including reduction of direct GHG emissions (Scope 1), emissions from electricity purchases (Scope 2 emissions) and indirect emissions in the value chain (Scope 3) from agricultural activities (upstream) and consumer usage of produced goods (downstream). Further, particulate matter and odour are some of the major air pollutants generated during the processing activities. With air pollution being considered a major concern in Indian cities, Company A needs to have appropriate emission monitoring and control devices implemented in accordance with standards of the Pollution Control Board and regulations from agencies such as National Green Tribunal
2. Water & Effluent	Company A has a huge reliance on reliable supply of good quality water for its operation, including use as the base ingredient in its final products and water scarcity or poor quality of water can have financial implications on its manufacturing operations. The key role of agricultural produce in the company's value chain further heightens water-related risks. Therefore, steps to reduce water consumption, improve water use efficiency and water conservation require requisite focus. For local communities in which the company operates its manufacturing facilities, water depletion and pollution (like high organic content, colour and odour in wastewater) is also a concern with possible business implications.
3. Packaging & Waste	Management, storage, treatment and disposal of putrescible organic solid waste generated as a by-product of manufacturing activities or rejected products may be a challenge for Company A, thus requiring appropriate waste reduction and management strategy and plan. Also, with increased push on collection and recycling of post-consumer waste, use of alternate sustainable packaging globally as well as in India (as part of Extended Producer's Responsibility), Company A can tap into the opportunity through product redesigns (that reduce packaging requirement and adopting recycled/ biodegradable packaging material). This could have positive impact on operating profit through reduced production costs, improved transportation efficiency and resultant reduction in post-consumption waste.

Step 3.2: Assigning risk weightage



Step 3.3: Relative scoring of environmental risks

Representative Indicators	Company A	Peer Group	➢	Score	÷	Maximum score	=	Normalized score	
1. Energy & Emissions									
Does the company identify and assess potential environmental risks?	Yes	Not reported		+1		1		+1	
Does the company have strategies/ initiatives to address global environmental issues such as climate change?	Yes	Not reported		+1		1		+1	
What is the total energy consumed?	37,79,500 MWh	42,14,143 MWh		+2		5		+0.4	
What is the % purchased renewable energy?	7.4%	8.3%		-3		5		-0.6	
What is the % of energy consumed from on-site renewable power?	0.50%	0.50%		+1		5		+0.2	D
What is the total GHG emissions across Scope 1, Scope 2 and Scope 3?	53,30,067 $MMTCO_2e$	51,70,165 $MMTCO_2e$		-1		5		-0.2	
Theme Score (Average)			➢					**+0.3**	
2. Water & Effluent									
What is the total water consumption?	86,400 ML	95,040 ML		+1		5		+0.2	
What is the specific water consumption?	1.4 ML/ Million USD	1.5 ML/ Million USD		+5		5		+1	
What is the improvement in water-use efficiency?	15%	14%		+1		5		+0.2	
What is the percentage of water recycled back into the process and reused for other purposes?	42%	49%		-3		5		-0.6	
What is the improvement in water-use efficiency of the direct Agri supply chain in high water risk areas?	2%	2.3%		-3		5		-0.6	
What is the percentage of water that was replenished in the same watershed from where it was extracted?	15%	25%		-5		5		-1	E
Theme Score (Average)			➢					**-0.1**	
3. Packaging & Waste									
What is the total amount of material used for production and packaging?	21,000 MT	21,210 MT		-1		5		-0.2	
Are there any initiatives to reduce the amount of packaging required?	Yes	Not Reported		+1		1		+1	
What is the amount of recyclable material used in production and packaging?	20%	23%		-3		5		-0.6	
Does the company have initiative to collect and recycle post-consumer waste?	Yes	Not Reported		+1		1		+1	
What is the amount of waste generated during production?	14,756 MT	15,030 MT		+1		5		+0.2	F
What is the reduction in amount of waste generated during production?	15%	13.5%		+2		5		+0.4	
Theme Score (Average)			➢					**+0.3**	

Step 3.4: Estimating the 'E Risk Management Score'

E Risk Score for Company A	*(Based on theme score and risk weightage)*	**+0.260**
(A*D) + (B*E) + (C*F)		

Thus 'E Risk Management Score' reflects the efficiency as also efficacy of management of environmental risks by a company. A higher score indicates better management of environmental risks. This score can be used to adjust the fundamental investment analysis of a company in order to arrive at a more holistically assessed investment or credit decision on a company.

Conclusion

The main objective of this document is two-fold:

- Support India's successful transition towards a low-carbon economy by guiding the financial institutions to tag their investments as green-aligned as a first step to increase dedicated investments in the green areas
- Apart from considering the greenness of their portfolio, the guidebook also aims to promote sustainable investment practices by guiding the financial community to go beyond the environmental compliance approach and look at impending environmental risks that can hamper the overall investments

As investors start to actively engage in the climate conversations and calibrate their investments approaches to the 1.5°C scenario by limiting their exposure to carbon-intensive sectors and proactively increasing the climate-aligned investments, this guidebook will equip them to gauge prospective project investments on their climate associated risks as also appropriately characterize their portfolios; thus, overall enhancing their transition towards sustainable investments realm.

The table below provides some additional resources including disclosure frameworks and initiatives related to sustainable investments.

Name	About	Weblink
Business Responsibility Report (BRR)	It is a disclosure framework, mandated by the Securities and Exchange Board of India for the top 500 Indian corporates on environmental, social and governance issues	www.sebi.gov.in/legal/circulars/nov-2015/format-for-business-responsibility-report-brr-_30954.html
Carbon Disclosure Project (CDP)	It runs the global disclosure system that enables companies, cities, states and regions to measure and manage their environmental impacts	www.cdp.net
Equator Principles	It is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making.	www.equator-principles.com
Global Reporting Initiative (GRI)	GRI helps businesses and governments worldwide understand and communicate their impact on critical sustainability issues such as climate change, human rights, governance and social well-being.	www.globalreporting.org
International Integrated Reporting Framework	The framework applies principles and concepts focused on bringing greater cohesion and efficiency to the reporting process, and adopting 'integrated thinking' as a way of breaking down internal silos and reducing duplication.	www.integratedreporting.org
Principles for Responsible Banking	It aims to provide framework for a sustainable banking system, and help the industry to demonstrate how it makes a positive contribution to society	www.unepfi.org/responsiblebanking
Principles for Responsible Investment (PRI)	PRI works to understand the investment implications of environmental, social and governance (ESG) factors and to support its international network of investor signatories in incorporating these factors into their investment and ownership decisions.	www.unpri.org
Task Force on Climate-related Financial Disclosures	The Task Force on Climate-Related Financial Disclosures (TCFD) was set up in 2015 by the Financial Stability Board (FSB) to develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders.	www.fsb-tcfd.org
United Nations Environment Programme Finance Initiative	It is a partnership between United Nations Environment and the global financial sector created in the wake of the 1992 Earth Summit with a mission to promote sustainable finance.	www.unepfi.org

ANNEXURE

Annexure 1: Green finance – sectoral view

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
CLEAN ENERGY					
Asset Creation (power, heat)	Wind	Use of airflow through wind turbines to generate electricity	Construction and operation of the facility	A. Location: •Location of solar parks important for wildlife. Setting up of large solar and wind farms in wildlife-rich locations can lead to a loss of habitat B. Lifecycle assessment – GHG emissions	Target: 60GW by 2022[12] Current: 34.6GW, i.e. 10% of total installed power capacity (December 2018)
	Solar	Solar PV (rooftop/utility): cells directly convert sunlight into electricity Utility scale concentrated solar power (CSP): use mirrors or lenses to concentrate (focus) sunlight onto a small area and then converts it into heat to create steam to drive a turbine that generates electrical power Solar thermal applications: collect sun's energy and transform into heat that can be used later. Solar thermal applications have residential and industrial uses such as domestic water heating, heating swimming pools, space heating, water processes for industrial heating and agricultural drying	Solar PV and CSP: Construction and operation of solar power plant Solar thermal system: Construction and operation of systems like solar water heater, solar heating system, solar cooling system		Target: 100GW by 2022[13] Current: 24GW, 6.9% of total installed power capacity (December 2018)
	Small hydro (up to 25 MW capacity)	Converts energy of flowing water into electrical energy	Construction and operation of the facility		Target: 5GW by 2022[14] Current: 4.5GW, 1.3% of total installed power capacity (December 2018).
	Tidal	Form of hydropower energy that uses energy of the oceanic tides to generate electricity.	Construction and operation of the facility		High costs (est. INR 30-60crore per MW) inhibit commercialization. Recognition could lead to scale

[12] http://pib.nic.in/newsite/PrintRelease.aspx?relid=155612
[13] Ibid.
[14] Ibid.

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
					which could bring down costs. Strong case with 7,517 km coastline. Energy potential estimated around 8000 MW[15]
	Geothermal	Utilizes heat stored in the earth's crust. Geothermal resources include dry steam, hot water, hot dry rock, magma, and ambient ground heat.	Construction and operation of the facility		Target 10,000 MW by 2030[16]
	Biomass energy	Biomass energy is generated from the conversion of solid, liquid and gaseous products derived from biomass. It involves processing of biomass which includes any organic (biological) matter available on a renewable basis including wastes and residues from agriculture, forestry and related industries as also the organic waste from municipal and industrial sources.	Construction and operation of the facility	•Lifecycle emissions •Liquid biofuels for transport have been most heavily associated with the environmental and social criticisms of bioenergy. •Traditional use of biomass in cooking needs to be avoided.	Biomass Target: 10GW installed capacity by 2022. Current installed capacity: 8.7GW (December 2018)
	Nuclear	Uses nuclear reactions to generate heat used to produce electricity. Nuclear is recognized as one of the lowest emitters of GHGs that can generate electricity.[17]	Construction and operation of the facility	Raw material storage, disposal of nuclear waste (toxicity), risk of accidents	Target: 13.5GW installed capacity by 2024 and 22.5GW by 2031.[18] Current installed capacity: 6780 MW, i.e., 2% of current installed capacity (December 2018)
Delivery Asset	Smart grids	Smart grid components including Wireless/ Wired/ Optic Communications, smart power meters, smart substations, controls, sensors	Setting up of smart grid infrastructure (will support both conventional and renewable power).	• Lifecycle assessment – GHG emissions	Electricity transmission and distribution (T&D) system losses in India are among the highest in the world[19]. As of 2014-15, these were

[15] http://www.pib.nic.in/newsite/PrintRelease.aspx?relid=90205
[16] MNRE Draft National Policy on Geothermal Energy
[17] www.iaea.org/topics/nuclear-power-and-climate-change
[18] http://dae.nic.in/writereaddata/parl/budget2018/lsus2064.pdf
[19] www.eia.gov/todayinenergy/detail.php?id=23452

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
	Green energy corridors	Dedicated infrastructure for evacuation of renewable energy from generation points to the load centres through strong grid connections	Setting up transmission and distribution network		reported to be 22.77%, that is over twice the world average and nearly three times the levels in the US.[20]
	EV charging infrastructure	Setting up and operation of EV charging stations and energy supply facilities for battery charged vehicles	Construction and operation of the facility		Available of electric charging infrastructure will be critical to uptake of EVs in the country.
	Transport Infrastructure	Construction of new roads, bridges, infrastructure upgrades, railway lines for freight and passenger traffic	Infrastructure construction companies, contracting companies setting up the projects		This area is already making a big impact in metros and has found mentions from Niti Aayog as a potential option to promote shared mobility.
	Facilities	Examples include district cooling and heating facilities that may be used for commercial or residential buildings	Set-up and operator of the facility		
Implementation Practices	Clean coal technologies	Technologies like Pulverized Combustion Ultra Super Critical (PC USC), Pressurised Circulating Fluidised Bed Combustion, Super Critical, Combine Cycle (PCFBC SC CC), Integrated Gasifier Combined Cycle (IGCC), Solid Oxide Fuel Cell (SOFC), Integrated Gasifier Fuel Cell (IGFC), Underground Coal gasification (UCG). These technologies were recognized in India's NDCs as possible options to make existing thermal power plants cleaner.	Investment in Ultra supercritical and Supercritical technologies that are high-efficiency, low-emission (HELE)		Low efficiency levels at existing coal plants (28% average efficiency compared to 36% in China and 33% in the US)[21] resulting from subpar quality of coal available in the country (that carries low energy content meaning more coal needs to be burnt to achieve same level of electricity) and subcritical technologies employed in coal-fired plants (that are low-cost but use more coal) have had the government consider measures to control coal-related GHG emissions through the

[20] beeindia.gov.in/sites/default/files/Transmission%20and%20Distribution%20Losses%20by%20CEA.pdf
[21] www.industry.gov.au/sites/g/files/net3906/f/June%202018/document/pdf/coal-in-india.pdf

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
					employment of clean coal technologies.[22]
	Renovation & Modernization (R&M) of thermal power technologies		Renovation, modernisation and Life Extension of old coal power stations		Energy efficiency targets set for 144 old thermal stations (as per NDC). R&M of existing old power plants requires less investment (vis a vis. setting up a new plant), can be completed in a shorter time frame and can help reduce emissions through adoption of upgraded technologies.[23]
Manufacturing & R&D	Generation equipment	Generation equipment including but not limited to: •wind: wind power monitoring system, control, systems of wind farms •solar PV: PV modules (panels), inverters, mounting structures, trackers, batteries and charge controller •small hydro: hydraulic machinery, steel structures, turbines, generator unit •tidal: turbine, generator, steel or floating structures •geothermal: geothermal vents, steam generator, condenser, turbine	Construction and operation of the facility	• Lifecycle assessment – GHG emissions • Ensuring that the products are manufactured sustainably (compliance with BEE standards) • Addressing environmental and social considerations	Indian government, in alignment with the 'Make in India' campaign, is encouraging locally manufactured products by prescribing that solar power projects bidding in RE sector projects need to source a majority of the components/ products locally
	R&D for RE equipment, EE products	R&D for creation of new and improved RE products and technologies. Examples of R&D projects include: •new product development: design and development of organic solar cell sub-modules which can be potentially low-	Capital expenditures to RE dedicated projects		R&D in manufacturing needs to be recognized as a critical building block for a wider scale-up for renewable energy (target of 175 GW through renewable energy by 2022) and energy efficiency in India

[22] www.industry.gov.au/sites/g/files/net3906/f/June%202018/document/pdf/coal-in-india.pdf
[23] http://www.cea.nic.in/reports/others/thermal/trm/lahmeyer.pdf

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
		cost, light-weight usable in tents, congested city environments (where modules need to be folded or rolled and kept away when not in use).[24] •cost efficient solutions: develop efficient single phase system to convert solar energy to electrical energy from solar PV.[25]			
	Renewable energy (solar) appliances & products	Includes solar lighting systems like lantern, solar street lighting and heating systems like solar cookers	Construction and operation of the facility		
	Systems and equipment for Delivery Asset	Key components	Construction and operation of the facility		
	Energy Storage	Equipment and key components	Construction and operation of the facility	• Lifecycle assessment – GHG emissions •End-of-life disposal	• As part of India's NDCs, targets under Clean and Efficient Energy System (large-scale development of RE) and National Smart Grid Mission will require development of energy storage technologies • The National Wind-Solar Hybrid Policy[26] recognizes the importance of energy storage devices in improving the plant & infrastructure utilization efficiency, power reliability and grid stability • Battery manufacturing is critical for a large-scale transition to EVs

[24] mnre.gov.in/file-manager/UserFiles/Solar%20R&D%20Projects/Ongoing-R&D-projects-in-solar-PV-5.pdf
[25] mnre.gov.in/file-manager/UserFiles/Solar%20R&D%20Projects/Ongoing-R&D-projects-in-solar-PV-11.pdf
[26] mnre.gov.in/sites/default/files/webform/notices/National-Wind-Solar-Hybrid-Policy.pdf

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
ENERGY EFFICIENCY					
Implementation Practices	Process efficiency due to employment of products, services and technologies that are considered energy efficient	Energy savings in Industrial processes can occur in a few ways. •Manufacturing process (whole or in-part) can be made energy-efficient through industrial automation (reducing human intervention), employing better machinery (fixed asset upgrades), •Energy retrofits such as heat pumps, conversion to LED lighting, power management through motion sensors, smart meters, smart grids, improvements in HVAC systems •Reduction in fuel consumption by shifting from fossil fuel to renewables	Specific plant where these EE measures are employed in manufacturing, asset operations	Lifecycle assessment – GHG emissions	
	Bulk energy services	Energy recovery technology, and storage, transmission and distribution which results in reduced energy losses			
Manufacturing & R&D	Product	Development of products that reduce energy consumption levels of end user without any necessary changes in their requirements. Examples can be seen in lighting, appliances, building materials, fans and ACs, motors, transformers, pumps, compressors, etc. Lighting products: Compact fluorescent lamps (CFLs), Light-emitting diode (LED) bulbs that have been replacing incandescent bulbs. Energy efficient appliances: Consumer durables like air conditioners, ceiling fans, washing machines that comply with certain Standards and Labels.	Manufacturer of the Product/technology and its key components	• Ensuring that the products are manufactured sustainably • Addressing environmental and social considerations	

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
		In India, energy efficiency labelling under The Standards & Labeling Programme from Bureau of Energy Efficiency (BEE) has both mandatory and voluntary forms of labelling.[27]			
	Process/ Technology	Energy efficient process or technology like industrial automation software, energy saving technologies that reduce energy consumption a process, system or technology. (without changing its requirements)			
CLEAN TRANSPORTATION					
Asset Creation	Low emission Vehicles	Examples of low emission public transport include urban rail transit, Bus Rapid Transit systems, Electric vehicles (rail, trams, buses). Examples of private and freight vehicles include cars, buses, other vehicles.	Ownership of the asset	Lifecycle assessment – GHG emissions	Target: 6-7 million EVs by 2020[28] Initiatives: •Under FAME (Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles), government already offers EV purchase subsidies to 2-wheelers, 3-wheeler auto, passenger 4-wheeler vehicles, light commercial vehicles and buses. •Government is also incentivising cities to launch electric buses. •Delhi is looking to procure 1,000 electric buses in 2019.[29]
Manufacturing	Key components	Motor manufacturing, battery, mechanical parts manufacturing	Manufacturer or assembler of the asset and its key component	Environmental and human rights concerns related to mining of raw materials	Currently there is no lithium-ion battery production in India although the government push to increase EV penetration (FAME incentives) will

[27] www.beeindia.gov.in/content/standards-labeling
[28] dhi.nic.in/writereaddata/Content/NEMMP2020.pdf
[29] http://www.ptinews.com/news/10211075_Tender-for-1-000-e-buses-to-be-floated-next-year--DTC-MD.html

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
				•End-of-cycle waste management	likely mean that manufacturing of batteries would be a critical end-product pricing factor. According to NITI Aayog and RMI estimates, India would require approximately 800 GWh of batteries per year by 2030 to support 100% EV sales across all types of personal vehicles, representing US$ 125billion (INR 8lakh crore) investment in battery manufacturing.[30]
GREEN BUILDINGS					
Asset Creation	New buildings	A green building is one that, in its design, construction or operation uses less water, improves energy efficiency, conserves natural resources, recycles waste and provides healthier spaces for occupants, as compared to a conventional building.[31] These buildings can be commercial like offices, malls, hotels, retail establishments, educational institution buildings, hospitals, etc., or residential private dwellings and multifamily residential buildings	Structure as well as application of processes that are green, sustainable and resource-efficient throughout life-cycle of the building: from design, construction, operation and maintenance, renovation etc.	Green compliance verification through a recognized global or Indian green rating agency	•With the launch of initiatives like Smart Cities Mission, Pradhan Mantri Awas Yojana, Atal mission for Rejuvenation and Urban Transformation, the need to establish green buildings has come to fore as all these initiatives centrally focus on establishing sustainable, safe and efficient habitats for the long-term •Leadership in Energy and Environmental Design (LEED) certified buildings in India stood at 752 LEED-certified projects with 20.28 million gross sq.mt of space. Similar numbers for other countries ranking above India include the US (30,669 projects, 385.65 mn gross sq
	Renovation, upgrade and modernization of existing building stock	Including energy conservation retrofits, lighting, appliance or equipment upgrades, cost of heating, cooling, insulation, etc.	Performance upgrades of existing building stock only (including commercial and residential buildings)	• Water, energy and waste conservation measures • Compliance through certification from a	

[30] niti.gov.in/writereaddata/files/document_publication/India-Energy-Storage-Mission.pdf
[31] www.worldgbc.org/what-green-building

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
				recognized national or international rating agency	mt), China (1,211 projects, 47.16 m gross sq mt) and Canada (2,970 projects, 40.77 mn gross sq mt).[32]
Manufacturing	Alternative construction materials	Examples include use of alternatives to cement and concrete, e.g., use of natural products, recycled plastic	Manufacturer of the materials	Certifications (through a nationally recognized rating agency) to promote environmentally sustainable construction material	
SUSTAINABLE AGRICULTURE AND LAND USE					
Implementation Practices	No-till farming	Use of conservation farming techniques to exclude soil tillage and prevention of crop residue to incorporate with soil	Project Implementation and operation	GHG Emission	Developing ecologically sustainable climate resilient agricultural production systems is a part of India's NDC plan. There are three schemes currently promotion organic agriculture: Paramparagat Krishi Vikas Yojana (PKVY), Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) and National Programme of Organic Production (NPOP)[33]
	Organic agriculture	Management practices that can help farmers adapt to climate change	Project Implementation and operation	GHG Emission and biodiversity considerations	
	Integrated pest control (IPM)	Integrated pest management systems including best preventive and control measures and using pesticides only when needed	Project Implementation and operation		There is national policy on IPM and part of India's NACCAP
	Precision farming	Using information technology, data gathering, and proximal data gathering	Project Implementation and operation (Information technology, GPS, satellite	GHG Emission	National mission for sustainable agriculture gives importance to access of information on farming

[32] US Green Building Council's (USGBC), 2018
[33] http://pib.nic.in/newsite/PrintRelease.aspx?relid=181608

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
		to improve fertilizer, soil and water management for agriculture activities	positioning (GNSS) data, remote sensor, drones)		practices with an objective of boosting productivity and income.
	Animal husbandry and Fishery	Sustainable animal farming techniques including manure processing, waste management, fishery thoroughbred, etc.	Project Implementation and operation	GHG Emission	Animal husbandry is one of the key sectors under the national adaptation plan
	Agro-forestry	Integration of forestry, crops farming, and livestock farming in the same piece of land	Project Implementation and operation	GHG Emission and biodiversity considerations	Focussed in India's Agro-forestry policy 2014 and part of India's plan to enhance carbon sinks
	Conservation and management of wet lands	Protection, preservation and sustainable use of wetlands	Project implementation and operation	Biodiversity and climate adaptation	
Asset Creation	Ecological Protection	National park, national geological park, project of natural heritage, natural reserve, etc.	Project Implementation (Facility construction) and operation	Biodiversity	
	Biodiversity	Protection of coastal, marine and watershed environments, and restoring degraded ecosystems (including their genetic and species diversity)			
	Forestry Development	Afforestation, Forestry seed breeding and seedling production, etc.	Project implementation and operation	GHG Emission	
Manufacturing	Farming equipment and pesticide	Farming equipment such as Roller/crimper, tillage equipment used for no-till farming and organic agriculture. Pesticide used for integrated paste control	Plant for manufacturing of equipment and pesticides	• Lifecycle assessment – GHG emissions • Ensuring that the products are manufactured sustainably (compliance with standards)	Farming equipment and pesticides are currently taxed in India.
	Raw materials	Construction materials such as cement, steel, iron and equipment for facility construction and maintenance (for example national and geological park, etc.)	Plant for manufacturing of raw materials used for farming equipment	Lifecycle assessment – GHG emissions	

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
	Storage and Distribution	Storage and Distribution of farming equipment, pesticide and raw materials	Warehouse construction and inventory financing of equipment and pesticide	Lifecycle assessment – GHG emissions	
	IT Development and Services	Information technology development and services for precision farming	IT Development and services	Lifecycle assessment – GHG emissions of PCs/ Laptops/ peripheral items	
WASTE & POLLUTION CONTROL					
Asset Creation	Wastewater treatment	Convert wastewater into an effluent that can be returned to the water cycle with minimum impact on the environment	Wastewater treatment plant	Pollution control and GHG emissions reduction	Abatement of pollution and setting up of resilient urban centres are the key activities of India's NDC plan. Rising population, urbanization, and industrialization has led to severe wastewater, solid waste management, and toxic air problem in cities. India generates a staggering 1.7 million tonnes of faecal waste a day and 78% of the sewage generated remains untreated[34]. India's air pollution problem is severe which reflects from WHO's database: 11 of the 12 cities with the highest levels are located in India[35]
	Sludge in wastewater	Solid, semisolid, or slurry residual material that is produced as a by-product of wastewater treatment processes	Sewage treatment plant		
	Air pollution	Air pollution control equipment and control facility	Device/Facility Construction and Operation		
	Municipal Solid Waste (MSW)	MSW including hazardous waste and medical waste treatment facilities	Solid waste disposal facility and MSW treatment plant		Estimates show that more than 55 million tons of MSW is generated in India per year and increasing at a rate of 5% per annum; 75% of municipal garbage in India dumped without processing.

[34] Down to Earth
[35] www.who.int/airpollution/data/aap_air_quality_database_2018_v13.xlsx?ua=1; www.vox.com/2018/5/8/17316978/india-pollution-levels-air-delhi-health

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
					Management of MSW is a component of National Mission on Sustainable Habitats. There are numerous initiatives taken by the Government including concept of common waste treatment facility and Biomedical Waste Treatment Facility. Under JNURM, funds disbursed to ULBs to upgrade MSW facilities.
	Soil pollution	Remediation of soil pollution			
	Tailings and Associated Mine	Redevelopment of mine with a purpose of resource efficiency improvement, development of geothermal power, reinjection and integrated utilization	Tailings and waste-rock management facilities		
	Industrial Solid Wastes, Exhaust Gas, and Effluent	Collection and resourcelization of industrial solid waste, exhaust gas, and effluent	Collection, operation and recycling facility	GHG emissions reduction	Promotion of waste to wealth is a key element of India's NDC plan.
	Renewable energy waste resource	Recycling, Sorting and Dismantling System, and processing and reuse of wasted resource			
	Electromechanical Products	Construction and operation of remanufacturing device/facility for Electromechanical products such as auto parts, engineering machines, and machine tools.			
	Co-generation	Facility used for simultaneous production of heat and electricity	Cogeneration power plant		Co-generation is one of the key initiatives of India's NACCP
Manufacturing	Environmentally sustainable products	Developing products with reduced environmental impact from raw material extraction and processing to end-of-life disposal	Facility and supplies related to resource-efficient, transportation and distribution packaging optimising the value		

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
	Resource-efficient packaging and distribution	Resource-efficient and fit-for-purpose packaging using low impact materials and an efficient value chain for distribution	chain to reduce fuel consumption, reducing transportation emissions, eco-friendly warehousing		
	Manufacturing devices and equipment	Manufacturing of devices, equipment, tools used in setting up plants, facility construction materials, etc.	Manufacturing plants devices, equipment, tools, facility construction materials, etc.		
	Raw materials manufacturing	Materials such as cement, steel, iron and equipment for facility construction and maintenance	Plant for manufacturing of materials		
	Storage and Distribution	Storage and Distribution of equipment, devices, construction materials, etc.	Warehouse construction and inventory financing of equipment, devices, construction materials, etc.	Lifecycle emissions of warehouse	
	R&D	R&D expenses on development of new products and devices used for environmentally sustainable products	Financing for R&D expenses		As waste and pollution control is a key component of India's NACCP, product innovation in this area will be key to India's NDC goal. There are incentives from Government to produce biodegradable plastics in India.[36]
WATER USE & CONSERVATION					
Asset Creation	Water Conservation	Industrial water saving technology, agricultural water saving irrigation, transformation of urban pipeline network for water supply, and integrated use of water resource	Facility Construction and Operation	GHG Emission and pollution	There is a national water policy; water conservation is a part of India's NACCP. The water policy stresses both water utilization and conservation. Climate adaptation programme. The national water mission has a target to increase
	Rural drinking water safety	Providing piped and improved water supply to rural areas	Drinking water infrastructure		

[36] economictimes.indiatimes.com/blogs/et-editorials/fund-rd-in-obps-biodegrading-plastics/

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
	Urban water conservation	Reduction in water demand and careful use for household, municipal and industrial uses	Facility construction and operation		water use efficiency by 20%. In addition, the mission focusses on assessment of impact of climate change on water resources, water conservation, augmentation and preservation, etc.[37]
	Water conservation	Activities to conserve and sustainably manage the natural resources of fresh water	Water Conservation Equipment & Supplies		
	Wastewater methane	Installing anaerobic sludge digestion, biogas capture systems etc. to capture methane from municipal wastewater systems	Wastewater methane capture facility	GHG Emission and air pollution	Ethane emissions from wastewater is a key source of GHG emission. Waste sector in India accounts for 3.5% of the total GHG emissions
	Wastewater – sludge used as fertilizer	Treat the primary sludge through biological, chemical or thermal treatment that can be used as a fertilizer to improve soil properties	Wastewater sludge treatment facilities	Excessive use of this fertilizer for a longer period increases metal bioavailability in soil and ultimately causes food chain contamination	
Manufacturing	Inputs manufacturing	Manufacturing of devices, pipes, systems, equipment, tools use in setting up plants, facility construction materials, etc.	Manufacturing plant for devices, equipment, tools, facility construction materials, etc.		
	Supply chain	Distribution of device, systems, pipes, tools, equipment, etc.	Warehouse construction and inventory financing		
	Raw materials manufacturing	Materials such as cement, pipes, systems, steel, iron and equipment for facility construction and maintenance	Plant for manufacturing of materials		

[37] http://nwm.gov.in/

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
CLIMATE ADAPTATION					
Asset Creation	Disaster monitoring, warning and emergency response system	Disaster monitoring of major infrastructure and emergency response system	Facility Construction and Operation	Climate Adaptation	Disaster prevention and management is a part of India's NAPCC. Optimizing water use is a part of India's NDC plan. The national disaster management programme covers disaster prevention programmes. It also includes building cyclone shelter, costal protection infrastructure
	Flood mitigation	River dyke construction and riverway dredging engineering	Facility Construction and Operation		
	Hygiene emergency	For addressing natural disaster and extreme weather, the production and storage of hygiene emergency response facilities	Facility and supplies		The national disaster management programme covers disaster relief program. Disaster control programme includes surveillance and control of vector borne disease
	Epidemic disaster	Waning, monitoring, prevention and control system of animal epidemics	Facility to house and/or burials of animals, health care facilities for animals, and immunization supplies and operation		
Implementation Practices	Forest protection	Natural forest protection project (NEPP), converting cultivated land into forests, construction and maintenance of shelter forest	Project Implementation		
	Drought management	Investments in reducing the probability of drought occurrence or in mitigation of losses resulting from drought	Project implementation related to (1) Soil and water conservation, and (2) Herd management Relief measures		Drought management is a part of India's climate change adaptation plan (NAPCC)

	Sub-category	Description	Scope	Green considerations	India relevance, targets, initiatives
	Public health management	Designing of public health approach to climate change that would include services extending to both clinical and population health services	Public health implementation such as health outreach, vaccination, vector programs		Emergency medical relief program in case of natural calamities is a part of India's climate change adaptation plan (NAPCC)
	Food security	Addressing challenges of potential increase in food insecurity and malnutrition due to climate change	Project implementation related to food security such as food supplies and storage, local farming and irrigation, agriculture infrastructure, and territorial integration		Food security is a part of sustainable goal and is on the high of India's development priorities. It is well acknowledged in India's NDC plan
Manufacturing	Manufacturing devices	Manufacturing of systems, devices, tools, machinery required for disaster monitoring and warning, control, emergency systems and supplies, dyke construction, drugs, etc.	Manufacturing plant		
	Raw materials manufacturing	Raw materials such as cement, pipes, steel, and iron for facility construction and maintenance	Plant for manufacturing of raw materials		
	Storage and distribution	Distribution of disaster preparedness supplies; storage of hygiene emergency response facilities	Warehouse construction and inventory financing		
	R&D	R&D for drugs developed for climate adaption and emergency	R&D expenses for discovery and development of climate adaption and emergency drugs		
	Disaster monitoring, warning and emergency response IT system	Information transmission, software and information technology services	Development of IT systems and Services		

Annexure 2: SASB materiality map for environmental dimension

At sector level

Category	Consumer Goods	Extractives & Minerals Processing	Financials	Food & Beverage	Health Care	Infrastructure	Renewable Resources & Alternative Energy	Resource Transformation	Services	Technology & Communications	Transportation
GHG Emissions											
Air Quality											
Energy Management											
Water & Wastewater Management											
Waste & Hazardous Materials Management											
Ecological Impacts											

- Issue is likely to be material for more than 50% of industries in sector
- Issue is likely to be material for fewer than 50% of industries in sector
- Issue is not likely to be material for any of the industries in sector

At industry level

Category	Consumer Goods							Extractives & Minerals Processing							
	Apparel, Accessories & Footwear	Appliance Manufacturing	Building Products & Furnishings	E-Commerce	Household & Personal Products	Multiline and Specialty Retailers & Distributors	Toys & Sporting Goods	Coal Operations	Construction Materials	Iron & Steel Producers	Metals & Mining	Oil & Gas – Exploration & Production	Oil & Gas – Midstream	Oil & Gas – Refining & Marketing	Oil & Gas – Services
GHG Emissions															
Air Quality															
Energy Management															
Water & Wastewater Management															
Waste & Hazardous Materials Management															
Ecological Impacts															

The table above presents a mapping for a sample of 15 industries across two sectors. A detailed industry level map for all sectors is available here: materiality.sasb.org

Annexure 3: Questions for E Risk Management Score Assessment

S. No.	Questions	For the reporting year	For last three financial years
Energy and emissions			
1	What is the break-down based on green and non-green asset base for the company?		
2	What are the different fuel sources used?		
3	What is the split based on usage for different fuel sources?		
4	What is the total amount of fuel being consumed annually?		
5	What is the quantum of energy derived from renewable energy sources?		
6	What is the amount of energy being used across different uses like heating, cooling, electricity and steam?		
7	What is the organization' specific energy consumption across different sectors?		
8	What is the target to reduce specific energy consumption (in percentage and absolute terms)?		
9	What is the target to increase renewable energy in the total energy mix of the company (in percentage and absolute terms)?		
10	What is the total GHG emissions across Scope 1, Scope 2 and Scope 3?		
11	What is the emission intensity (report the type of emissions i.e. Scope 1, 2, 3 included)?		
12	What is the GHG emission reduction target (report the type of emissions i.e. Scope 1, 2, 3 included)?		
13	What is the amount of emissions of No_x, So_x, Persistent organic pollutants (POPs), Volatile organic compounds (VOC)?		
14	What are the different actions taken to mitigate climate change risks?		
Water and effluents			
1	What is the total water consumption?		
2	What is the water consumption across different sources such as surface water, ground water, recycled water, municipal water?		
3	What is the specific water consumption across all sectors of operation?		

S. No.	Questions	For the reporting year	For last three financial years
4	What is the percentage of water recycled back into the process and reused for other purposes?		
5	What are the total number of projects or sites that are located in areas classified as 'water stressed'?		
6	What proportion of projects or sites have rainwater harvesting facility?		
7	What is the total amount of effluent generated?		
8	What are the targets for reducing specific water consumption and effluent discharge?		
9	What are the total notices received from the pollution control nodal agency?		
10	What are the total number of reported cases/ disputes by the local community on water level, wastewater discharge?		
Packaging and waste			
1	What is the total amount of material used for production and packaging?		
2	What is the amount of recyclable material used in production and packaging?		
3	Are there any initiatives to reduce the amount of packaging required?		
4	What has been the investment made in R&D for improvement of product designs and manufacturing process to reduce waste generation?		
5	What is the total amount of hazardous and non-hazardous waste generated (excluding post-consumer waste)?		
6	What is the amount of waste (hazardous and non-hazardous) disposed across different approaches?		
7	What is the target to reduce waste generation?		
8	What is the total amount of post-consumer waste generated (based on production and product sales)?		
9	What steps have been taken to collect and recycle post-consumer waste?		
10	Total amount of post-consumer waste recycled		