



Sustainable

Manufacturing

WELCOME

Helping companies move up the value chain

Global warming

Climate Change

Climate Actions

Sustainability

Sustainable Development



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Climate Change

Paris agreement



- ✓ Signed by 190 countries.
- ✓ India is a signatory.
- ✓ India committed 35% emission intensity reduction by 2030.

PARIS CLIMATE AGREEMENT

1.  $<2^{\circ}\text{C}$

Limit the avg. global temperature increase to $<2^{\circ}$ centigrade + achieve net zero emissions by mid-century

2. 

Enhance resilience and adaptation to climate impacts certain to occur

3. 

Align financial flows in the world with these objectives

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Sustainable Development Goals- 17 SDG



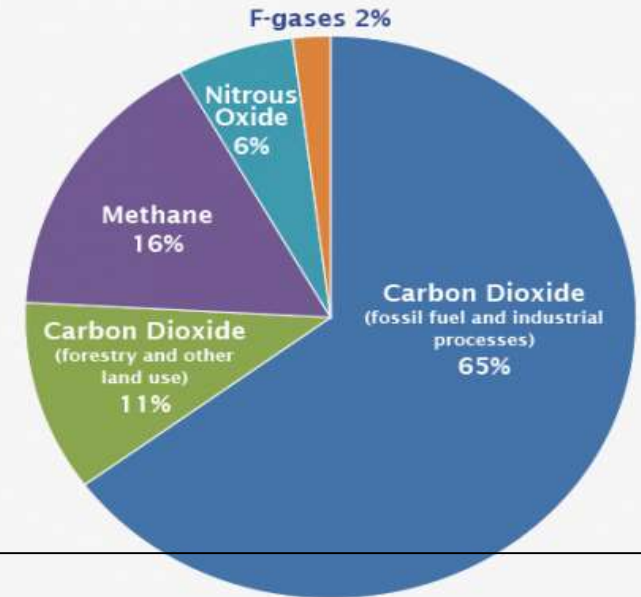
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Climate Change

Greenhouse gas emissions by India are:

- Third largest in the world
- 2½ tons per person, which is half the world average.
- 7% of global emissions.

Global Greenhouse Gas Emissions by Gas



The main causes of climate change are:

- Electricity generation,
- Industry,
- Transport,
- Deforestation.

How can we stop climate change in India:

- Energy security
- Circular value chain
- Water security
- Resource efficiency



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Sustainable Manufacturing

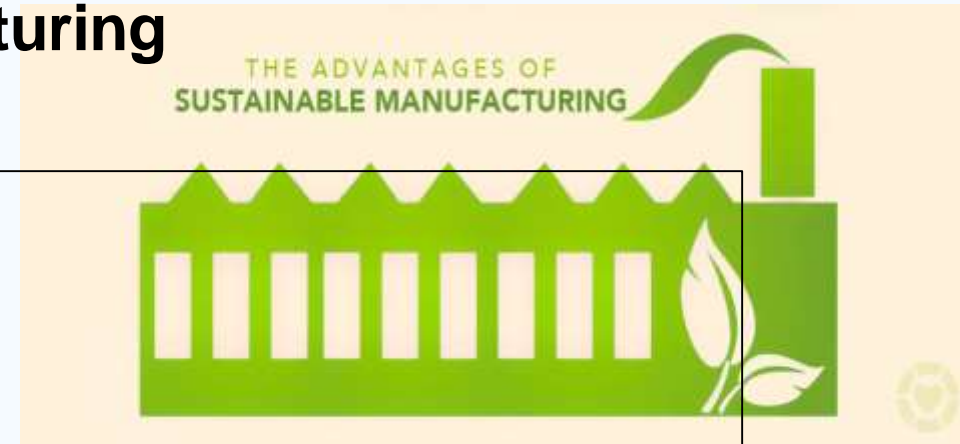
3-Dimensional
Effects of
Sustainable
Manufacturing



Sustainable manufacturing is

- ✓ creation of manufactured products through economically-sound processes
- ✓ that minimize negative environmental impacts
- ✓ while conserving energy and natural resources –
- ✓ positively impacting people, planet and profits (3 Ps)

Why Sustainable Manufacturing



KEY BUSINESS BENEFITS: 1/3

➤ Financial performance:

- *Increase sales (USP) –*

- by anticipating and meeting environmental and social expectations better than your competitors.

- *Improve efficiency and productivity (Profits) –*

- by reducing resource use (including Energy) and by reducing waste

- *Reduce dependence on expensive or hazardous materials –*

- by exploring, innovating and introducing greener alternatives.

Why Sustainable Manufacturing

KEY BUSINESS BENEFITS: 2/3

➤ Business excellence:

- *Stay ahead of regulations –*

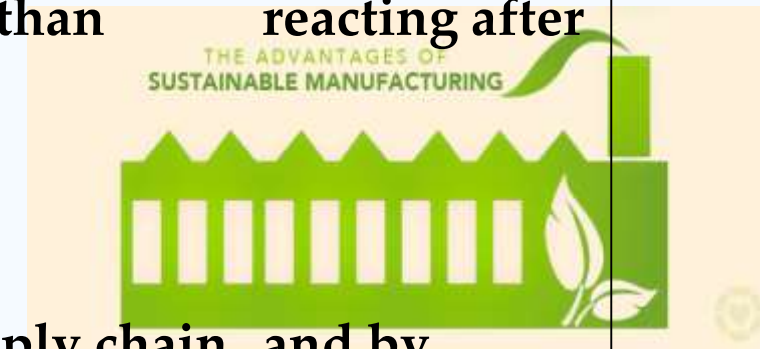
by being proactive and shaping best practice, rather than reacting after changes are implemented.

- *Win access to capital / Government contracts –*

by reducing risks in operations, strategy and the supply chain and by developing innovative solutions and new products for market.

- *Gain strategic foresight –*

by anticipating how your business can innovate solutions or adaptations to new added value.



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Why Sustainable Manufacturing

KEY BUSINESS BENEFITS: 3/3

➤ Relationships with stakeholders:

- *Enhance reputation* –
by demonstrating green know-how and setting a positive example.
- *Improve employees' morale and retention* –
by empowering them to contribute to a better environment and more productive business.
- *Build better community relations* –
by demonstrating a responsible and proactive approach to the local environment and people.



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Why Sustainable Manufacturing

News item : *Financial Express* 10th June'2021

The sustainability heat on companies

June 10, 2021 6:10 AM

At least three key factors have led us here:

1. Investors unwilling to put their money in companies without a sustainability focus,
2. Regulatory push, and
3. The streamlining of sustainability reporting

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Why Sustainable Manufacturing

News item : [Reuters](#) June 12, 2021, 01:16 IST

Toyota aims to make its factories carbon neutral by 2035:

Toyota Motor Corp will aim to make all its global factories carbon neutral by 2035, a senior executive said on Friday, pulling forward the goal by 15 years from 2050. Toyota's chief production officer Masamichi Okada said the automaker will focus initially on introducing new technologies for processes such as painting, coating and casting.

With pressure growing on global automakers to slash emissions, German luxury automaker BMW said its factories in China plan to reach carbon emissions neutrality by the end of this year, while Ford also aims to power all of its plants with locally sourced renewable energy by 2035.

Tata Motors, Maruti-Suzuki, Honda already working aggressively on developing Sustainable supply chain

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Why Sustainable Manufacturing

News item : *PTI* June 22, 2021, 17:57 IST

Green hydrogen purchase to be made mandatory: Power & Renewable Energy Minister R K Singh:

Green hydrogen would be brought under renewable purchase obligation (RPO), Power and New & Renewable Energy Minister R K Singh said on Tuesday.

Under RPO, bulk purchasers like discoms, open access consumers and captive users are required to buy a certain proportion of renewable energy out of their total consumption of electricity. They can also buy RE certificates from renewable energy producers to meet the RPO norms.

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Why Sustainable Manufacturing

News item : *Financial Express* 23rd June'2021

Soon Industrial units can buy 100% renewable power

June 23, 2021 6:30 AM

Industrial units and businesses across the country will soon be able to meet their entire power requirement via renewable energy (RE) sources, a move that could boost their goodwill image and help reduce their carbon footprint.

Announcing a 'green tariff mechanism' towards this end on Tuesday, Union power minister RK Singh said the necessary guidelines would be issued shortly.

The green tariff will be weighted average of the cost of procurement of green energy, which should be slightly lower than the overall energy prices," Singh said.

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ACMA Sustainable Manufacturing Program - ASMP

ACMA Cluster programs – a progression through skill and competence development

ASMP

- **Improve Sales and Profits**
- **Secure stakeholders' trust**
- **Emerge as a socially responsible company**



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ACMA Sustainable Manufacturing Program - ASMP

Anticipated outcomes in 18 months:

- Reduce Carbon Footprint
- Reduce Greenhouse Gas Emissions
- Improve Energy efficiency – Reduce energy costs
- Water security – water neutral company
- Reduce Production costs
- Improve Gross Yield
- Reduce Consumables consumption
- Reduce Logistics cost per kg
- Atma-Nirbhar enterprise for continuous improvement

The ACMA SMP contributes to following Indian Government Goals/Initiatives:

- Atma-nirbhar Bharat (Self – Reliant India)
- Swachh Bharat
- National Clean Air Programme
- National Policy on Resource Efficiency
- National Solar Mission

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ASMP – Supported by GIZ – German Experts

ASMP has support from **Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Germany** providing training and project implementation interventions.

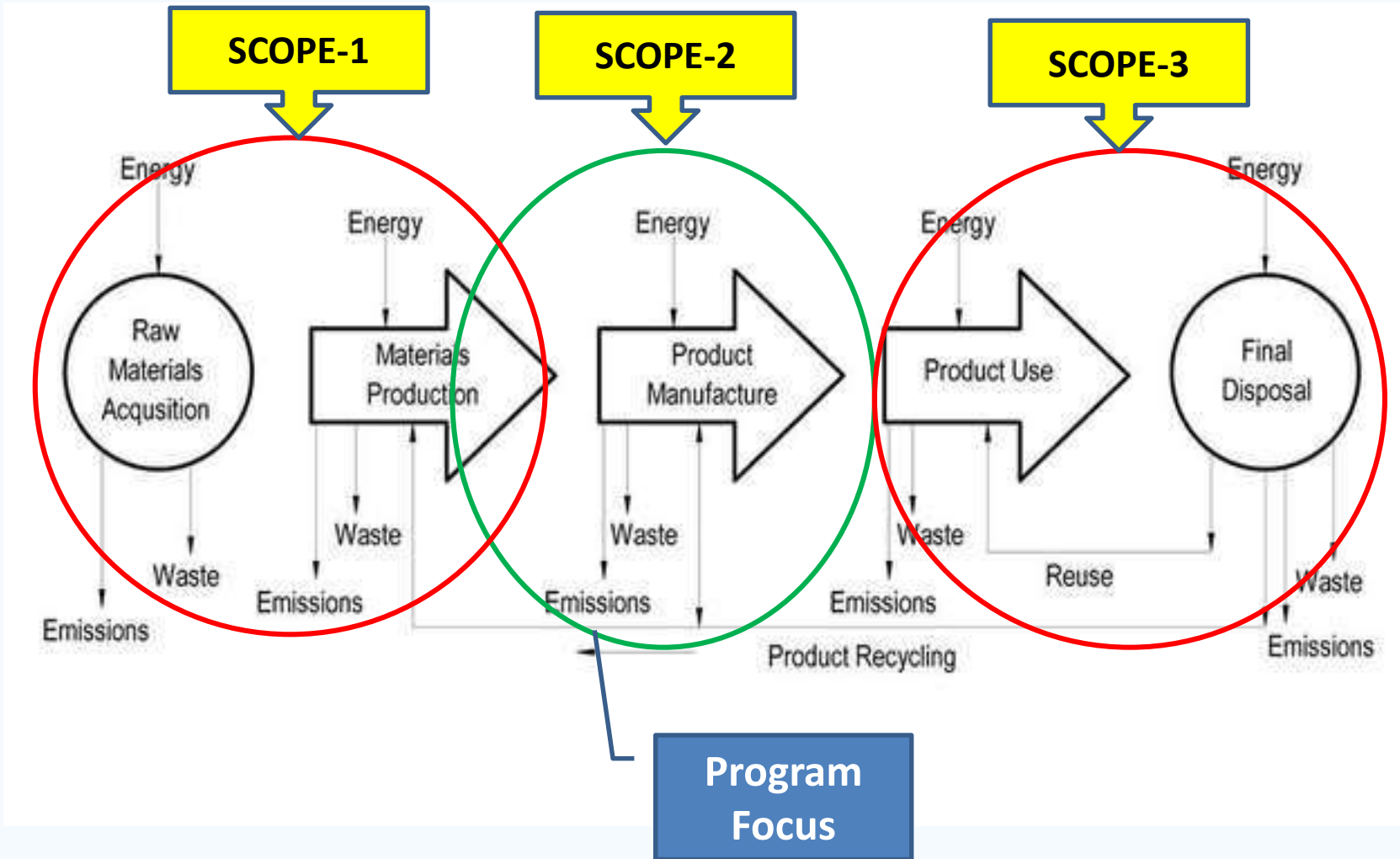
GIZ support:

- ✓ Training by German experts
- ✓ Assessment and guidance visits by German experts at cluster company site (2~3 visits during program)
- ✓ Common virtual review sessions with German experts
- ✓ 2 Model Plant Visits (Virtual company visit for German company, Physical / virtual visit for Indian company)
- ✓ “Access to Finance” support by German/Indian experts for specific sustainability projects

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ACMA Sustainable Manufacturing Program - ASMP

Manufacturing Footprint



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ACMA Sustainable Manufacturing Program - ASMP

Sustainability strategy is based on the company's social and environmental responsibility.

Start with

Sustainability

Strategy

- Committed to implementing global standards
- Keep a high level of legal and ethical practices
- Giving back to local communities
- Ensuring the safety and health of employees, and
- Reducing the impact of products and services on the environment.

To stay sustainable, company's business directly or indirectly must influence most of the 17 SDGs.

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Six Elements of Sustainable Manufacturing Process



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Sustainable manufacturing example

Cutting fluids are used extensively in metal machining processes

- The mist and vapour generated is harmful for the operator
- Stringent environmental legislations require that the spent cutting fluids be recycled or disposed of in a manner that is not harmful to the environment.

Alternatives such as:

- Minimum Quantity Lubrication (MQL) or mist application
- Equivalent dry cutting conditions

Green cutting fluids:

- Cutting fluids based on vegetable oils are bio-degradable as well as renewable.
- Biobased fluids performed better.
- Easy disposal and hence the disposal cost.



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ACMA Sustainable Manufacturing Program - ASMP

ASMP Tools

- 1. GHG emissions quantification tool**
- 2. Material, Energy and Water flow balance tool**
- 3. Resource controlling and monitoring tool**
- 4. Renewable energy potential estimation tool**
- 5. Energy auditing tool**
- 6. Sustainable practices checklist**
- 7. UN's 17 Sustainable Development Goals**
- 8. KPIs monitoring sheet**

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ACMA Sustainable Manufacturing Program - ASMP



KPI Report - ACMA Sustainable Manufacturing Program

Note : This report is to be filled at start of the program and to be monitored during all counselor visits internally by companies .

Topic	Indicators	UoM	Target (to be achieved as per road map and within cluster duration)	Status at the start of the cluster	Month 1
1. Developing Understanding about Sustainability	Understanding of Sustainability concepts (Test score)	%	80%		
	Document developed for Sustainability strategy	Nos	Align sust stratgey with company vision, mission		
	Capture current status of KPIs - as per KPI list	%	100%		
2. Meeting basic Sustainability Goals	Must be facilities score - as per check list	%	85%		
	Employees educated in code of conduct practices	%	100%		
	Female employees in various categories (worker, supervisor, midle mgt, top mgt)	%	Maximise		
3. Sustainable Production	Conversion cost reduction	%	20%		
	Production cost reduction	%	20%		
	Carbon footprint reduction	%	To be set during initial mapping		
	Yield improvement	%	10%		
	Consumables cost reduction	%	20%		
4. Energy sustainability	Energy consumption reduction	%	20%		
	Electricity bill reduction - Monthly bill	%	20%		
	Water consumption reduction	%	To be set during initial mapping		
	GHG emission reduction	%	To be set during initial mapping		
6. Circular Value Chain	Reduction in Logistics cost per kg	%	20%		
	CO2 emission reduction	%	To be set during initial mapping		
	Number of trees planted	Nos	To be set during initial mapping		
7. Control and Improve	Understanding of Sustainability Tools (Test score)	%	80%		
	Implementation of each tool	Nos	At least one tool in one product line		
	Creation of material flow balance sheet	Nos	At least one balance sheet in one product line		

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Sustainable manufacturing

Sustainable manufacturing
for the following four ac
supply chain with activities

1. Energy use reduction
2. Water use reduction
3. Emissions reduction – (Use less materials / consumables, less machines, less time)
4. Waste generation reduction

Projects on:

- Primary materials efficiency improvement
- Secondary materials efficiency improvement
 - Energy efficiency improvement
 - Water neutrality
 - Waste management

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Time in Months		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Deliverables	Sustainability Development Goals met
Implementation phases		Phase-1						Phase-2						Total = 18 months							
1	Reviews and audits after program completion													Committed Assurance	Ensure delivery against commitment						
1	Sustainability team development													Control and Improve	Self reliance for continuous improvement	17. Partnership for goals					
2	GHG emission quantification tool															7. Affordable and clean energy					
3	Material, energy and water flow balance tool															9. Industry innovation and infrastructure					
4	Resource controlling and monitoring tool															12. Responsible consumption and production					
1	Practice of 6Rs											Circular Value Chain	Reduce life cycle footprint, reduce CO2 emission	12. Responsible consumption and production							
2	Returnable / reusable packaging												Reducing logistics C-footprint and Cost/kg	13. Climate action							
3	Green logistics												Neutralise negative environment impact	15. Life on land							
4	Offset carbon footprint																				
1	Water consumption monitoring with feedback mechanism									Water Security	System based control	6. Clean water and sanitation									
2	Water audits - Consumption optimisation, Conservation										Improving water efficiency for reduced cost	12. Responsible consumption and production									
3	Wastewater reduction										Reducing wastewater treatment cost										
1	Renewable energy potential estimation and implementation							Energy Sustainability	Reducing electricity cost, reducing energy cost	7. Affordable and clean energy											
2	Energy consumption monitoring with feedback mechanism								System based control	12. Responsible consumption and production											
3	Energy audits - Consumption optimisation, Conservation								Improving energy efficiency for reduced energy cost												
1	Using alternative low-carbon technologies					Sustainable Production	Responsible production - Reduce carbon footprint				13. Climate action										
2	Process parameters optimisation						Responsible consumption - Reduce production cost														
3	Process improvements						Reducing GHG emissions - Reduce production cost				9. Industry innovation and infrastructure										
4	Primary materials efficiency - Reducing direct materials waste						Responsible consumption - Improve gross yield				12. Responsible consumption and production										
5	Auxiliary materials efficiency - Reducing indirect materials waste						Responsible consumption - Reduce consumables costs														
1	Access to 'Must be facilities'			Meeting Basic Sustainability Goals	Providing basic hygiene work environment						3. Good health & well being										
2	Safety preparedness				Employee health and well being						6. Clean water and sanitation										
3	Building awareness - Energy, Water, Wastewater & Raw Material				Employee skill enhancement						17. Partnership for goals										
4	Gender equality				Equal opportunity employer						5. Gender equality										
1	UN's Sustainable Development Goals (SDGs)							Understanding Sustainability	Building understanding on 17 SDGs released by UN												
2	Sustainability management								Understanding Risk management, Cost reduction, Value creation												
3	Mapping of KPIs and target setting								Monitoring performance against sustainability parameters												
4	GHG emissions - current state mapping (scope 1 & 2) and Target setting								Establishing baseline and setting reduction targets												
5	Regulatory compliance and ethical practices								Documentation of compliance readiness												



Plant trees



OFFSET CARBON FOOTPRINT

Circular released : Apr'21
Target Launch : July'2021
Join now to secure a sustainable future

Questions Comments



Thank You

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