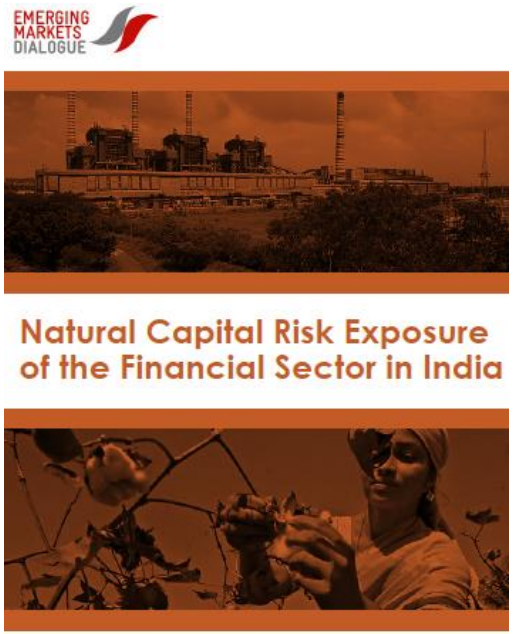
NATURAL CAPITAL RISK EXPOSURE OF THE FINANCIAL SECTOR IN INDIA

Presentation of the study and key findings



6th November 2015

WHAT'S THE PROBLEM?

Natural Capital underpins economic activity with companies dependent on resources such as water and raw materials

3bn more middle class consumers by 2030

147% increase in real commodity prices since 2000

80% rise in steel demand projected 2010-2030

$1 trillion spent annually on resource subsidies

"Over the next quarter century, the rise of three billion more middle-class consumers will strain natural resources. The race is on to boost resource supplies, overhaul their management, and change the game with new technologies."

McKinsey, The Resource Revolution

Trucost data allows companies and investors to price risks relating to natural resource constraints and climate change

NATURAL CAPITAL IN INDIA
DEMAND & SUPPLY SIDE PRESSURES

"No Development Process can afford to neglect the environmental consequences of economic activity or allow unsustainable depletion and deterioration of natural resources" (India Planning Commission 2013)

DEMAND SIDE

Population Growth

Economic Development

Industrialization

Natural Capital Consumption
(e.g. Energy, Food, Clothing, Housing…)

Natural Capital Availability

Natural Capital Costs

SUPPLY SIDE

Environmental Degradation
(e.g. deforestation, pollution)

Climate Change
(e.g. droughts, floods)

Environmental degradation in India amounts to USD 80 billion, or 5.7% of GDP in 2009 (World Bank).

The cost of air pollution to society in India in 2010 USD500bn per year in lives lost and ill health (UNEP 2014)

NATURAL CAPITAL HAS COSTS

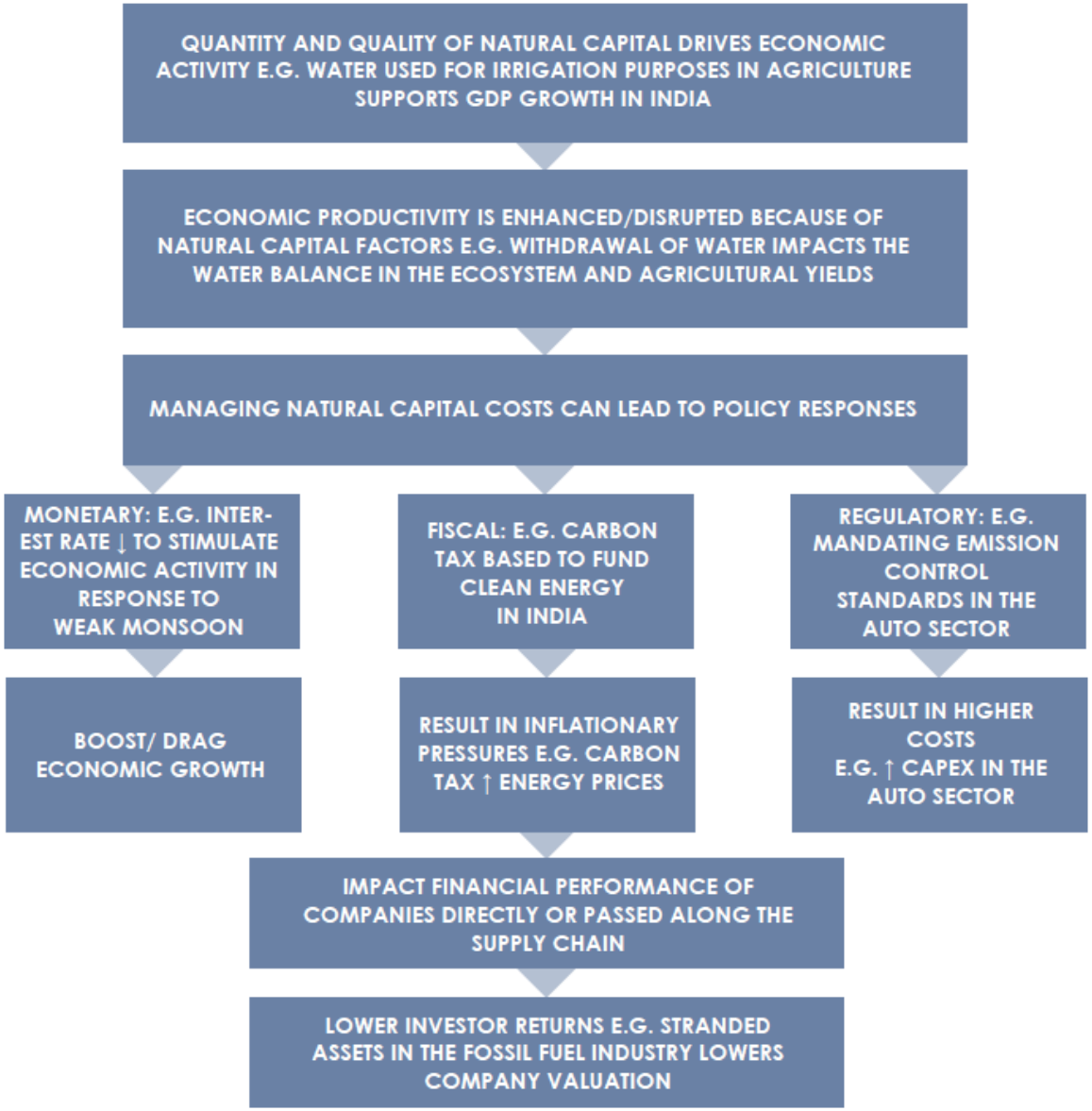
CLIMATE CHANGE IMPACT IN INDIA EXPECTED TO BE SEVERE

ITEM	ASSUMPTIONS
Extreme heat	Under 4°C warming, the west coast and southern India are expected to shift to high-temperature climatic regimes with significant impacts on agriculture
Changing rainfall patterns	Sudden changes in the monsoon could lead to more frequent droughts as well as greater flooding in large parts of India
Droughts	Droughts are expected to become more frequent and crop yields are expected to fall significantly because of extreme heat by the 2040s
Groundwater	More than 60% of India's agriculture is rain-fed, making the country highly dependent on groundwater. Falling water tables could impact agricultural output
Glacier melt	Alterations in the flows of the Indus, Ganges, and Brahmaputra rivers could significantly impact irrigation, affecting the amount of food that can be produced in their basins as well as the livelihoods of millions of people
Sea level rise	Sea-level rise and storm surges would lead to saltwater intrusion in the coastal areas, impacting agriculture, degrading groundwater quality, contaminating drinking water, and possibly causing a rise in diarrhea cases and cholera outbreaks
Agriculture and food security	Seasonal water scarcity, rising temperatures, and intrusion of sea water would threaten both rice and wheat yields, putting at risk the country's food security
Energy security	Declines in water availability cut pose a risk to the India's thermal power generation
Health	Higher incidence of diseases such as malaria in areas where colder temperatures had previously limited transmission

Agricultural Yields and Human Health expect to be hard hit

(Source: World Bank)

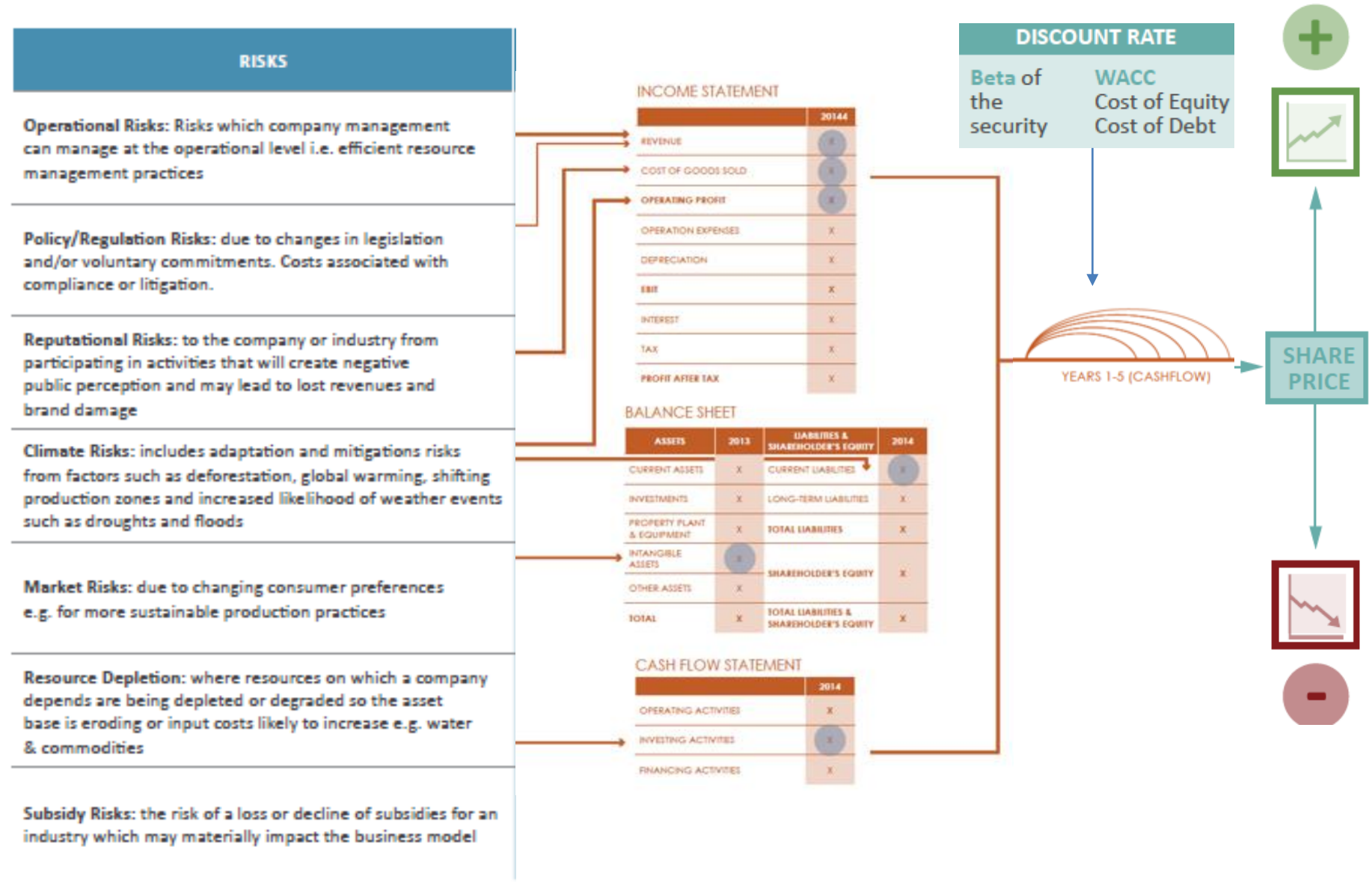
VERY REAL FINANCIAL IMPACTS



HOW CAN INVESTORS INTEGRATE NATURAL CAPITAL?

RISK INTEGRATION FRAMEWORK

TRUCOST

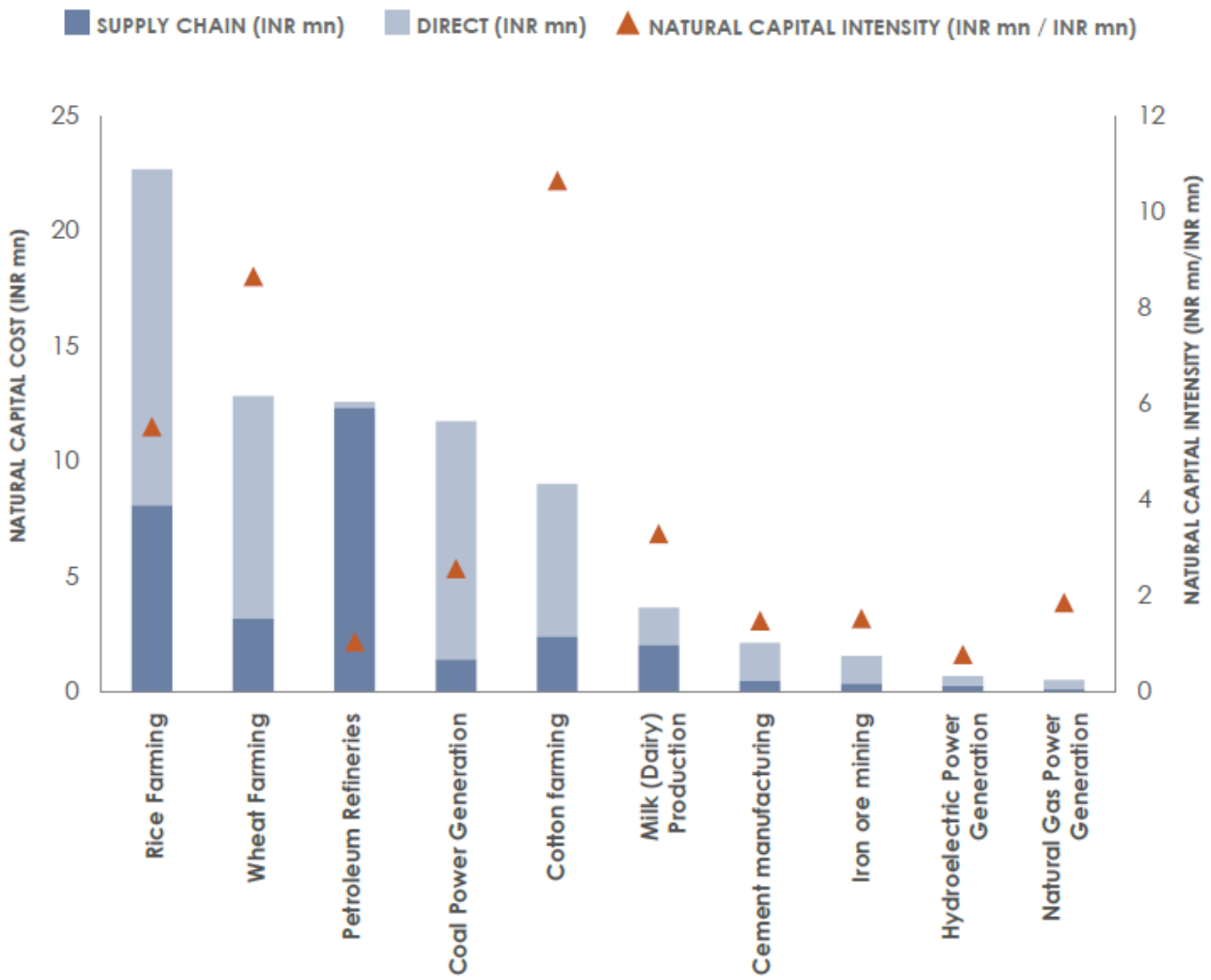


NATURAL CAPITAL INTENSITIES FOR INDIA

THE STUDY

% OF GROSS BANK LENDING	SECTOR	NATURAL CAPITAL COST (MN INR / MN INR REVENUE)						
		GHG EMISSIONS	AIR POLLUTANTS	WASTE	LAND USE	WATER USE	WATER POLLUTANTS	TOTAL
12.5%	AGRICULTURE AND ALLIED ACTIVITIES							
0.7%	Cattle ranching and farming	1.9	0.2	0.1	7.9	5.4	0.5	16.0
0.6%	Cotton farming	0.2	1.8	0.1	0.9	7.3	0.3	10.6
2.1%	Wheat farming	0.4	0.2	0.2	1.1	5.0	1.7	8.6
0.7%	All other grain farming	0.3	0.2	0.2	4.5	1.8	1.4	8.4
0.7%	Sugarcane farming	0.2	0.1	0.1	0.8	5.5	0.4	7.2
3.1%	Rice farming	0.2	0.1	0.2	0.9	3.5	0.5	5.4
1.9%	Oilseed (except canola, flaxseed, safflower & sunflower & soybean) farming	0.3	0.1	0.1	1.3	2.0	1.6	5.4
0.7%	Poultry hatcheries	1.2	0.1	0.1	2.2	0.8	0.9	5.4
0.7%	Milk (dairy) production	0.5	0.1	0.1	1.1	1.3	0.1	3.2
0.7%	Potato farming	0.1	0.1	0.1	0.3	1.1	0.2	1.8
0.7%	Coffee farming	0.1	0.0	0.1	0.7	0.6	1.0	2.5
9.1%	POWER							
6.6%	Coal power generation	2.0	0.3	0.2	0.0	0.1	0.0	2.6
0.5%	Natural gas power generation	1.4	0.1	0.2	0.0	0.0	0.1	1.9
0.5%	Hydroelectric power generation	0.0	0.0	0.2	0.0	0.5	0.0	0.8
0.5%	Natural gas distribution	0.1	0.0	0.5	0.1	0.0	0.0	0.7
0.5%	Electric power distribution	0.1	0.0	0.2	0.0	0.0	0.0	0.3
0.5%	Wind power generation	0.1	0.0	0.2	0.0	0.0	0.0	0.3

NATURAL CAPITAL INTENSITIES IN INDIA
IMPORTANCE OF SUPPLY CHAINS

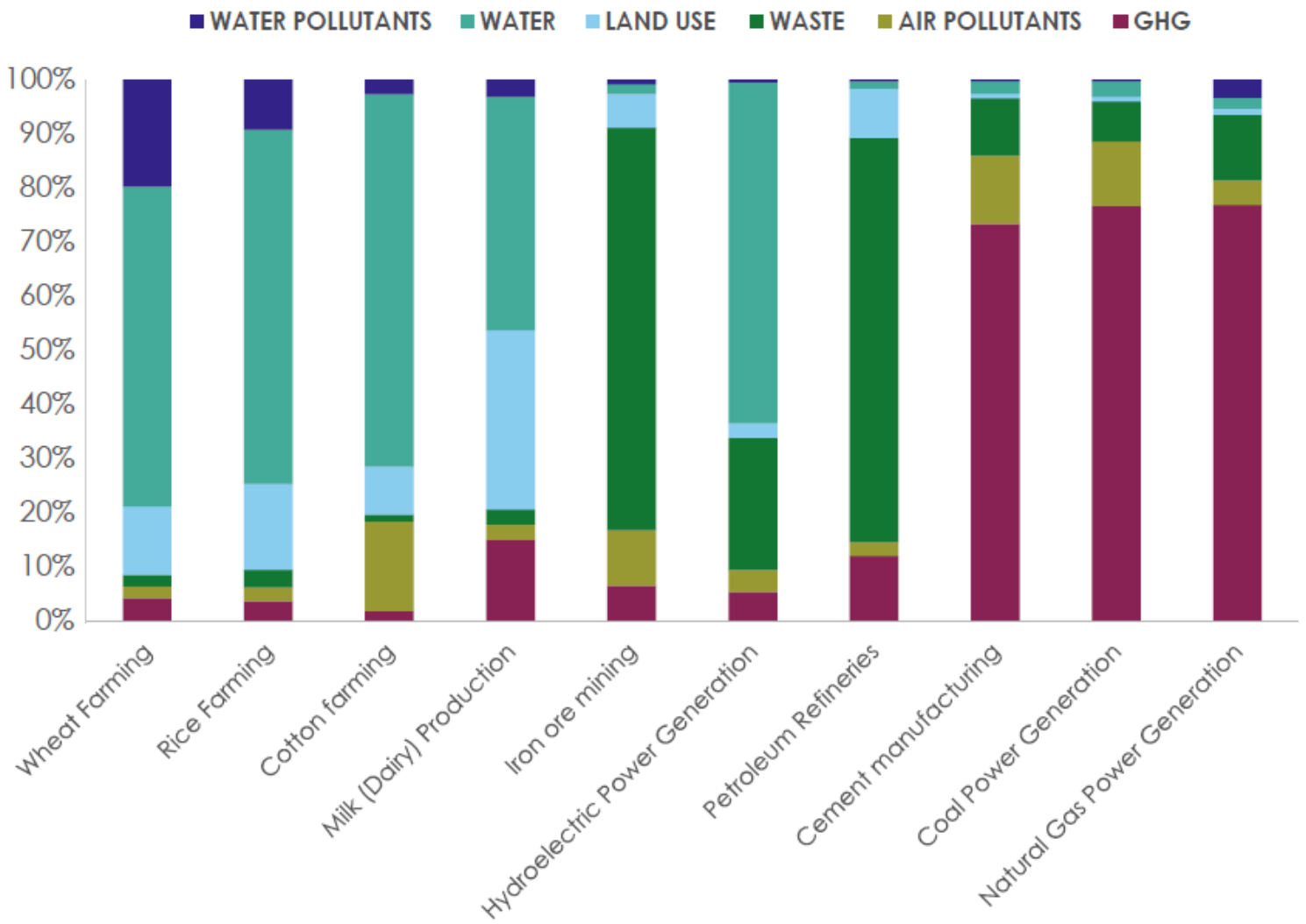


Source: Trucost

Agricultural sectors (wheat, rice, cotton) have high direct impacts.

Petroleum refining has the highest impacts in its supply chain (98%).

DIFFERENT SECTORS FACE DIFFERENT RISKS

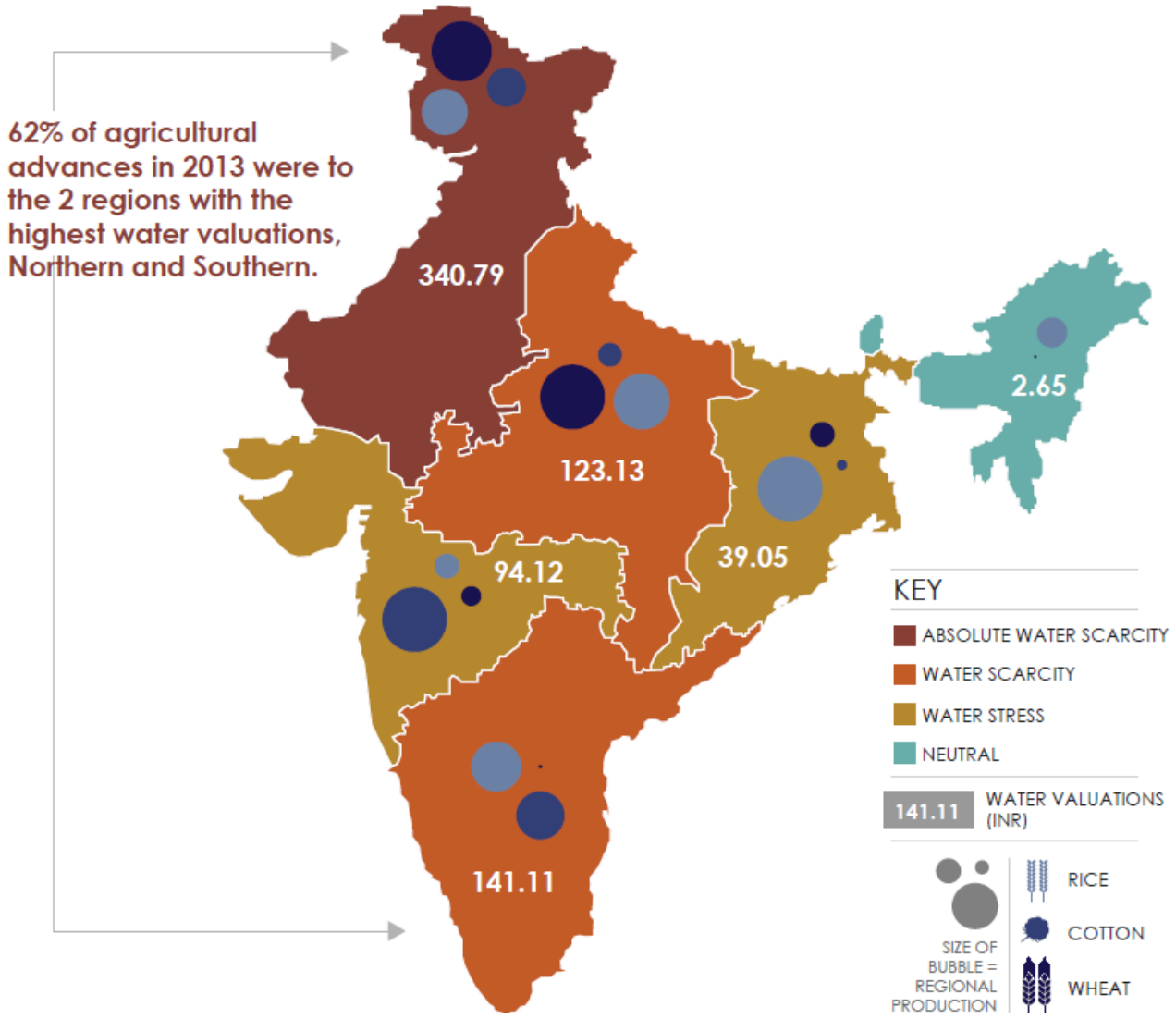


Source: Trucost

SIGNIFICANT REGIONAL DIFFERENCES IN RISK

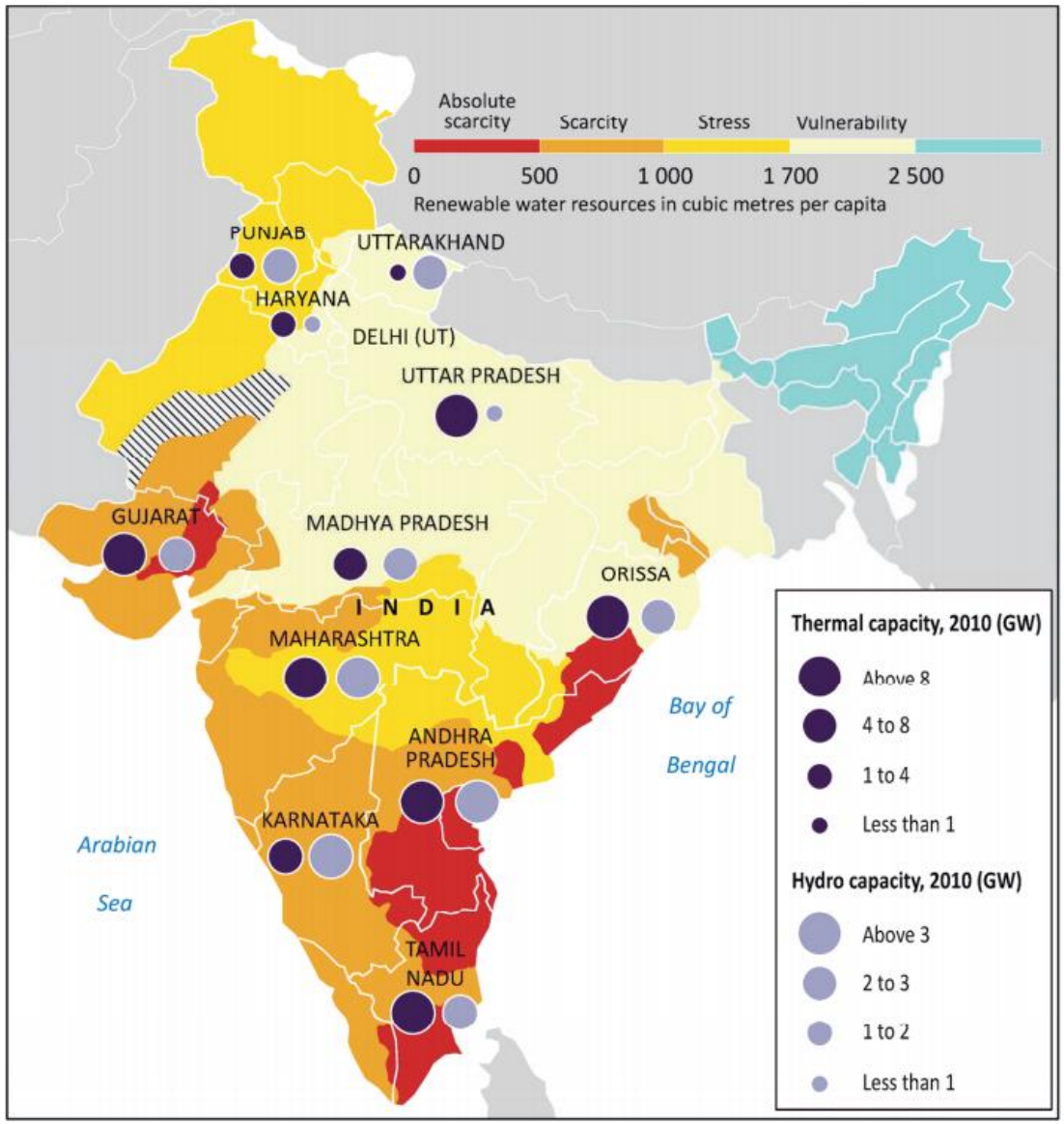
SECTOR	REGION												
	NORTHERN		CENTRAL		EASTERN		NORTH–EASTERN		WESTERN		SOUTHERN		INDIA
	BN INR	%	BN INR	%	BN INR	%	BN INR	%	BN INR	%	BN INR	%	TOTAL IMPACTS
Wheat Farming	6,380	50%	5,170	41%	674	5%	6	0%	451	4%	24	0%	12,705
Rice Farming	5,728	26%	5,049	23%	5,328	24%	976	4%	894	4%	4,324	19%	22,300
Cotton farming	2,719	30%	515	6%	61	1%	0	0%	3,360	37%	2,343	26%	8,998
Milk (Dairy) Production	808	23%	946	26%	459	13%	39	1%	531	15%	794	22%	3,576
Iron ore mining	3	0%	335	21%	955	61%	0	0%	134	9%	134	9%	1,561
Hydroelectric Power Generation	321	47%	106	15%	35	5%	9	1%	51	7%	165	24%	687
Petroleum Refineries	1,933	15%	670	5%	775	6%	376	3%	7,186	57%	1,641	13%	12,582
Cement manufacturing	494	23%	476	22%	158	7%	20	1%	298	14%	680	32%	2,127
Coal Power Generation	2,320	20%	2,599	22%	1,469	13%	12	0%	3,225	27%	2,124	18%	11,749
Natural Gas Power Generation	107	20%	21	4%	2	0%	35	7%	249	47%	116	22%	530
TOTAL IMPACT	20,813	27%	15,887	21%	9,917	13%	1,474	2%	16,380	21%	12,344	16%	76,815

AGRICULTURE & WATER



- India's agriculture sector, which provides livelihoods to half population, is heavily dependent on water
- Rice is a strategic crop: 65% of impacts are from water use, with 72% of NC costs concentrated in 3 regions.
- Northern and Southern regions, the most water stressed in India, accounted for 18% and 44% of loans to the agriculture sector
- **RBI development goals** require domestic banks to make loans to the agriculture sector equalling **18% of net bank credit.**

POWER & WATER



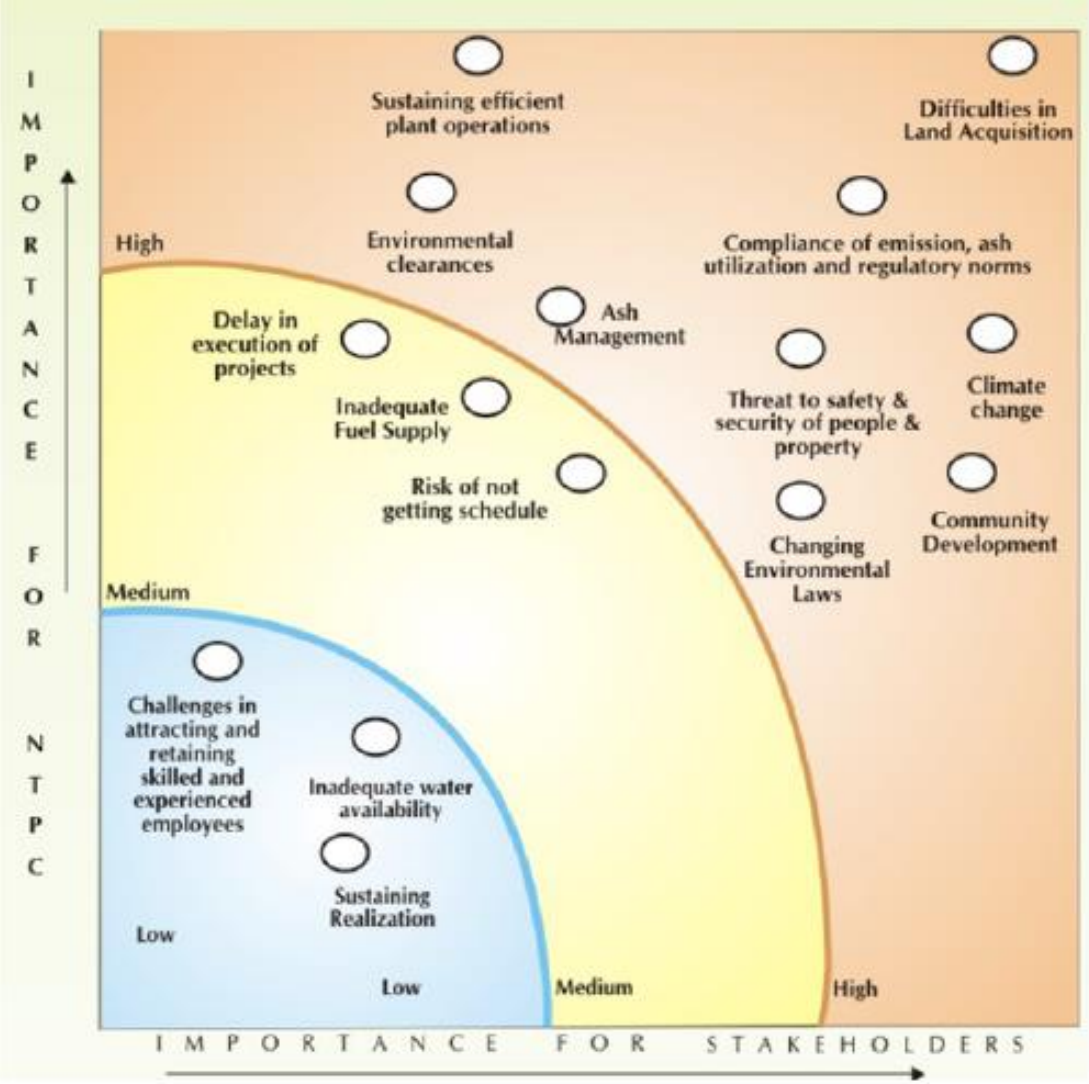
Almost half of India's coal-fired power generation is located in regions facing severe water stress (19% northern and 28% western regions).

Power generation accounts for 9% of commercial bank lending in India, driven by coal – 61% of the total installed domestic power generation capacity.

The NCI of 2.6x is driven by **GHG emissions and air pollution** (**89%** of total natural capital impacts)

COMPANIES RECOGNISE THE RISKS

NTPC SUSTAINABILITY MATERIALITY ASSESSMENT



Source: NTPC Sustainability report (2013-2014)

REGULATORY DRIVERS

In the absence of adequate market mechanisms, unpriced natural capital costs can trigger tighter regulation as governments intervene

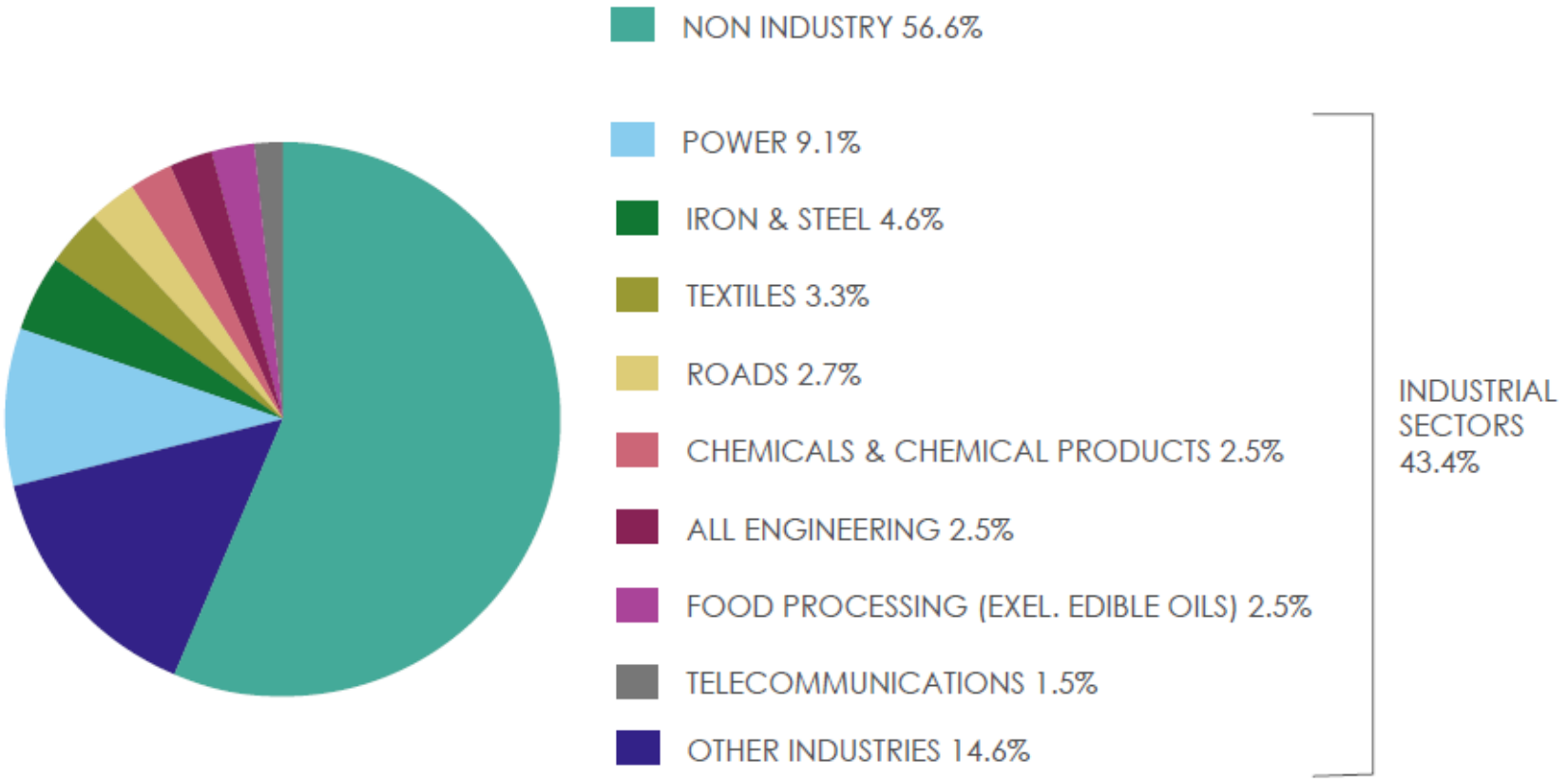
RENEWABLE ENERGY: INDIA'S ENERGY MINISTER GOYAL STATED NOVEMBER 2014

- **Plans to transform Indian electricity system from 35GW to 175GW of renewable energy installations by 2021.** This involves trebling wind installs to 6-8GW and lifting solar installs tenfold to 10GW pa
- **A plan for a US$50bn national grid upgrade to drive grid efficiency.**
- **Plans to more than double India's domestic coal production to 1.58n tpa by 2019,** requiring a massive investment in rail infrastructure, coal handling and preparation plants plus major new mine development.

Energy Security
"I'm very confident of achieving these targets and am very confident that India's current account deficit will not be burdened with the amount of money we lose for imports of coal. Possibly in the next two or three years we should be able to stop imports of thermal coal." **Goyal 2014**

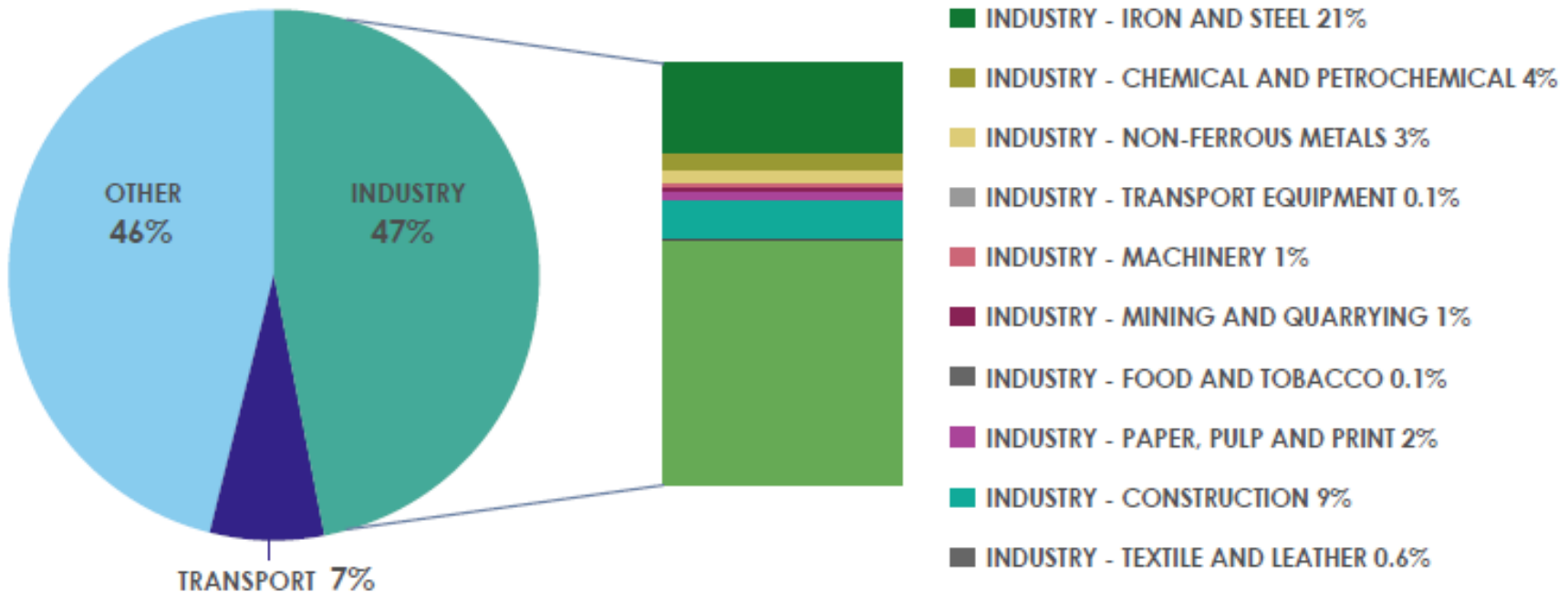
INDUSTRIAL SECTOR HIGHLY EXPOSED

Industrial sectors accounted for 43.4% of gross Indian Bank lending as at March 2015
Generates 27% of all unpriced natural capital costs from bank lending in India.



Source: (RBI, 2015)

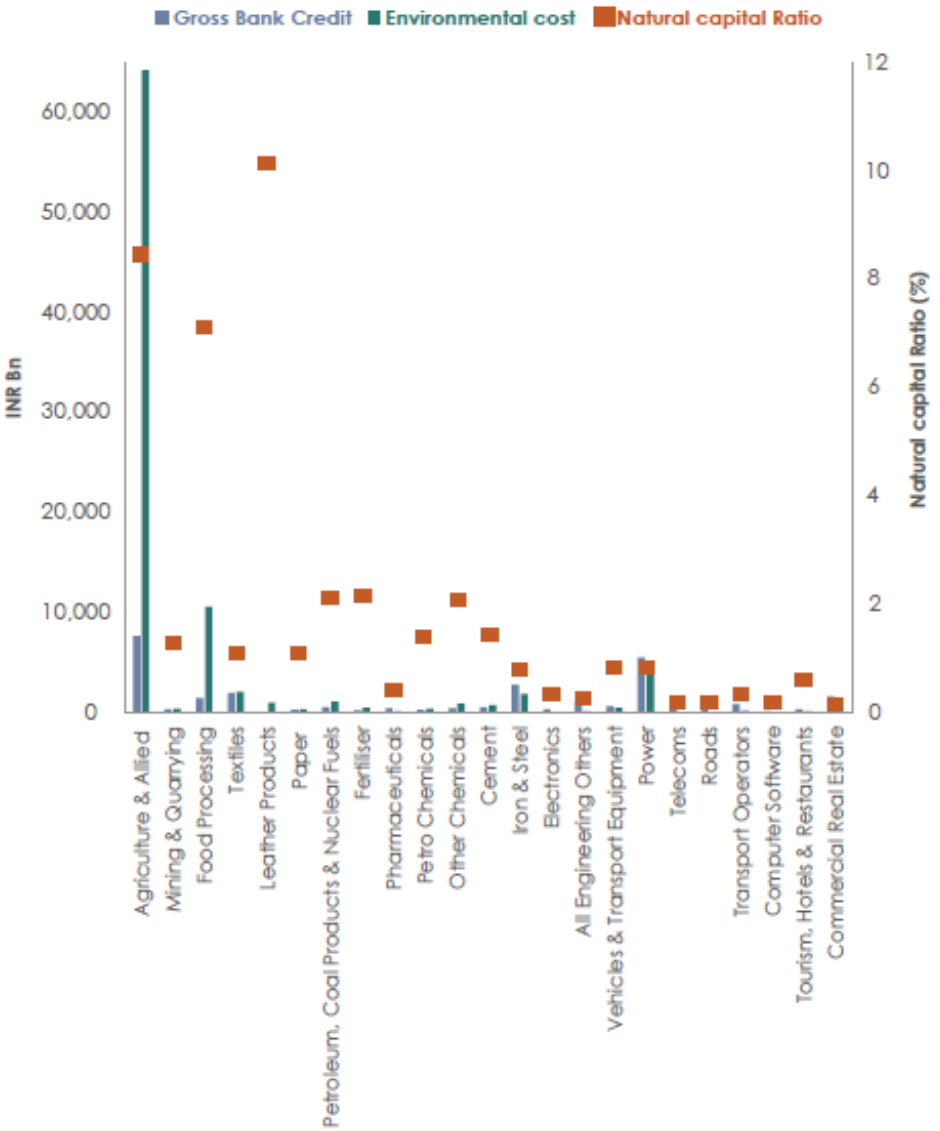
FOCUS ON INDUSTRY
PASS THROUGH COSTS



Source: GOI (2015)

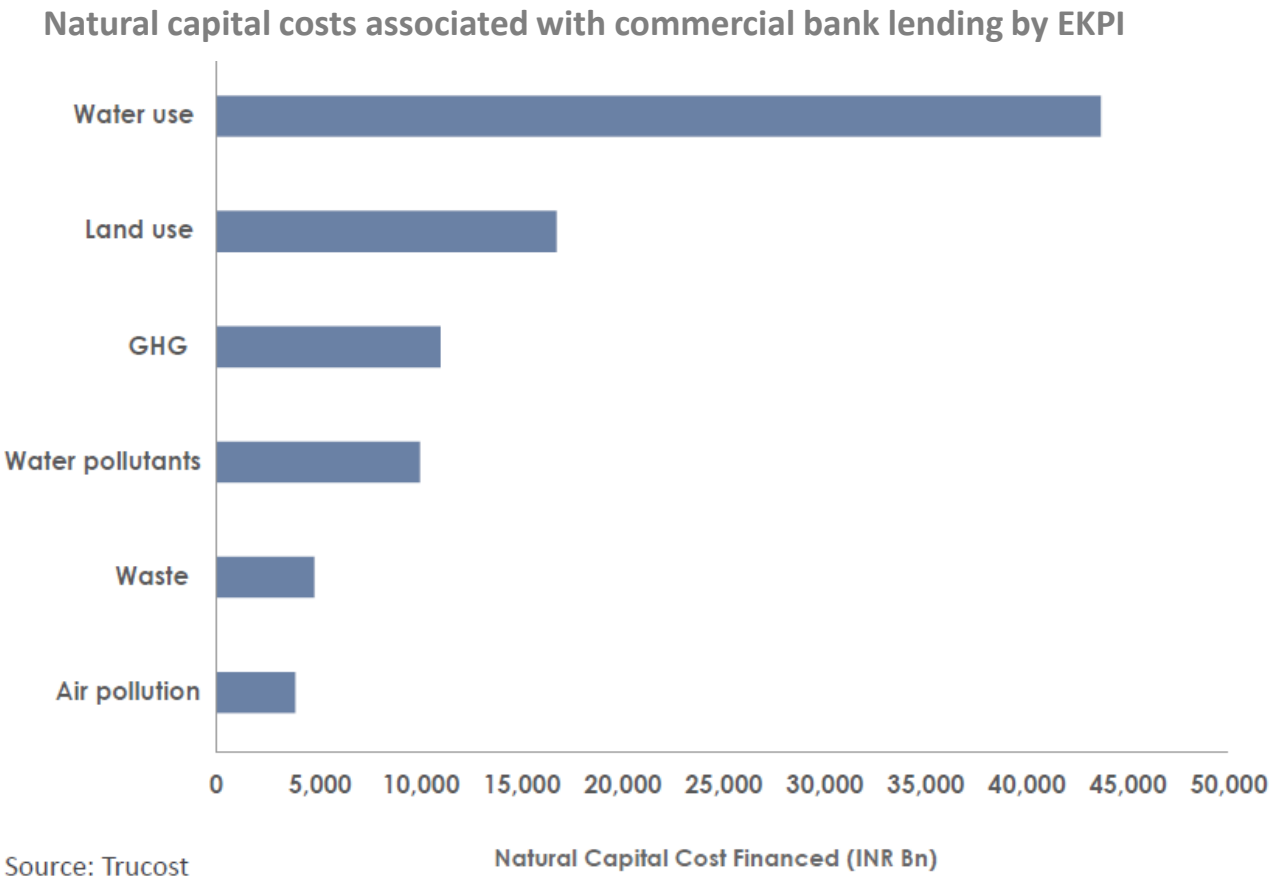
- **Industrial sectors consume 47% of energy generated in India. Costs often passed on.**
- **Higher utility rates from NC cost internalization in the power generation sector would significantly impact the cost base of the industrial sector.**

WHAT DOES THIS MEAN FOR THE FINANCIAL SECTOR?
MAPPING OF LENDING TO FI's



- Commercial Banks account for 60% of assets in India's Financial System
- Indian Banks are financing NCC of 2.9x credit provided to those sectors. Internalisation would significantly impact creditors ability to repay loans.
- Banks more exposed than equity markets due higher level of lending to agriculture and power and lower exposure of Bombay Stock Exchange (greater exposure to Finance 29%, 12% IT)
- Industry accounts for 43% of bank lending and 28% of unpriced NC costs
- Agriculture represents 13% of bank lending but 71% NC Costs.
- Power sector represents 5% NC costs financed by banks

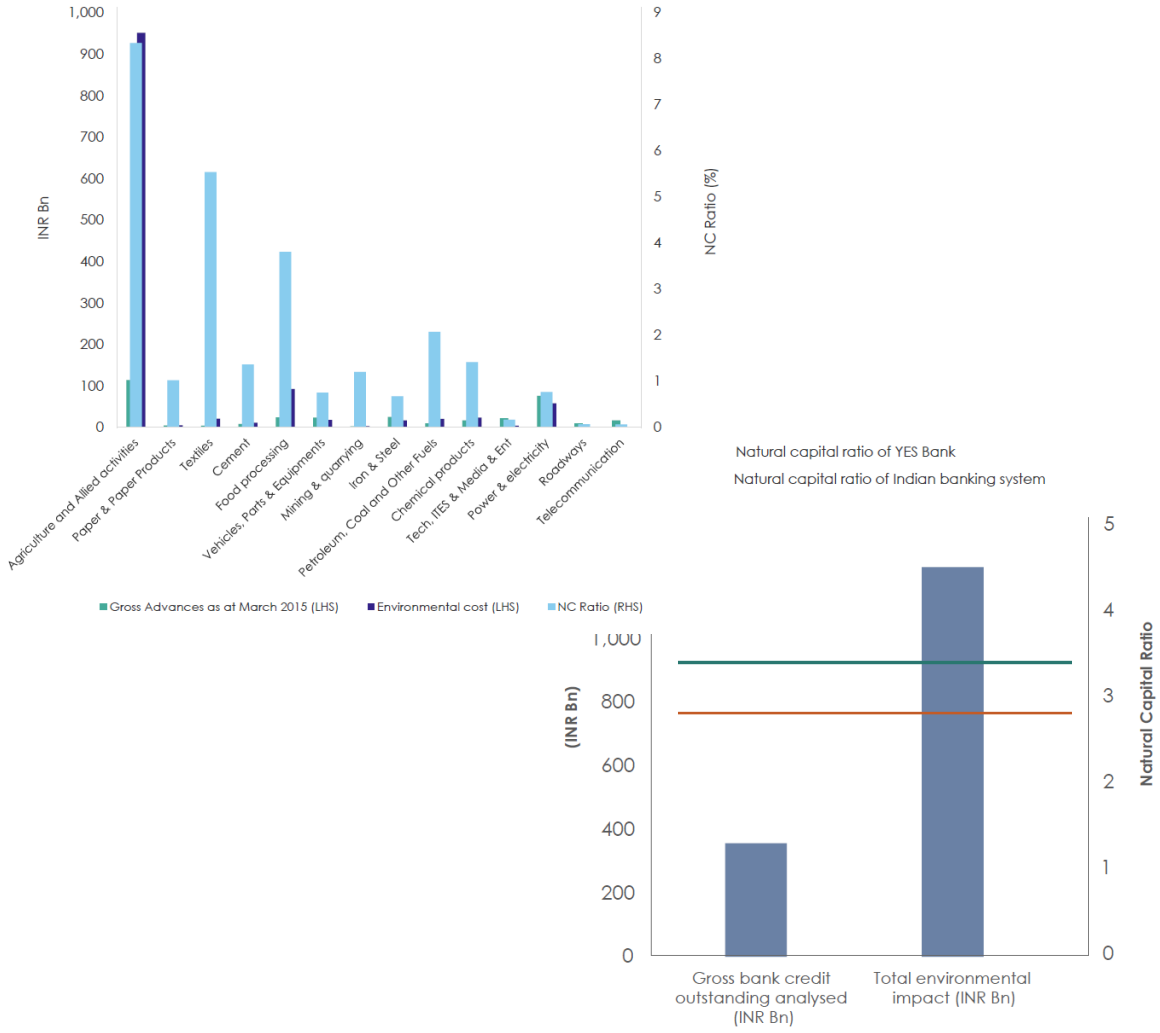
WHAT DOES THIS MEAN FOR THE FINANCIAL SECTOR?
MAPPING OF LENDING TO FI's



Source: Trucost

- Commercial Bank lending most exposed to water (48%), then Land Use
- "Agitations around land acquisitions, deforestation, water use, air and water pollution and our response to natural disasters have become more common" *(India Planning Commission, 2013)*

YES BANK CASE STUDY
BUILD RESILIENCE, CREATE OPPORTUITIES

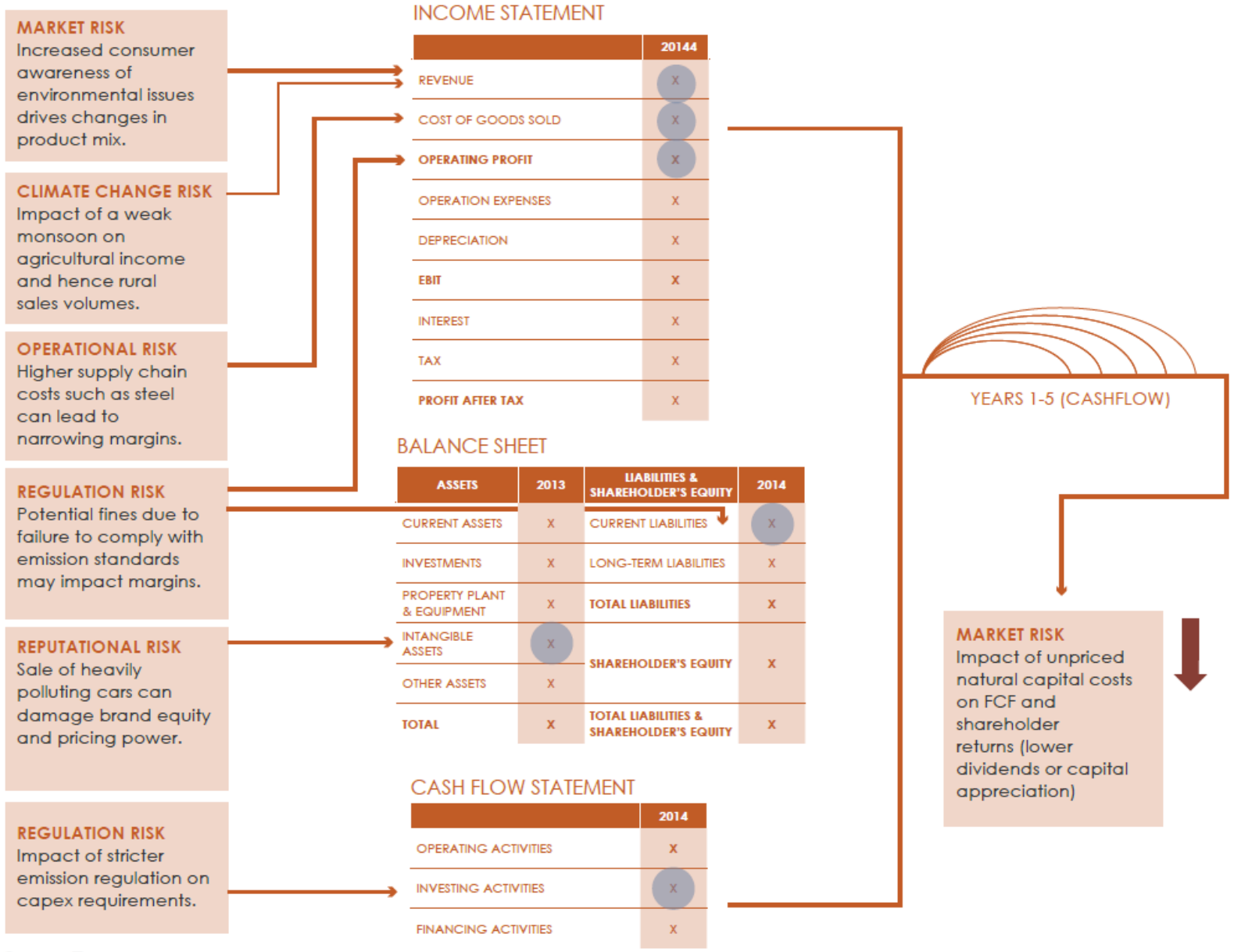


Source: Trucost

- Analysis covered 47% of YES Bank's loans and advances as of March 2015.
- Per INR m of credit disbursed, it is financing over 3x natural capital costs
- YES Bank has higher exposure to the agriculture and allied activities sector than the industry average. Agriculture is 15% of YES Bank's loans compared to 13%.
- Unpriced NC costs apportioned to loans and advances are INR 1,226 billion, compared to investments analysed of INR 357bn. The NCE ratio is 3.4x.

WHAT CAN INVESTORS DO?

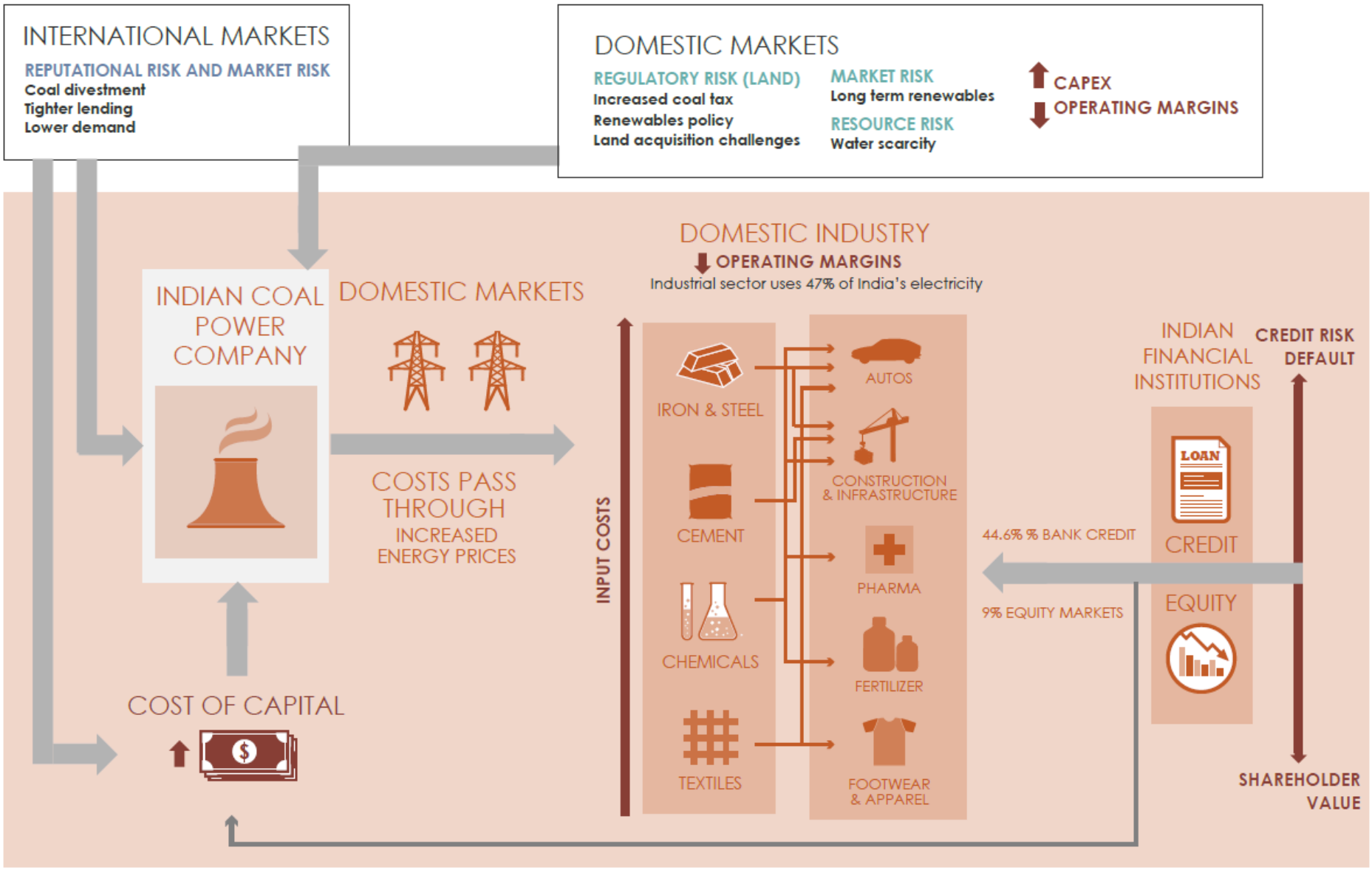
INTEGRATE RISK: AUTO INDUSTRY EXAMPLE



Source: Trucost

WHAT CAN INVESTORS DO?

FACTOR IN CONNECTEDNESS: COAL POWER EXAMPLE



Source: Trucost

WHAT CAN INVESTORS DO?
BUILD RESILIENCE

- **TOP DOWN: QUANTIFY PORTFOLIO NATURAL CAPITAL EXPOSURE:** Map portfolio to sectoral natural capital intensities to identify exposure hotspots
- **BOTTOM UP: DEEP DIVE ON SECTOR & COMPANY SPECIFIC HOTSPOTS:** Integrate natural capital risks and opportunities into valuation models
- **DUE DILIGENCE:** Acquire additional information for high risk sectors e.g. agriculture, infrastructure, power
- **CAPACITY BUILDING:** FIs should invest in natural capital training in order to build capacity for risk managers to identify and quantify exposure to natural capital risks. This should be beyond ESG to help them quantify NC value, impact and risk.
- **INTEGRATE:** Sector specific natural capital considerations should be included into credit analysis, particularly long duration loans & . Sensitivity analysis with shadow carbon pricing.
- **MITIGATE/ACCOUNT MANAGEMENT:** long term timeframes and relationships offers the opportunity to educate clients on sustainable resource management and provide financing for new projects e.g. energy efficiency, sustainable agriculture etc.
- **RURAL DEVELOPMENTS BANKS:** High exposure = high opportunity

WHAT CAN INVESTORS DO?
CREATE OPPORTUNITIES

- **LENDING FOR SUSTAINABILITY IMPROVEMENTS**: e.g. Energy efficiency, Capex for implementation of sustainable cotton certification etc

- **LENDING TO SECTORS WHICH BENEFIT**: e.g. Renewable Energy, Low-Carbon Transport, Infrastructure and Sustainable Farming.

- **PRODUCT INNOVATION:** consider innovative financing instruments such as green bonds to find projects with a net positive impact

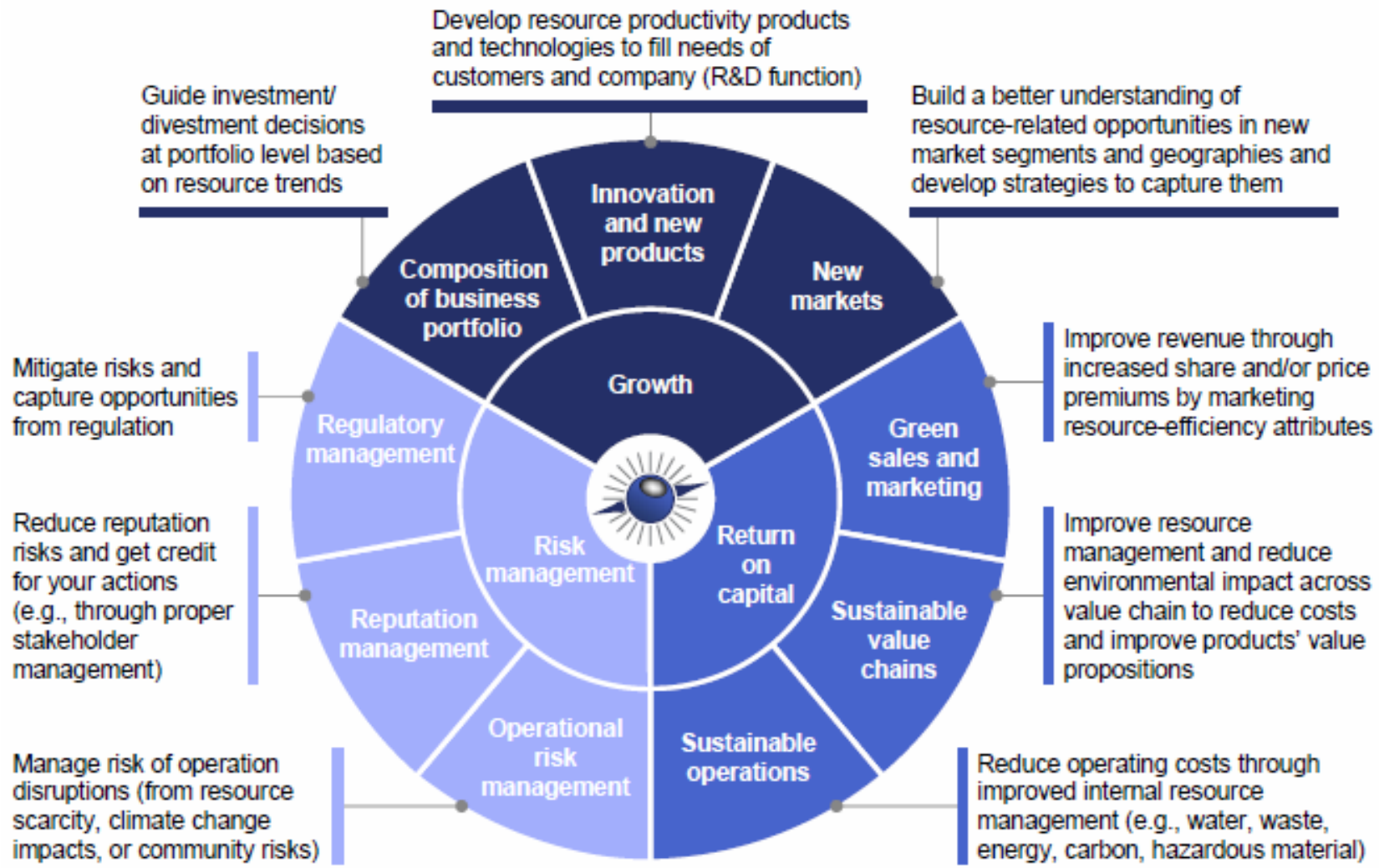
- **GREEN BONDS:** $35 billion of green bonds were issued worldwide in 2014 & strong market growth in 2015. In February 2015, YES Bank successfully issued India's first green bond. Signals the growing confidence in the Indian renewable energy sector. The government has ambitious plans to expand renewable energy capacity from 35 GW currently to 175 GW by 2022, providing significant opportunities for FIs. The government has approached eight FIs to raise funds for renewable capacity expansion through the issuance of green bonds, including public sector entities like the Indian Renewable Energy Development Agency and IDBI Bank, as well as private sector entities like ICICI Bank and YES Bank. In March 2015, the Indian Export-Import Bank raised $500 million in India's first dollar-denominated green bond issue. Compared to developed countries where the green bonds market has traditionally been centred, India offers high deposit rates, and as a result rupee-denominated bond issues are expected to be much more attractive (Mittal 2015).

BUILD RESILIENCE

FACTORING NATURAL CAPITAL IN CREDIT RATIOS

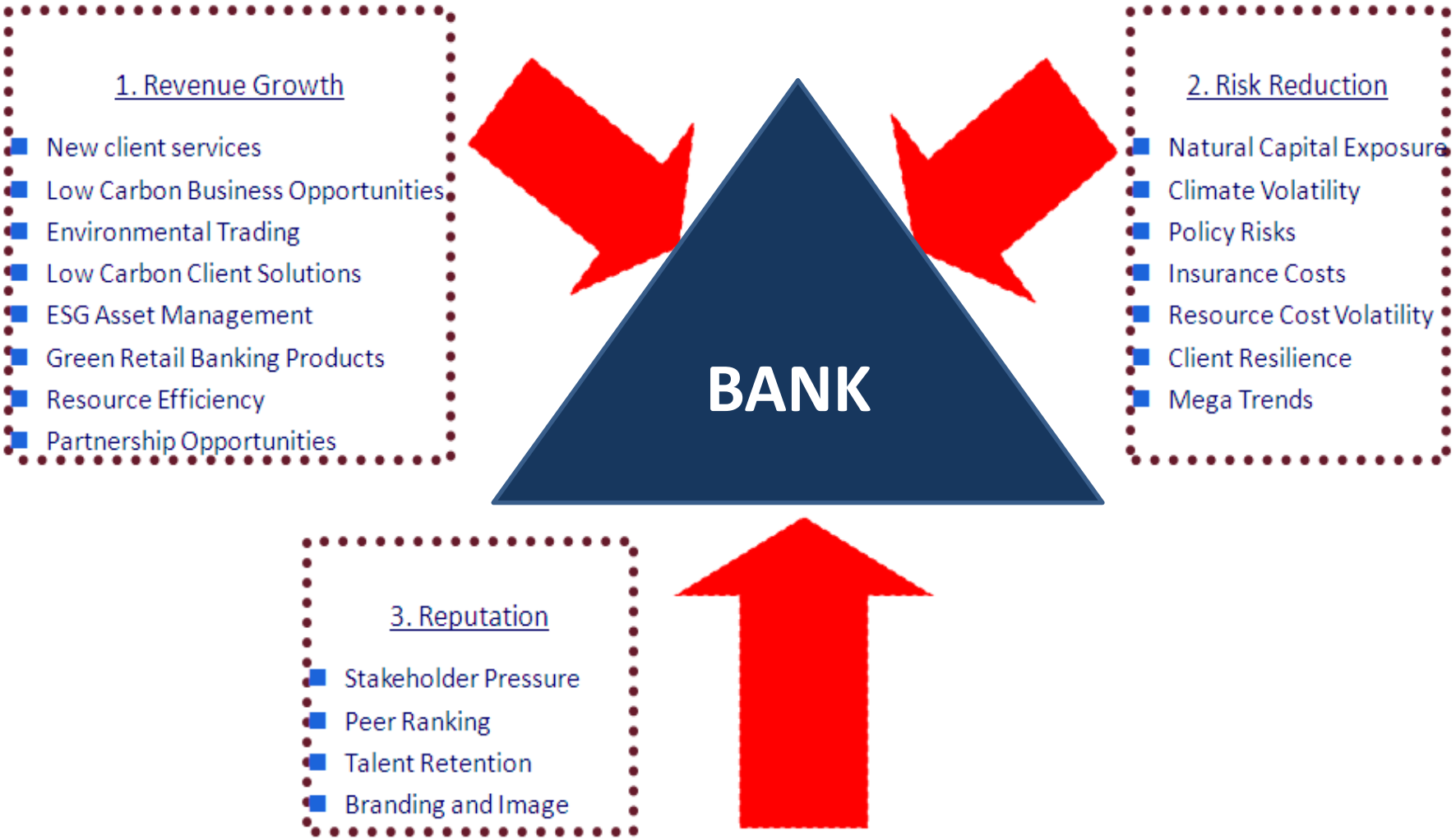
CREDIT RATIOS	CALCULATES	IMPACT OF UNPRICED NATURAL CAPITAL COSTS
EBITDA Margin (EBITDA/Revenue)	Gives the core operating profitability of the borrower (the higher the margin the less operating expenses eat into the bottom line). All measures of profitability begin with revenue – the amount of income generated from the sale of goods and services.	As operating expenses increase, the EBITDA margin is reduced, and the company's profitability is impacted. Operational expenses can be increased by higher input costs or increased regulatory burden.
Net Debt/EBITDA	A measurement of leverage typically used to determine a borrower's ability to pay its debt. This ratio shows the number of years to pay back debt if the net debt and EBITDA remains constant. Generally a ratio of 4 or higher is considered too high. This does not include the risks of capital expenditures. Loan agreements often include a requirement that the borrower must remain above a certain debt to EBITDA ratio otherwise the loan is immediately due.	Unpriced natural capital costs can impact EBITDA by reducing earnings (income minus the cost of goods sold). As with the EBITDA Margin, any increase in costs of production that increase operating expenses will impact on a borrowers EBITDA.
Interest Cover Ratio (EBIT/Annual Interest Expense)	Calculates the borrowers' ability to meet interest payments and to take on additional debt. A high ratio indicates that the borrower can easily meet all of its obligations, the lower the ratio the more the company is burdened by debt expense.	Reduced earnings will reduce EBIT and lead to a lower ICR ratio, placing increased burden on the borrower.
Debt Service Ratio (commonly calculated as Operating Income/ Total Debt Service Costs)	The ability of the borrower to service current debts by comparing available cash with current debt obligations, providing a useful indicator of financial risk.	Any changes to a borrowers cash flow will impact the borrowers DSR. For example an increase in expenses relative to sales volume or low sales (e.g. caused by lower rural demand).

WORK WITH CLIENTS TO TURN RISK INTO OPPORTUNITIES



SOURCE: McKinsey analysis

RISKS & OPPORTUNITIES



Questions?

Lauren Smart

Executive Director

Trucost Plc, 22 Chancery Lane
London UK

Tel: +44 20 7160 9814
E-Mail: lauren.smart@trucost.com

Lauren Smart
Executive Director