

Low Carbon Emission Technologies

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Now or Never – Time To Act for Climate Change

733+ MILLION PEOPLE



LIVE IN COUNTRIES
WITH HIGH AND
CRITICAL LEVELS
OF WATER STRESS

(2019)

DROUGHT ESTIMATED TO
DISPLACE 700 MILLION
PEOPLE BY 2030



DROUGHTS

Facts and Figures as per *RBI Discussion Paper on Climate Risk – July 27,2022*

- Greenhouse gases (GHGs) emissions from human activities are responsible for **~1.1°C of warming** since pre-industrial times. As per a recent study by CarbonBrief, a 1.5°C - 2°C temperature increase will shave nearly 8-13 % of the global GDP by 2100.
- UN's Intergovernmental Panel on Climate Change report dated August 9, 2021

- Over the next 5 years, societal and environmental risks to be of foremost concern.
- Over a 10-year horizon, “Climate action failure”, “Extreme weather”, and “Biodiversity loss” ranking as the top three most severe risks in environmental risk
- Global Risks Report 2022 published by the World Economic Forum

- India recorded 756 instances of natural disasters (landslides, storms, earthquakes, floods, droughts, etc.) since 1900, out of which total 354 events recorded during 2001-2021.
- India Meteorological Department (IMD) annual report

A new report from the World Economic Forum identifies floods and droughts as leading causes of mortality. Floods pose the highest acute risk of climate-induced mortality, accounting for 8.5 million deaths by 2050. Droughts are the second-highest cause of mortality, with an anticipated 3.2 million deaths. Heat waves take the highest economic toll at an estimated \$7.1 trillion



MAY KILL 14.5 MILLION PEOPLE AND INFLICT \$12.5 TRILLION ECONOMIC LOSS BY 2050



Biggest killers: Floods & droughts

LAST MONTH, Tamil Nadu witnessed one of the most unprecedented rainfall and flooding events in its history, costing 31 lives and thousands of crores in economic loss. In fact, 2023 was a year of homogeneous natural disasters.

In India, cloudburst in North Sikkim triggered flash floods while heavy rains in Himachal Pradesh set off landslides. Cyclone Michaung drowned the metropolitan city of Chennai. Elsewhere, destructive wildfires hit Hawaii and earthquakes struck Turkey, killing tens of thousands of people. The World Meteorological Organisation confirmed 2023 as the warmest year on record. The worst hit are the vulnerable communities for whom the climate crisis is a health crisis.

Things are only going to manifest further going by the latest report released by the World Economic Forum (WEF) during its annual meeting in Davos, Switzerland. The report titled "Qualifying the Impact of Climate Change on Human Health" analysed six climate-driven events, which include floods, droughts, heat waves, tropical storms, wildfires and rising sea levels for their direct and indirect impact on health.

The findings show that by 2050 climate change will place immense strain on global

\$1.1 trillion in extra costs to healthcare systems around the globe. The analysis is based on scenarios developed by the Intergovernmental Panel on Climate Change (IPCC) on the most likely trajectory for the planet's rising average temperature - 2.5°C to 2.9°C over pre-industrial levels.

Shyam Bishetti, Head, Centre for Health and Healthcare and member of the Executive Committee, World Economic Forum, warned: "Over the next decade, the failure to mitigate and adapt to climate change will represent our greatest risk globally, with changing climate and weather patterns already leading to alarming trends."

Prarthana Borah, sustainability leader, said understanding the impact of climate change on health is essential if we have to accelerate mitigation solutions. While the direct impact is more easily identified, it is difficult to see the indirect impact because applied studies like the WEF report are few. "Every step must be taken to educate the healthcare industry not only to understand the issue but to take mitigation steps. Active participation of healthcare workers in the climate dialogue is essential, which would be a progressive step. COP29 was historic to include a specific health day and positioning health within climate negotiations."

The new report identifies floods and droughts as leading causes of mortality and heat waves as the biggest cause of economic losses. Floods were found to pose the highest acute risk of climate-induced mortality, accounting for 8.5 million deaths by 2050.

South East Asia, northern South America and Middle Africa represent key regions projected to face the highest impact due to floods and rainfall. In fact, from 1970 to 2019, floods accounted for 39% of climate-related disasters and 77% of climate-related deaths in South America. Additionally, the midsection of Africa is projected to experience a distinct rise in flood risk.

Droughts, indirectly linked to extreme heat, are the second-highest cause of mortality, with an anticipated 3.2 million deaths. Heat waves take the highest economic toll at an estimated \$7.1 trillion by 2050 due to the loss in productivity. Excess deaths attributed to air pollution, caused by fine particulate and ozone pollution, are expected to be the largest contributor to premature death with almost 9 million deaths a year.

Climate change will also trigger a catastrophic rise across several climate-sensitive disease outcomes, including vector-borne disease, which will likely impact previously less affected regions such as Europe and the

United States. By 2050, an additional 500 million people may be at risk of exposure to vector-borne diseases, the report finds.

"The climate crisis is a health crisis, and it is driving a vicious cycle of disease, economic devastation and suffering. It is clear from this report that we are still to understand the full impact," said Vanessa Kerry, CEO of Seed Global Health and WHO Special Envoy for Climate Change and Health. "If we fail to act, not only will the death toll be staggering but we also risk losing progress made over decades to improve health outcomes around the world. Countries least able to afford these shocks - and who contribute the least to global emissions - will be impacted the most."

Vulnerable populations & equity gap

According to the United Nations, approximately 3.5 billion to 3.6 billion people live in areas highly vulnerable to climate change. Eight countries most affected by climate change compiled by the United World Food Programme includes six African countries. While developed regions account for two-thirds of global emissions, Africa - which only produces about 2-3% of global emissions - is already suffering a disproportionate amount of the pain from climate change, according to the WFP.

In southern Asia and Sub-Saharan Africa, the resulting productivity loss may reach 5%, according to the International Labour Organization. By 2050, there could be as many as 1.2 billion climate refugees. More than half of the world's population will live in regions with severely limited water supplies by 2040. This includes extensive regions in China and India, the report said.

Another alarming aspect highlighted in the report is the increasing percentage of morbidity. It is projected that only 31% of the overall health impact will be attributable to actual mortality, while 79% is due to long-term disability and health conditions that developed subsequent to the climate event.

This trend raises concerns about the lasting effects of climate events on the wellbeing of individuals. It also highlights an alarming trend of climate events leading to generations of unwell individuals. The prevalence of unmet development among vulnerable populations and generalised anxiety disorder illustrates why morbidity may have such a negative impact over the rest of the century.

The incidence of both is significantly higher than almost any other disease or condition, except for malaria, which follows close behind.

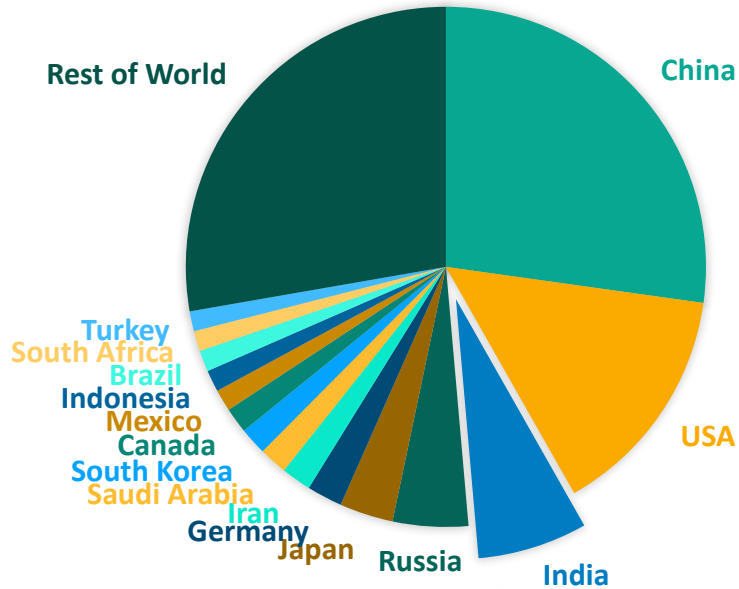
Need for collaboration

Despite these stark findings, the new research shows that there is still time for global stakeholders to take decisive, strategic action to counter these forecasts and mitigate the health consequences of climate change. Intensified multi-stakeholder collaboration, across borders and industries, as well as a comprehensive transformation of the global health system to make it more resilient, adaptable and equitable will be crucial steps to achieve this.

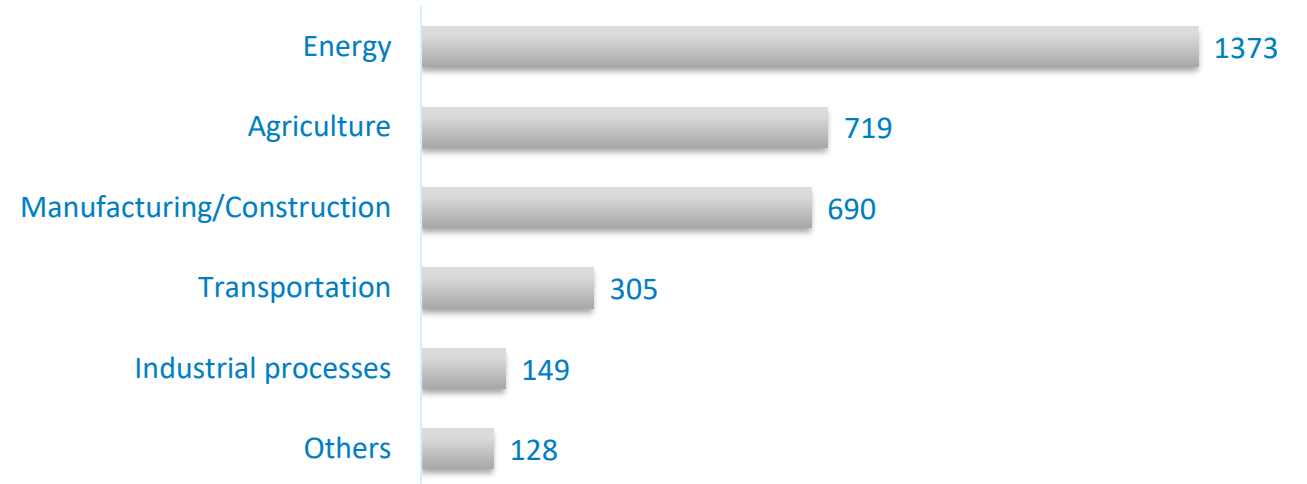
"Our analysis sheds light on the profound impact of climate change on mortality, morbidity and the interconnected macroeconomic landscape, with healthcare systems alone likely having to bear an additional cost of \$1.1 trillion due to climate change," said Sam Glick, Global Leader of Health and Life Sciences at Oliver Wyman. "It is clear that we need sustained action to mitigate the far-reaching consequences of climate change and ensure a healthy future for all."

Global CO₂ Emissions

GLOBAL CO₂ EMISSIONS



India - GHG emissions by sector



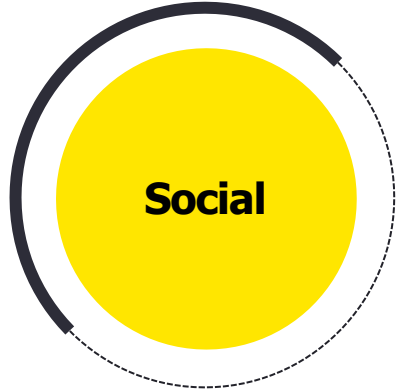
- Global CO₂ emissions in 2023 were 37.55 Gt CO₂e with **India as 3rd largest emitter** after China and USA
- As per CSE's projections, India's CO₂ emissions (2.88 Gt in 2021) would grow to 4.48 Gt CO₂e by 2030
- Significant portion of above emissions would be in hard-to-abate sectors (Iron & Steel, Cement, Chemicals, heavy-duty transport like trucking, shipping, aviation)

Decipher ESG



Environmental

Responsible management of natural resource



Social

Caring for people and communities



Governance

Business operations in a fair and ethical manner



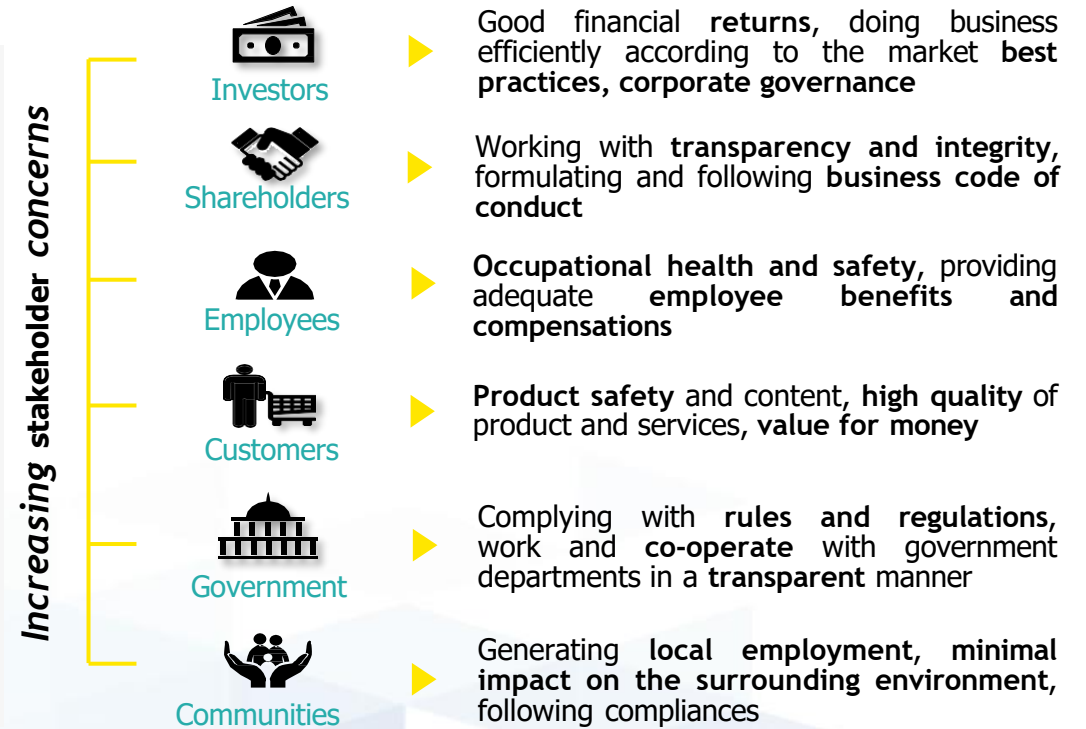
Why ESG

Environment & Social aspects are hitting harder and accelerating faster than many predicted. These aspects are on top of the list both in terms of likelihood & impact

Top 10 Global Risks by Severity



Sustainability is something that Investors are demanding, Customers are expecting, Shareholders are relying, & Employees are valuing



Changing concept of Asset Valuation-More dominance of "Intangible Assets"



Need for valuation of "Shared Values" and "Externalities"

Transition-oriented Growth Businesses

As per recent survey report by Bain & Company based on survey of over 600 industry executives across the globe to better understand industry leaders' views on the energy transition, new technologies, and investment opportunities, and where they see the greatest challenges for decarbonisation. Salient findings were:

- Fewer executives expect the world to achieve net-zero carbon emissions by 2050. (62% are optimistic of achieving by 2060)
- Most companies are maintaining or increasing investments in their transition-oriented growth businesses.
- Executives are more concerned than ever about generating acceptable returns to scale up their transition-related businesses.
 - A 500-basis-point increase in the cost of capital can increase the total annual revenue required to finance a project by as much as 50%
- North America is now viewed as the most attractive region for investment, followed by Europe and then Australia and New Zealand.
- Artificial intelligence is increasingly seen as a difference maker. The most promising AI applications include improving maintenance, production, and the supply chain.

The greatest obstacle to scaling up their transition oriented businesses is finding enough customers willing to pay higher prices (or having equivalent policy support) to create sufficient ROI.

ESG related regulations are increasing globally



Source: Dun And Bradstreet

India's Nationally Determined Contributions (NDC) commitments at COP 26

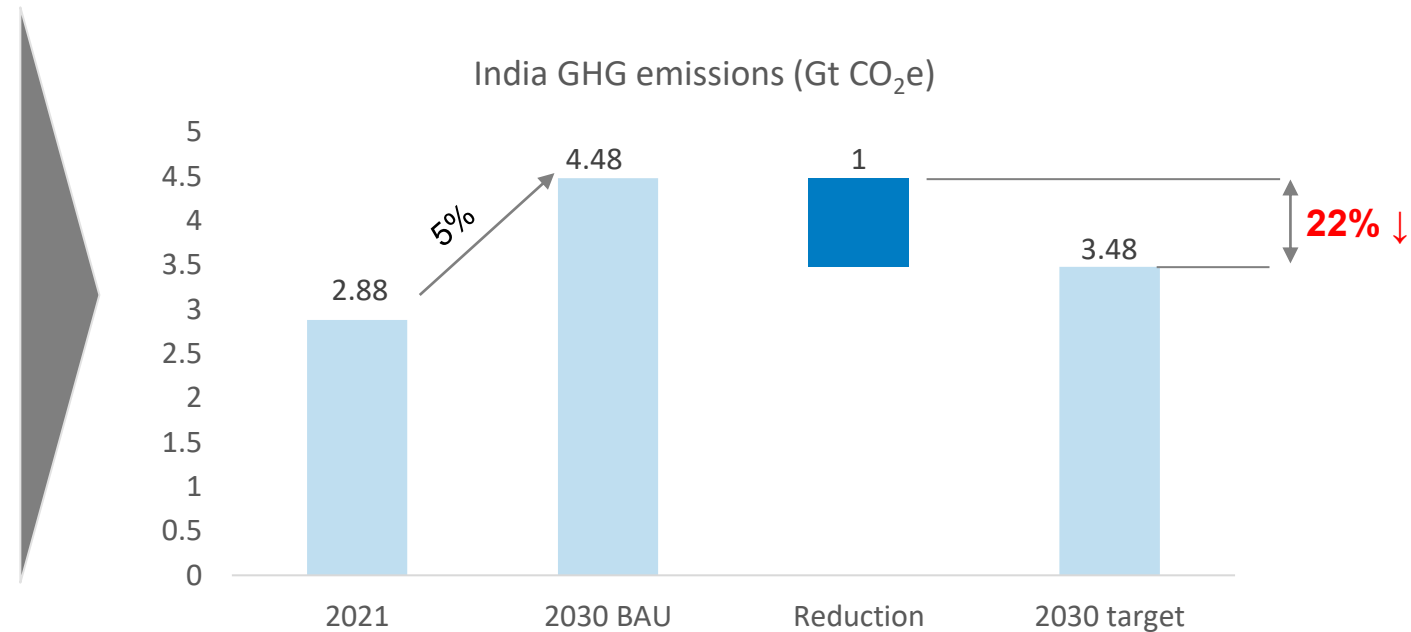
Panchamrit Pledge

- Non-fossil energy capacity to 500 GW by 2030
- To meet 50% of energy requirements till 2030 with renewable energy
- To reduce projected carbon emissions by 1 Bn tCO₂e by 2030
- To reduce carbon intensity of economy by 45% by 2030
- To achieve net zero by 2070

Updated NDCs August 2022

- Reduce Emissions Intensity of its GDP by 45 % by 2030, from 2005 level
- Achieve about 50 % cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.

- **Domestic carbon market** would supplement policy measures for climate change mitigation by developing a common marketplace for emissions trading
- World Bank's Partnership for Market Readiness (PMR) has announced a \$8 Mn grant for India to prepare for and pilot use of carbon pricing instruments



COP28

If emissions stay on their current trajectory, estimates from various sources suggest that net zero would not arrive even by the end of the century. Hence, Countries need to act **NOW!**

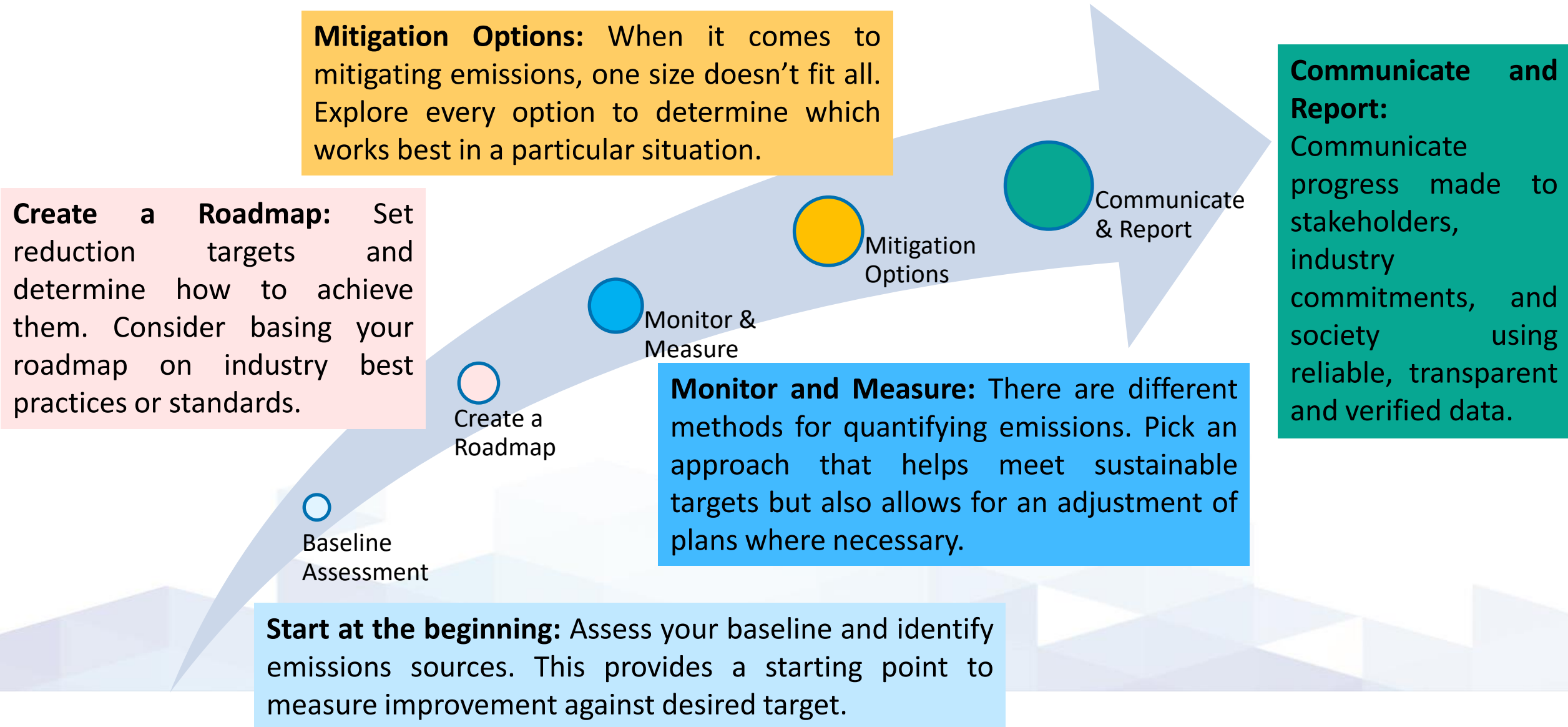
Takeaways

- Need to reduce GHG emissions by 43% i.e. 22 GT by 2030
- 9 GT of GHG emission can be reduced using high integrity carbon reduction and carbon removal projects
- Need to scale up finance mobilization by developed countries to developing ones in their adaptation efforts and mitigation of climate change

Suggested Actions

- Need for high integrity carbon market to fund the transition
- Need to develop high integrity carbon framework for Corporate buyers and sellers
- Regulatory framework embedding the transition

From Ideas to actions: A five step approach to reduce emissions



Actions on emissions monitoring and abatement

Benefits of Proactive voluntary detection and mitigation of emissions

Reduce regulatory and reputational risks

Technologies that actively track and manage emissions set companies up **as future market leaders**

Get ahead of their competition while also meeting many of their most prominent business goals

Working with partners that help Companies leverage advanced measurement techniques

Continuous monitoring through ground-based or aerial-based methods to detect methane leaks, quantify the rate of leakage, and deliver real-time alerts for immediate action

Many abatement solutions are attractive as they increase efficiency, boost production, and reduce waste

Solutions can effectively utilize data to reduce emissions across the value chain

Net Positive Actions : In General Case Studies

Companies operate differently from what's normal today by doing the following:

- Eliminate more Carbon than it produces; use only RE and renewably sourced materials.
- Create no waste and build everything for full circularity
- Replenish and make cleaner all the water it draws – To become Water Positive
- Through its products, services, and purpose-led initiatives – not philanthropy: consumers and communities will be better off.

Actions for enhancing profit and growth by serving customers and the world

- **Food and agriculture companies** embracing regenerative practices, making the soil richer, protecting biodiversity, and sequestering millions of tons of carbon.
- **Aluminium, Cement and Steel manufacturers** developing carbon-free products and taking carbon out of air
- **FMCG Companies** increasing human and planetary well-being with everything they sell.(Product Stewardship)
- **Natural resource and material companies** giving back to the earth and improving lives in the indigenous communities they impact.
- **Social media companies** helping people find truth and strengthening the democratic process.
- **Apparel companies** decoupling their growth from further resource use, providing living wages, restoring dignity, and helping develop communities in their supply chains around the world.
- **Financial companies** funding only clean technologies and serving the poor better than the rich, giving people a hand up and creating equal opportunities for all.

Decarbonization Initiatives

- Solar Power
- Wind power
- Biofuels (including biomass)
- Electric vehicles
- Energy efficiency, materials efficiency, enhanced recycling in industry
- Energy efficiency in buildings
- CO2 abatement in agriculture and land use
- Non-CO2 abatement in waste and industry (Circular Economy / Waste to Energy)
- Methane abatement in coal, oil and gas operations
- Industrial electrification
- Carbon capture in power and industry
- Other low-carbon power capacity (such as nuclear and geothermal)

DCM Shriram Ltd – Business Verticals



Urea



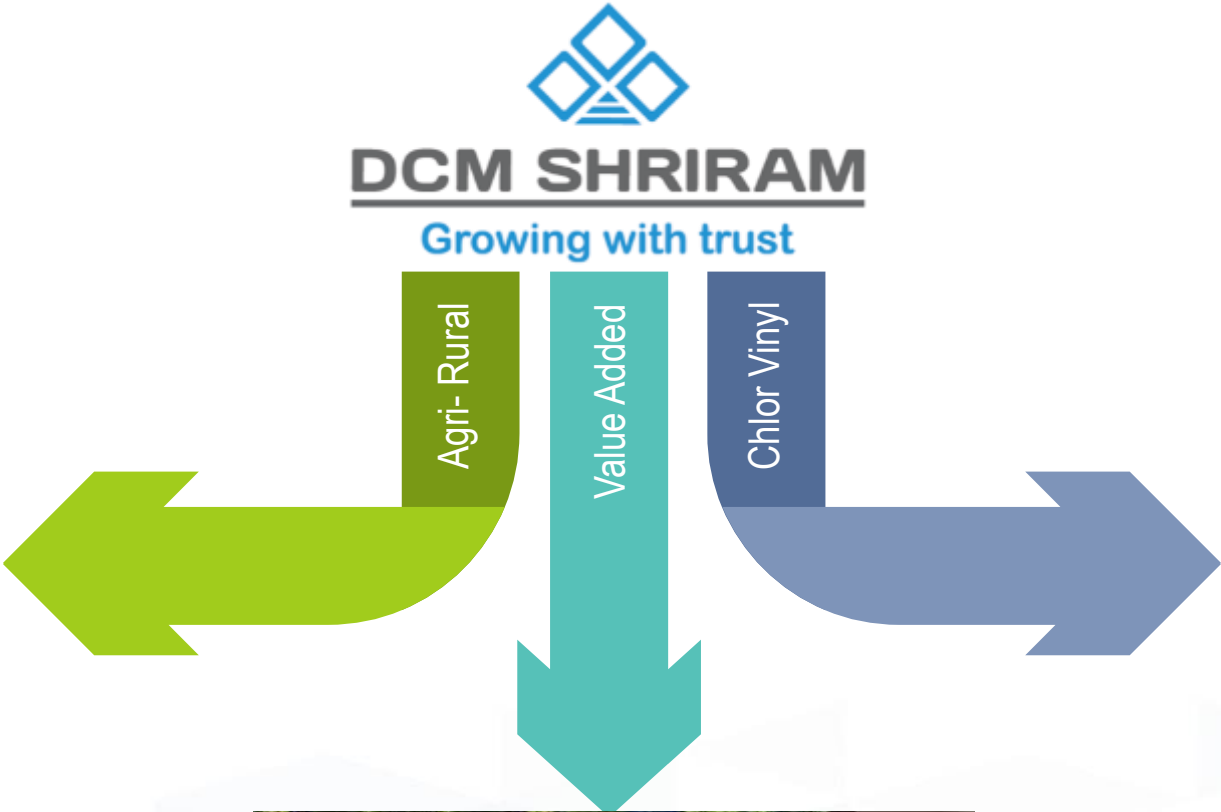
Sugar & Distillery



Farm Solutions



Hybrid Seeds



Fenesta UPVC Windows



Chlor Alkali



Calcium Carbide



PVC Compound



PVC Resins



Cement

Case1: Increase Sludge Utilization through Carbonation (In-house Innovation)

Preamble

- In the Process of Acetylene production from Calcium Carbide, Calcium Hydroxide sludge is generated, which contains 8-10% solids and rest 90-92% water
- This sludge is pumped to the Cement Plant where it is decanted & Solid content increases to 14-15%. Higher moisture in the sludge poses challenge for its usage in the cement.
- Sludge generated from Carbide plant can be completely used if moisture can be reduced up to ~ 65-70%

Scheme Implemented

- Since long, various experiments were undertaken for this process improvement. Subsequently a Break through was achieved during in-house experiments for 'Carbonation of Sludge' using flue gases from kiln stack. The CO₂ present in flue gases when passed through the sludge converts Calcium Hydroxide to Calcium Carbonate.
- Calcium Carbonate, being heavier than Calcium Hydroxide, settles faster and results in lower moisture from decanter. Various lab tests and pilot trials validated the carbonation of sludge and its improved settling.

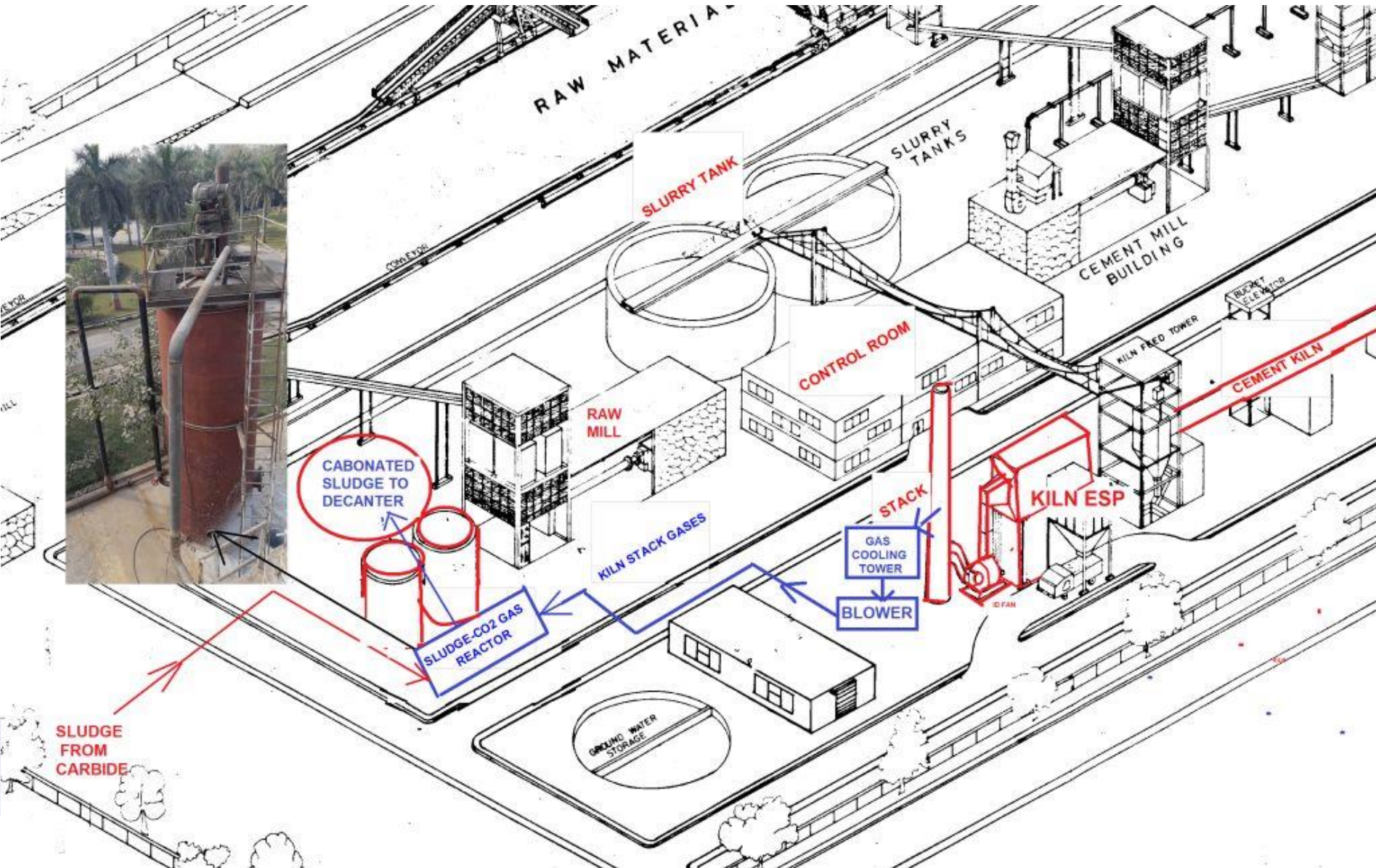
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Advantages achieved

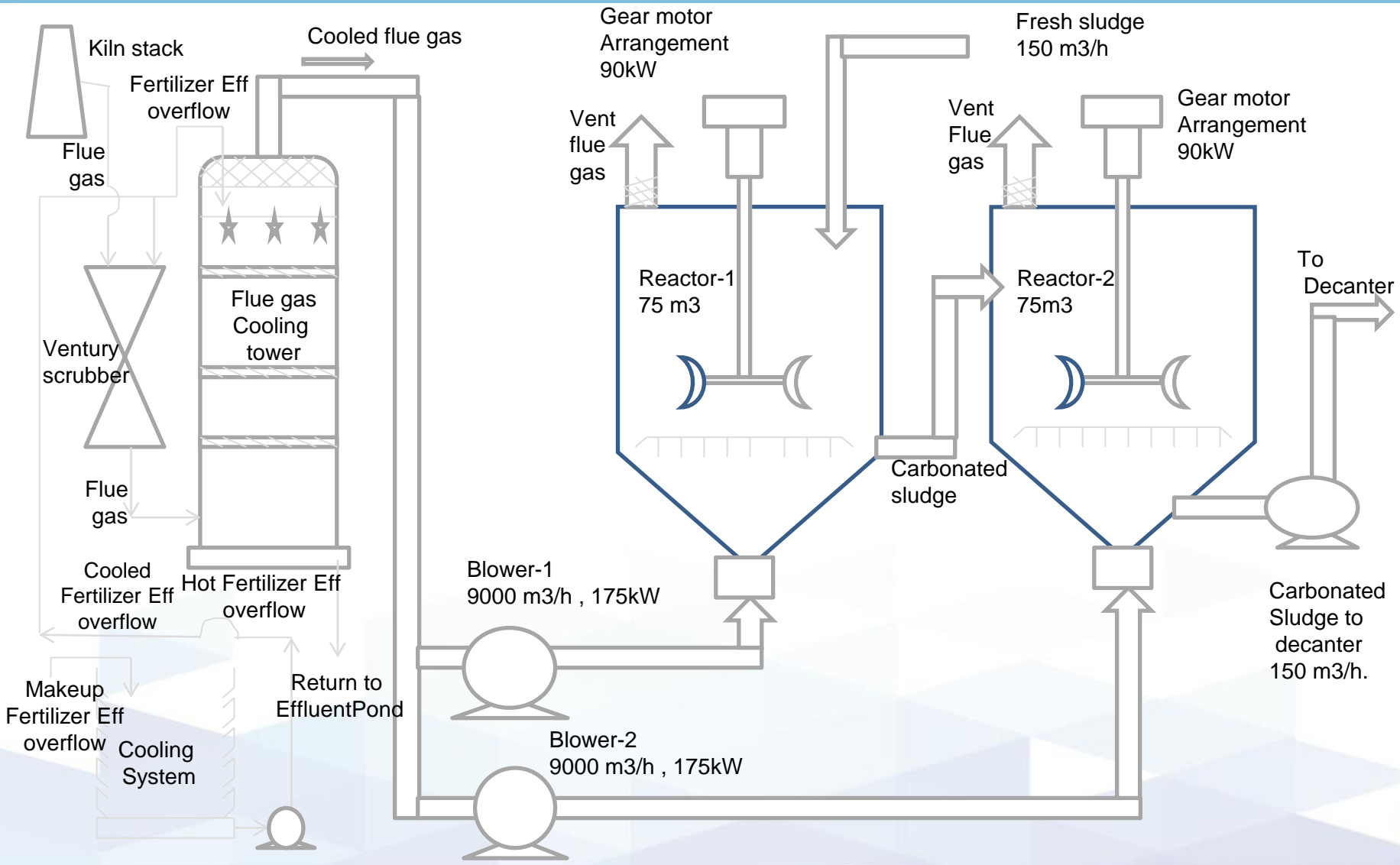
- Sludge consumption increased almost to double and substantial reduction achieved in the Lime stone consumption
- Due to increased sludge usage, savings in power in the limestone crushing and its handling

Reduction of CO2 emission by ~ 21000 MT/year due to reduced usage of Limestone

Carbonation of Lime sludge from Calcium Carbide

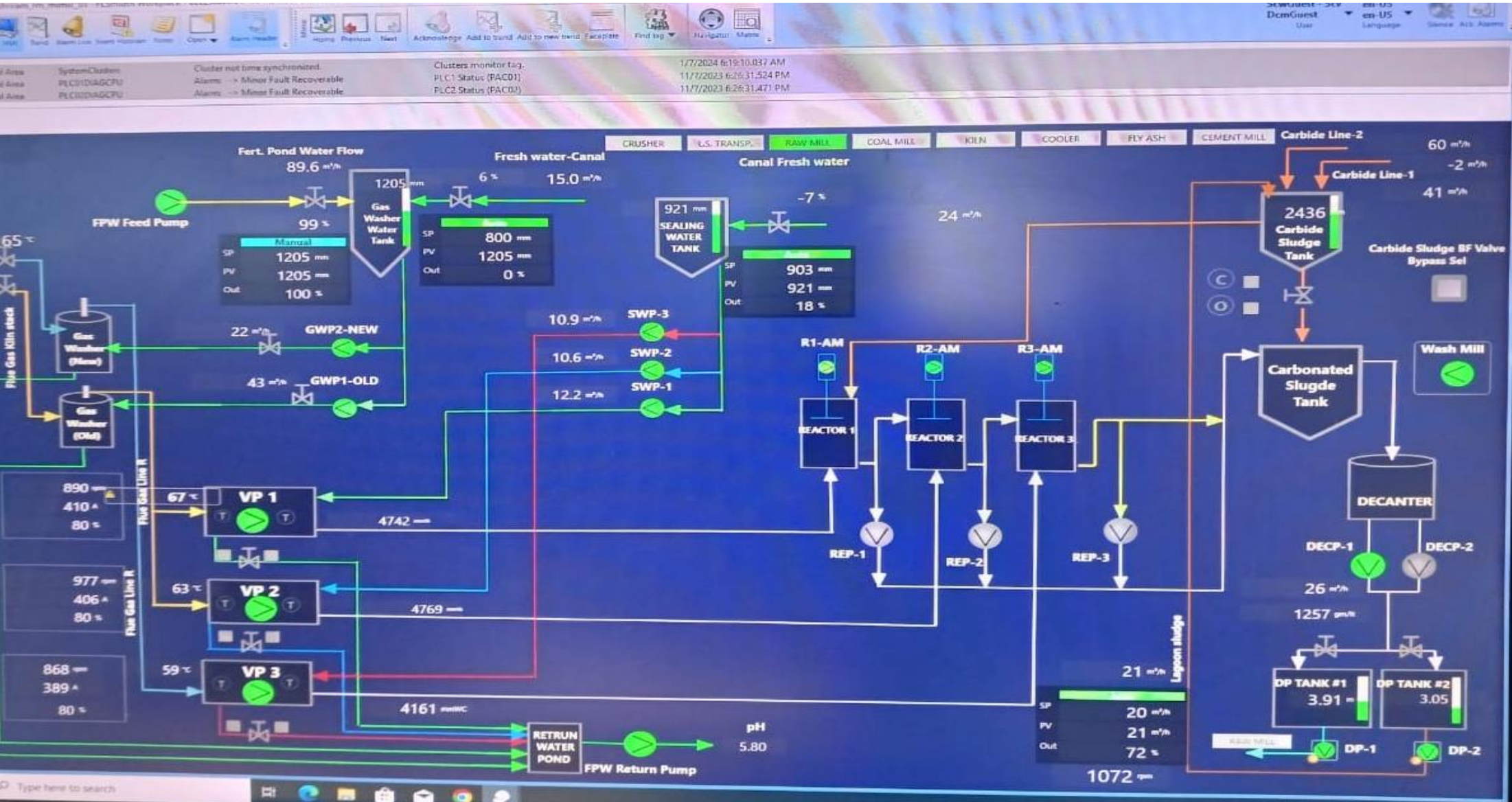


Carbonation of Lime sludge from Calcium Carbide



Process Flow Sheet

DCS Operated Process




Glimpses of site



Carbonation Reactors

Case2: Utilising biomass for Power generation and increasing in feedstock mix

- Utilizing Bagasse in Sugar mills for producing Power that is used captively and excess to the State grid ~ 18 Lac Tons of GHG emission reduction
 - Slop fired boilers in Distillery Units using bagasse as support fuel for auxiliary power of distillery
 - Increasing the biomass from 10% to @ 20% in the feedstock of Captive Thermal Power Plants
 - Recently installed boiler is designed for @ 40% Biomass in the feedstock
- 

Case3: RE Power for Manufacturing facility at Bharuch



DCM Shriram Ltd. and ReNew Power sign an agreement to set up 50 MW hybrid wind/solar projects for its Manufacturing facility in Bharuch, Gujarat

**One of the largest corporate renewable power supply deals
in India under captive model**

DCM Shriram has signed an agreement for 50 MW of hybrid Wind/solar renewable energy from ReNew Power for its chlor-alkali manufacturing facility in Bharuch, Gujarat.

The agreements will see renewable energy supplied from ReNew's two upcoming projects in Bhavnagar, Gujarat, to DCM Shriram's Chlor-Alkali manufacturing facility in Bharuch district.

"We as a group are committed to improving our energy footprint and this is a step in that direction".

"With a long-term commitment towards ESG (environmental, social and governance), the captive power agreements for green energy have been signed for 25 years and will mitigate around 2,25,000 tCO₂e (carbon emissions) annually."

The 50-MW hybrid project, which has around 100 MW of wind and solar generation capacity at its backend, is expected to generate around 250 million units of renewable energy every year exclusively for the DCM Shriram's Bharuch facility.

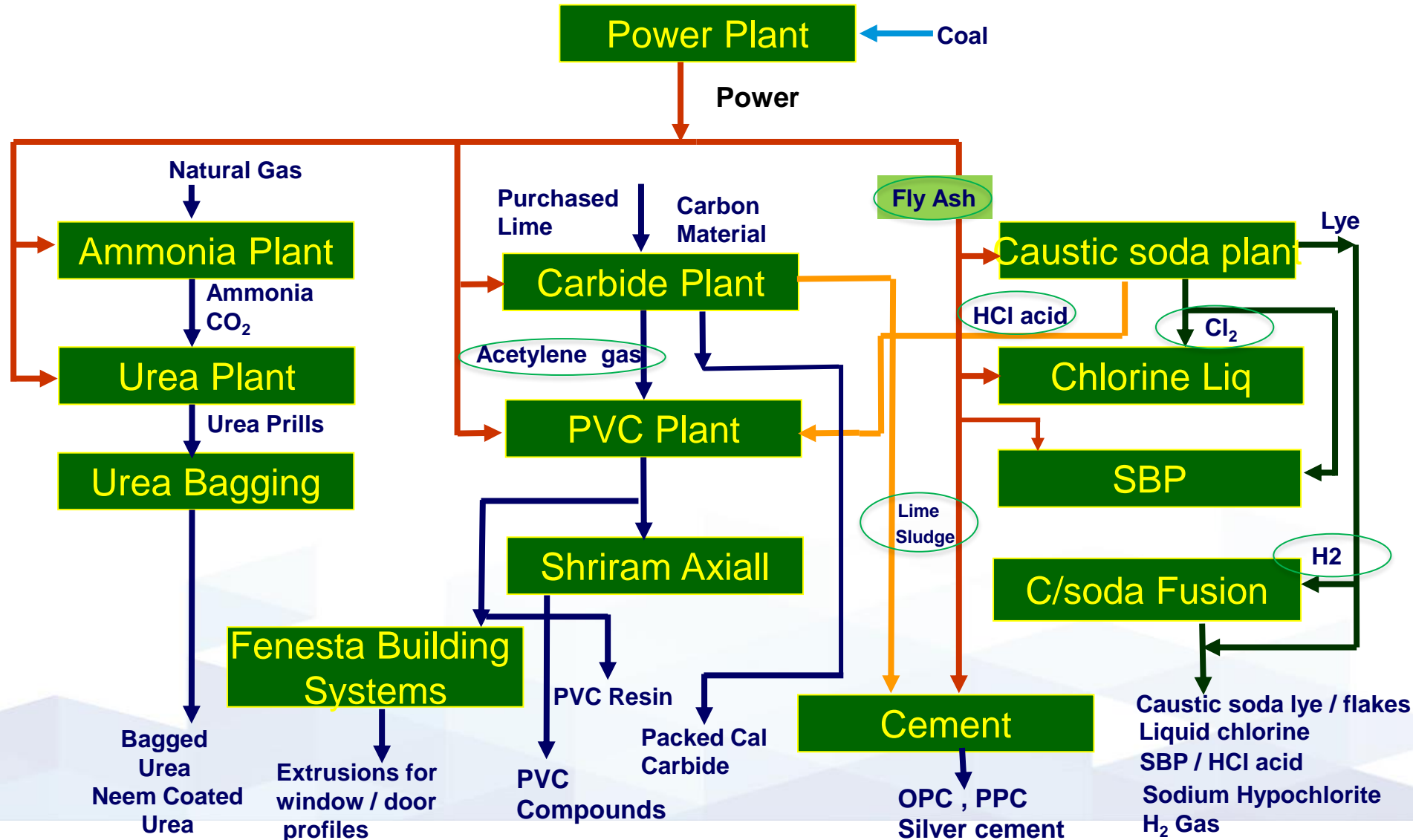


- Products with reduced Carbon footprint
- Hydrogen produced as by-product from Chlor-alkali plants is used as fuel in furnaces substituting fossil fuel reducing GHG emissions

Case4: Other Initiatives

- Alcohol manufacturing from Molasses for Petrol blending under the National Petrol Blending program ~ 3.3. Lac Tons of GHG emission reduction
- Hydrogen produced as by-product from Chlor-alkali plants is used as fuel in furnaces substituting fossil fuel reducing GHG emissions
- Utilization of Biogas from Bio-digesters in ETP for substituting PNG/LPG
- **Using data and technology for de-carbonization**
 - Preventive schedules of equipment based on AI generated data for resource efficiency
 - Using Digital Twins for resource optimization such as heat rate analysis maximizing boiler efficiency
 - AI & ML data in Logistics for vehicle tracking for inbound and outbound vehicles
 - BI reports in place of conventional xls based reports
 - Digital issuance of POs and online payments eliminating use of paper
- CBG from press mud (Under implementation)

Case5: Circular Economy Model - Kota complex



3% of the total wastes goes for Land fill disposal. 25% of the materials are recycled as key raw materials

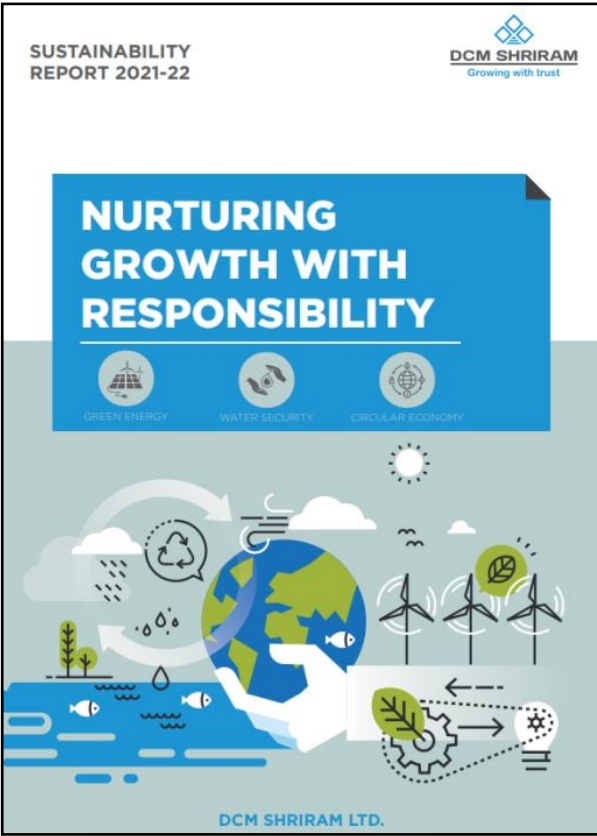
Sustainability Reports of DCM Shriram Ltd



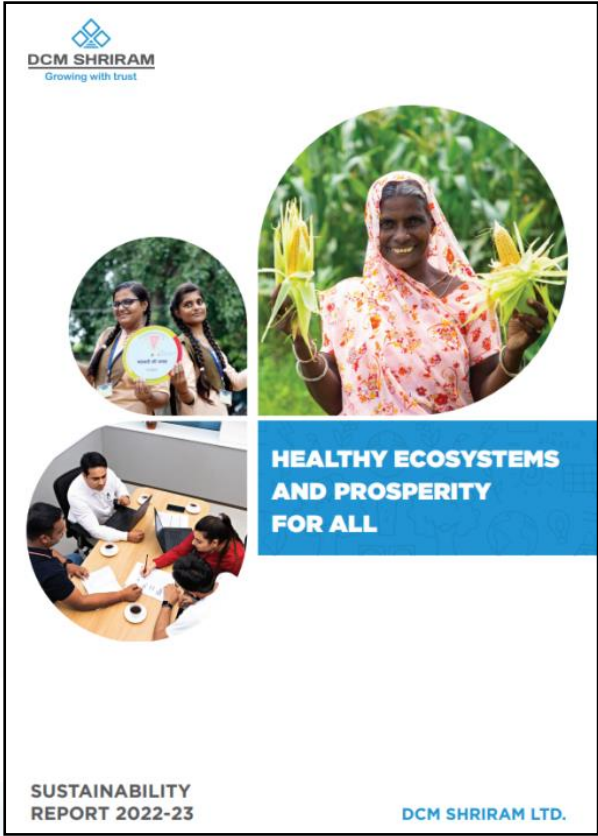
FY2018-19



FY2020-21



FY2021-22



FY2022-23

ESG Performance at a Glance – FY23

Environment

Water Security

- ❖ **12 Times Water Positive**
- ❖ Reduction in Specific Water intensity by 12 % per ton
- ❖ Maintained **Zero Liquid Discharged (ZLD)** in distillery units

GHG Emission Reduction

- ❖ **42% Green Energy** as % of total direct energy consumed
- ❖ **26 Lakh tCO₂e** emission saved through various decarbonisation and energy saving initiatives
- ❖ **Reduction in energy intensity by 12%**

Circular Economy

- ❖ **25% of material recycled** as raw materials
- ❖ **70% of the plastics packaging** recycled through the authorized plastic waste recyclers
- ❖ **17% Reduction** in wastes



Social

Safety

- ❖ Bharuch and Kota sites are certified for **British Safety Council Five Star Safety Rating**
- ❖ **ISO 45001 Certification** for all the sites
- ❖ Lost Time Injury Frequency Rate (LTIFR) 0.11 for Employees & 0.26 for Contract Employees

Human Resources

- ❖ 32 Million man-hours worked
- ❖ **Average training of 2 days/ employee / year**
- ❖ Turnover rate reduced from 15 % for permanent employees

CSR

- ❖ INR 18.76 Cr spent on community development
- ❖ Positively impacted the lives of **more than 1.3 Lakh people** through our CSR intervention



Governance



Disclosures

- ❖ Disclosure of BRSR in Annual Report & GRI Compliant SR
- ❖ DJSI score of 57 among top 7% global chemical companies
- ❖ 2nd among Diversified sector and 38th among top 200 most sustainable Companies by BW

Policies

- ❖ **Framework on BRSR**
- ❖ Anti-corruption and no bribery policy
- ❖ **Human right policy**
- ❖ Risk Management Policy
- ❖ Code on Prevention of Insider Trading

Digitalization

- ❖ **Digital tool for compliance monitoring and reporting**
- ❖ **Internal controls**

Awards, Recognitions and Certifications

Awards & Recognitions...

S&P Global

DJSI Corporate Sustainability Assessment rating among the top 7% of Global Chemical Companies



2nd Rank among India's Most Sustainable Companies in Diversified Category at Sustainable World Conclave 2023 by BW

38th Rank amongst India's most sustainable 200 companies by BW during 2023



CII Environment Excellence Award 2022

Certifications...



ISO certification in Integrated Management System (IMS) category for all DCM Shriram Manufacturing facilities and Businesses



Five Star Occupational Health and Safety Audit for Shriram Alkali and Chemicals at Bharuch and Kota sites



ICC Responsible Care (RC) for Bharuch Site



Bonsucro certification for three sugar mills and 5000 smallholder farmers

“ESG, Sustainable development and Climate Change represents the greatest disruption in 300 years of Industrial history.

Companies and Industries will either transform or disappear.”



Q & A ??

Thank You

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