INTRODUCTION

Tejaswini Kulkarni, Project Associate, WRI India
GUIDELINES

- Attendees will remain in listen-only mode.

- Today’s presentation is being recorded and will be shared with registered participants.

- Please use the “Questions” pane to type in your comments or questions during the webinar.
OBJECTIVES OF THE TRAINING SERIES

RESILIENT, PROFITABLE SUSTAINABLE MSME SECTOR

Build Awareness
Build Skills
Build Preparedness
Build Resilience
Leverage Opportunities
Topics Covered in the Training Series

- Climate Change*
- GHG Accounting & Reporting*
- Energy Efficiency*
- Resource Efficiency & Cleaner Production
- Finance & Policies

* Hyperlink to event page with session recording and materials attached
ABOUT THE TRAINING SERIES

▪ Part of the Carbon Market Simulation Project, facilitated by WRI India and supported by MacArthur Foundation

▪ Conducted in partnership with Confederation of Indian Industry (CII)
# AGENDA

| INTRODUCTION | Tejaswini Kulkarni,  
| Project Associate – Climate Programme, WRI India |
| PART I : INTRODUCTION TO RECP IN THE MSME SECTOR |  |
| RECP : Concept & Approach | Dr Bharat Jain,  
| Member Secretary, Gujarat Cleaner Production Centre |
| RECP for the MSME Sector | Atik Shaikh,  
| Counsellor – Energy & Climate Change, CII Godrej Green Business Centre |
| Question & Answer Session I |  |
| PART II : OPERATIONALIZING RECP |  |
| Resource Efficiency: MSME Experience Sharing | Kathiresan Arunachalam  
| Owner, Syndicate Impex |
| Cleaner Production: Renewable Energy | Ashok K Thanikonda  
| Manager - Energy Programme, WRI India |
| Question & Answer Session II |  |
| CLOSING REMARKS | Atik Sheikh,  
| Counsellor, CII-GBC |
SIGNIFICANCE OF RECP FOR MSMES

- Readiness to meet Future Regulations
- Access Green Finance & Schemes
- Meet Procurement Requirements of OEMs
- Cost Savings
- Production Efficiency
- Reduce Environmental Impact

Readiness to meet Future Regulations

Cost Savings

Access Green Finance & Schemes

Production Efficiency

Meet Procurement Requirements of OEMs

Reduce Environmental Impact
# AGENDA

<table>
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<th>Details</th>
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<td>INTRODUCTION</td>
<td>Tejaswini Kulkarni, Project Associate – Climate Programme, WRI India</td>
</tr>
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<td><strong>PART I : INTRODUCTION TO RECP IN THE MSME SECTOR</strong></td>
<td></td>
</tr>
<tr>
<td>RECP : Concept &amp; Approach</td>
<td>Dr Bharat Jain, Member Secretary, Gujarat Cleaner Production Centre</td>
</tr>
<tr>
<td>RECP for the MSME Sector</td>
<td>Atik Shaikh, Counsellor – Energy &amp; Climate Change, CII Godrej Green Business Centre</td>
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</tr>
<tr>
<td>CLOSING REMARKS</td>
<td>Atik Sheikh, Counsellor, CII-GBC</td>
</tr>
</tbody>
</table>
What in your opinion could be the biggest benefit of RECP to your organization?

Poll Results (single answer required):

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing Environmental Impact</td>
<td>50%</td>
</tr>
<tr>
<td>Reducing Costs/Increasing Productivity</td>
<td>30%</td>
</tr>
<tr>
<td>Readiness to Meet Future Regulations</td>
<td>10%</td>
</tr>
<tr>
<td>Meeting Green Procurement Criteria of OEM Customers</td>
<td>10%</td>
</tr>
</tbody>
</table>
PART I: INTRODUCTION TO RECP IN THE MSME SECTOR
CONCEPT & APPROACH

Dr Bharat Jain, Member Secretary, Gujarat Cleaner Production Centre
Resource Efficiency and Cleaner Production

RECP

By:
Dr. Bharat Jain
Member Secretary
Gujarat Cleaner Production Centre
Gandhinagar

10th March 2021
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01 RECP: A concept
02 Background
03 Benefits of RECP
04 RECP Practices and Methodology
05 RECP: Indicators and Barriers
06 Areas of application
RECP: A Concept

RECP entails the continuous application of preventive environmental strategies to processes, products and services in order to increase efficiency and reduce risks to humans and the environment.
Background

1972
1st International conference on environment

Action Plan for Human Environment

Establishment of Ministries of Environment in different countries

1987
Formation of “Brundtland Report” providing Concept of Sustainable Development

1989
UNEP began its initiative on Cleaner Production

1992
Rio Conference produced Agenda 21 which offered a set of goals to achieve sustainable development

UNIDO and UNEP jointly initiated National CP centre programme. Since then, 22 CP centres have been established

1994

1998
UNEP prepared International Declaration on Cleaner Production
Realizing the potential of Cleaner Production (CP) in the state of Gujarat, GCPC was established in the year 1998 by the Industries Department of the State Government under technical support of United Nations International Development Organization (UNIDO). GCPC also acts as an ENVIS centre for Ministry of Environment, Forests and Climate Change (MoEFCC) under “Chemical wastes and Toxicology”. GCPC Imparts Knowledge as well as expertise to tackle with various environmental issues to different industries. It promotes CP/CT through various services like Orientation Programmes, Assessment Project, Training Programmes and Dissemination Programmes.

**OUR SERVICES**

- CP Orientation & Awareness Programme.
- CP Training Programme
- CP Demonstration Project
- CP Promotional Activity
- Guidelines on CP for different Industrial Sectors

A step towards…
Pollution Control to Cleaner Production
ECONOMIC: Production Efficiency:
  optimization of the productive use of natural resources (materials, energy and water);

ENVIRONMENT: Environmental management:
  minimization of impacts on environment and nature through reduction of wastes and emissions;

SOCIAL: Human Development:
  minimization of risks to people and communities and support for their development.

RECP addresses the three sustainability dimensions individually and synergistically:
RECP Practices

01. Good Housekeeping
02. Better Process Control
03. Input Material Change
04. Equipment Modification
05. Technology Change
06. Production of useful Byproducts
07. Onsite Reuse and Recycling
08. Product Modification
RECP Methodology

01 Planning and Organisation
- Planning and Organisation

02 Initial Assessment
- Initial Assessment
  - Feasibility Analysis
  - Implementation and continuation
- Secure Management Commitment
- Organize Project team
- Establish Baseline RECP Profile

03 Detailed Assessment
- Detailed Assessment
  - Technical and operational evaluation
  - Economic & Environmental Evaluation
  - Plan and implement feasible options
  - Monitor RECP benefits
  - Integrate RECP in management
- Develop material and energy balances
- Assess root cause of inefficiencies and wastes
- Generate RECP options
- Screen RECP options

04 Implementation and continuation
- Implementation and continuation
- Plan and implement feasible options
- Monitor RECP benefits
- Integrate RECP in management
RECP progress at an enterprise is monitored using a set of Resource Productivity and Pollution *Intensity indicators* as follows:

**Resource productivity**
- Energy productivity (product output per unit of energy used)
- Materials productivity (product output per unit of material used)
- Water productivity (product output per unit of water used)

**Pollution intensity**
- Carbon intensity (greenhouse gas emissions per unit of product output)
- Waste intensity (waste generation per unit of product output)
- Waste-water intensity (waste-water generation per unit of product output)
Benefits of RECP

- Increasing Productivity
- Increasing Economic benefits
- Improving environmental situation
- Gaining competitive advantage
- Continuous Environmental improvement
Common types of Barriers

- Conceptual and motivational (Preparedness and willingness to accept)
- Organizational (Roles and Responsibilities in a firm)
- Economic (Cost/benefits, Market acceptance and access to finance)
- Policy (Regulatory uncertainty)
Examples / areas of application

- RECP for Energy efficiency
- RECP for material efficiency and waste minimization
- RECP for efficient & responsible chemical use
- RECP for water sufficiency and reduction of waste water
- Management Internalization

Areas of application include:
- Water
- Raw materials
- Power
- Emissions
- Wastes
- Effluents
RECP for **Energy Efficiency**

**Sources**
- Where is energy used?
- For what purpose?
- With what losses?

**Causes**
- What factors influence these energy uses and losses?

**Options**
- How to minimize these causes of energy uses and energy losses?
Energy: Probable checklist

- Regular **surveying & repairing of steam leaks**
- Regular surveying & repairing **Hot/Cold pipe insulation**
- Reduce the **compressed air pressure** to minimum acceptable level (normally 70-90 PSI)
- Eliminate the use of **compressed air knives** as much as possible (Blowers/Pressure Regulator)
- Convert the **plant lighting** to High-Efficiency Lighting Fixtures (T-5, LED 8 use of Motion Sensor)
- Ensure all HVAC Filters, Condenser, Evaporator Coils are **clean at least annually**
- Conduct **employees training/involvement program on energy savings**
Check of the energy losses through Thermography

Efficient Use of Energy

Uninsulated sides Energy Loss
A case study

Ceramic Sector: Modification in Kiln car furniture by replacing “Solid Cordierite Kiln Car Shelves” with “Extruded Batt’s”

Heavier the material on kiln car more will be the gas consumption of the kiln. The heavier the furniture material, more the heat utilized to heat up the car, which is of no use. The only useful heat is what absorbed by the product loaded on the car.

Recommendations:
As per the thumb rule, the gas consumption will be reduced dramatically by reducing the weight of the kiln car. The option to reduce the kiln car weight is by changing the design of shelves in the kiln car. Thus, Solid Cordierite shelves were replaced by light weight ‘Extruded cordierite batts’

Outcomes:
% reduction in weight: 22%
% reduction in gas consumption: 22% approximately
Savings in gas consumption per annum: 1,20,860 SCM
Investment: Rs. 4,90,000/-
Expected savings: Rs. 22,80,000/-
Payback period: 3 months
Reduction in Electricity consumption by reduction reaction pump RPM

**Before Cleaner Production**

In the process, reaction pump is designed for 30 m head and 920 m³/hr capacity. The electricity consumption is 78 KWH

**After Cleaner Production**

1. Lab scale trials were carried out to study the effect of rate of reaction on mass transfer.
2. To optimize the RPM of reaction pump, the study was carried out between from 1375 RPM to 1000 RPM.
3. Based on the study, it was observed that lowering the reaction RPM from 1375 to 1000 RPM it did not hamper the rate of reaction and mass transfer rate
4. Further lowering the RPM below 1000, was hampering the circulation.
5. Hence, the reaction pump RPM is optimized to 1000 RPM

**Environmental Benefit:**

1. Electricity consumption reduced from 78 KWH to 44 KWH
2. Reducing CO2 footprint by 0.878 MT

**Economical Benefit:**

1. Investment: 0 INR
2. Savings: 1.65 lakhs
RECP for efficient & responsible chemical use

Sources
• Where are chemicals used?
• For what purpose?
• What is their fate (Product, conversion and waste)?

Causes
• What factors influence the use and fate of chemicals?

Options
• How to minimize these causes of high usage of chemicals and their undesired fate, including possible release into the environment?
Prepare a list of raw materials and auxiliaries which are used in the process.

Proper understanding of the functions of the raw materials in the production process

Check on the quantities the chemicals are used.

Check the costs of the raw materials and auxiliaries used in the process.

Check on the hazardous characteristics they have for humans and the environment.
**Agrochemical Sector:** Reduction in consumption of raw material Acrylonitrile for manufacturing of CMAC (Cypermethric acid chloride) and optimization of raw material.

**Reactions:**

Reaction of Carbon tetra chloride (CTC) with Acrylonitrile (ACN) occurs in a reactor with help of Cupric Chloride as catalyst, DEA-HCl as buffer & Acetonitrile (AN) as a solvent resulting into Tetra Chloro Butyro Nitrile (TBN) and upon acid hydrolysis of Crude TBN using 30% of HCl solution, Tetrachloro Butyric Acid (TBA) is formed. This is the first stage reaction for the formation of CMAC.

**Recommendation:**

Reduce the consumption of Acrylonitrile (ACN) which may increase the yield of Tetra Chloro Butyro Nitrile. By suggested reduced amount of Acrylonitrile, industry will achieve significant cost benefit which is reflected in the outcomes.

**Outcomes:**

<table>
<thead>
<tr>
<th>Cost of Acrylonitrile</th>
<th>Rs. 122 / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial consumption</strong> of Acrylonitrile</td>
<td>500 kg / MT of CMAC</td>
</tr>
<tr>
<td>Consumption of Acrylonitrile after CP Assessment</td>
<td>430 kg / MT of CMAC</td>
</tr>
<tr>
<td><strong>Savings</strong> due to CP Assessment</td>
<td>Rs. 8540 / MT of CMAC</td>
</tr>
<tr>
<td>Savings for 170 MT CMAC production per month</td>
<td>Rs. = 8540 x 170 = Rs. 14,51,800</td>
</tr>
<tr>
<td>Savings for CMAC production per year</td>
<td>Rs. = 14,51,800 x 12 = Rs. 1,74,21,600</td>
</tr>
</tbody>
</table>
RECP for material efficiency and waste minimisation

Sources
- Where is material used?
- For what purpose?
- With what material losses?

Causes
- What factors influence these material uses and losses?

Options
- How to minimize the causes of these material uses and losses?
Waste Minimization: Probable checklist

- Check the quantity and quality of waste streams generated from each process
- Identify the category of wastes as hazardous or non-hazardous.
- Details of input materials used to generate waste streams of a particular process or area.
- Quantity of a particular input material enters each waste stream
- Check the efficiency of the process.
- Check the housekeeping practices which are used to limit the quantity of wastes generated.
- Identify the various process controls are used to improve process efficiency.
RECP for water sufficiency and reduction of waste water

**Sources**
- Where is water used?
- For what purpose?
- With what losses and pollution?

**Causes**
- What factors influence these water uses, losses and pollution?

**Options**
- How to minimize these causes of water uses, losses and pollution?
Water: Probable checklist

- Implement **Regular Program for Surveying & Repairing** Water Leaks.
- Optimize the **design of pump seals**.
- Optimize **Water Treatment** (Backwash, Recovery, Recycle, Re-Use).
- Optimize **cleaning and sanitation** procedures.
- Optimize **Package Washing and Rinsing** (Ionized Air, Recycling).
- Optimize **Cooling Towers** and its water use (cooling efficiency, pre-treatment, reduction).
- Optimize water **hoses and sanitary systems**.
Ceramic industry requires a stage where slip preparation is to be done. Wherein, the slurry is formed by mixing various types of raw materials in a fixed composition manually in the ball mill. A batch of ball mill contains equal proportion of raw material, water and riverbed stone pebbles. The ball mill grinds the raw materials for more than 8 hours to form slurry, which is passed through a 40 mesh size sieve, so as to reject the oversized particles.

Recommendations:
It was observed that the water removed from the slip in the form of filtrate was drained out from the plant earlier, which was a major loss of water from the plant. Approximately 7.48 KLD Of water was wasted in the process stage. All of the filtrate water can be reused in the process, at the wet grinding stage in ball mill.

Outcomes:
The plant is a Zero Liquid Discharge plant, all the water is reused in the process. Additionally, reduction in the cost of purchasing water from GIDC was also obtained. Approximately reduction in fresh water demand: 7.48 KLD.
Management Internalization

Plan and implement RECP options

Monitoring of RECP progress

Mainstreaming RECP in company’s management and operations
CLEANER PRODUCTION AS A SUBJECT IN CHEMICAL & ENVIRONMENTAL ENGINEERING

• “Cleaner Production and its application to Industries” is being used as a reference material (text book) for the students to understand the concept of Cleaner Production and its various applications.

• The book is intended to provide guidance on concept of cleaner production and its benefits to the industries.

• The book thoroughly describes the tools and methodologies to implement cleaner production, including success stories and case studies of cleaner production implementation in various industrial sectors.
Gujarat Cleaner Production Centre (GCPC), is promoting ‘Research and Development’ in the field of Cleaner Production, Clean Technologies, by interlinking of Government, Academia and Industries providing a single knowledge sharing platform to academicians and industrial technocrats, organizing programme named ‘Integration of Research to Industrial Application’. The programme aims on practical application of theoretical research conducted by students on Cleaner Production and Clean Technology.
CP Award Ceremony
Schemes of Assistance for Environment Protection Measures

Scheme-1

Scheme for assistance to Environment Management

Eligible Activities

Implementation of *Cleaner Production Technology* in place of existing process such as substitution & optimization of raw material, reduction in water consumption or energy consumption or waste generation.

1. Any other environment management project with use of Clean, Efficient and Innovative Pollution Control Equipment.
Quantum of Assistance

The following quantum of assistance shall be provided:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Eligible Activity</th>
<th>Quantum of Assistance per project</th>
</tr>
</thead>
</table>
| 1.     | Implementation of cleaner production technology in place of existing process such as substitution & optimization of raw material, reduction in water consumption or energy consumption or energy consumption or waste generation | 1. Upto 35% of cost of plant & machinery with ceiling of Rs. 35 lacs during the operative period of the scheme for MSME.  
2. Upto 10% of cost of plant & machinery with ceiling of Rs. 35 lacs during the operative period of the scheme for large projects. |
| 2.     | Any other environment management project with use of Clean, Efficient and Innovative Pollution Control Equipment | 1. Upto 25% of cost of plant & machinery with ceiling of Rs.35 lacs during the operative period of the scheme for MSME.  
2. Upto 10% of cost of plant & machinery with ceiling of Rs. 35 lacs during the operative period of the scheme for large projects. |
THANKS!
RECP FOR THE MSME SECTOR

Atik Sheikh, Counsellor, CII-GBC
Resource Efficiency & Cleaner Production

*Status, approach and Tools*

ATIK SHEIKH, Counsellor, CII Godrej GBC
Agenda

❖ Material Consumption and Productivity
❖ RECP – Concept
❖ Sectoral Potential
❖ RECP – Audit
❖ RECP – Tools
❖ Summary
India material consumption grew by 7 times from 1.18 billion tonnes in 1970 to 7 billion tonnes in 2015 (Agrarian to industrial society)

Material consumption expected to double by 2030 – Economic growth and urbanisation

India’s Per capita consumption India is low - 7 tonnes, while global average is 10 tonnes

Regulatory & Policy Framework on material/resource efficiency taking shape in India

- National Resource Efficiency Policy, 2019 (Draft)
Resource Efficiency

India Resource Productivity

USD/kg


Source: OECD

vkprajapati@amuldairy.com

© Confederation of Indian Industry
India’s resource productivity has improved by 2.5 times in last three decades.

Source: OECD

vkraipat@amd.dairy.com
As a result of EE measures since 2000, in 2018 India avoided 15% more Energy Use (300 million T CO$_2$ (14% more)).

Countries - comparison

RESOURCE PRODUCTIVITY (2017)

INDIA 1.1
GERMANY 2.8
UNITED STATES 2.9
FRANCE 3.3
JAPAN 4.2
UNITED KINGDOM 4.8

Source: India Policy Review - 2020, IEA
As a result of EE measures since 2000, in 2018 India avoided 15% more Energy Use. Source: India Policy Review – 2020, IEA

India’s resource productivity is much lower as compared to other nations indicating that we still use more material for generating economic output.

India – Opportunities for Material Efficiency
India’s Resource Efficiency Policy

NREP aims to **implement resource efficiency across all resources** including both biotic and abiotic resources, sectors and life cycle stages.

NREP, 2019 (Draft)
Scope of the National Resource Efficiency Policy encompasses resources and materials used across all life cycle stages of any sector, including both biotic and abiotic resources, sectors, and life cycle stages.

NREP, 2019 (Draft)

Mix of policy, regulatory, and market instruments proposed for improving material efficiency across sectors.

The progress on resource efficiency will be tracked on the set of indicators that will include sector-specific indicators, recovery and recycling indicators.

Role of Industry and stakeholders critical

3 year action plan for improving RE will be implemented.
Which approach?

- **PASSIVE**
  - Ignore pollution

- **REACTIVE**
  - Dilution and dispersion

- **CONSTRUCTIVE**
  - End-of-pipe treatment

- **PROACTIVE**
  - RE Cleaner Production

- **PROACTIVE**
  - Process Improvements with reduction of water pollution at source, Automatic blowdown for boilers, Green Chemistry,

**Example** – Adding Excess Water to meet the water discharge norms

**Example** – Setting up of ETPs, and use of CETPs at Cluster Level

Producing more with less Resources & Pollution

© Confederation of Indian Industry
Which approach?

PASSIVE
Ignore pollution

REACTIVE
Dilution and dispersion

CONSTRUCTIVE
End-of-pipe treatment

PROACTIVE
RE Cleaner Production

Example – Adding Excess Water to meet the water discharge norms

Example – Process Improvements with reduction of water pollution at source, Automatic blowdown for boilers, Green Chemistry,

Example – Setting up of ETPs, and use of CETPs at Cluster Level

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Why RECP in MSMEs?

- Significant potential exists for improvements
- Technology obsolescence has been a common phenomenon with Indian MSMEs
- Lack of penetration of modern and efficient technologies commonly observed

Lack of Latest Technologies

- Operational inefficiency, technology vintage, and hence resource intensive
- Profit margins, sustenance, expansion to quality based market

Potential of 25-30% improvement in efficiency through RECP measures
# Sectoral Potential

<table>
<thead>
<tr>
<th>Sl. NO</th>
<th>SECTORS</th>
<th>Pollution Intensity</th>
<th>RECP Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electroplating</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>2</td>
<td>Engineering units (Metal surface treatment)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>3</td>
<td>Pharmaceuticals (bulk drugs)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>4</td>
<td>Dairy and Dairy products (Integrated)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>5</td>
<td>Tannery</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>6</td>
<td>Textiles (Yarn, Dyeing &amp; Printing)</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>7</td>
<td>Chemical Pesticides</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>8</td>
<td>Recycled Paper</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>9</td>
<td>Common treatment and disposal facilities(CETP, TSDF, E-Waste recycling, CBMWF, effluent conveyance project, incinerator, solvent/acid recovery plant, MSW sanitary landfill site)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>10</td>
<td>Dye &amp; Dye intermediates (Located outside notified industrial area)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>11</td>
<td>Dye &amp; Dye intermediates (Located inside notified industrial areas)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>12</td>
<td>Manufacturing of paints, varnishes, pigments and intermediate</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>13</td>
<td>Organic chemical (Located outside notified industrial area)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>14</td>
<td>Organic chemical (Located inside notified industrial areas)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>15</td>
<td>Wood &amp; Agro Based Paper mill (with pulping)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Sl NO</td>
<td>SECTORS</td>
<td>Air Pollution</td>
<td>Water Pollution</td>
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</tr>
<tr>
<td>15</td>
<td>Wood &amp; Agro Based Paper mill (with pulping)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>16</td>
<td>Foundry and Forging units</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>17</td>
<td>Cotton spinning and weaving (medium and large scale)</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>18</td>
<td>Pharma (Formulation)</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>19</td>
<td>Distilleries (All molasses and sugarcane-based &gt;30 KLD)</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>20</td>
<td>Distilleries (All non-molasses and sugar based &lt;30 KLD)</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>21</td>
<td>Dairy and Dairy products (Small scale)</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>22</td>
<td>Paints and varnishes (mixing and blending)</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>23</td>
<td>Tyres and tubes vulcanization/ hot retreating</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>24</td>
<td>Fish feed, poultry feed and cattle feed</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>25</td>
<td>Spray painting, paint baking, paint shipping</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>26</td>
<td>Glass ceramics, earthen potteries and tile manufacturing with fossil fuel kiln</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>27</td>
<td>Glass, ceramic, earthen potteries, tile and tile manufacturing using electrical kiln</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>28</td>
<td>Edible Oil &amp; Vanaspati (&gt;100 KLD waste water generation)</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>29</td>
<td>Soft Drinks</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>30</td>
<td>Ceramics</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>31</td>
<td>Glass Manufacturing &amp; Processing</td>
<td>H</td>
<td>L</td>
</tr>
</tbody>
</table>
RECP – Implementation in India MSMEs

- RECP is being implemented by industries in form –
  - Technology upgradation and operation optimization
    - Energy (Most focus)
    - Water (Depending on the costs – Textile, Chemical, etc)
    - Waste Management
    - Lean Manufacturing
    - Renewable Energy
  - Driven by cost savings and improvement in operations
  - Compliance to proactive approach

![Diagram](image-url)
Key RECP initiatives

- **Government Led Initiatives**
  - National Manufacturing Competitiveness Program
  - CLSS
  - ZED Rating
  - MSME cluster development program
  - BEE EE in SME Program
  - GCPC

- **Financial Institutions**
  - SIDBI Programs/Schemes
  - SBI Program

- **Voluntary Programs**
  - GreenCo Rating

Diagram:
- RECP
  - Government led initiatives
  - International Organisation led initiatives
  - Voluntary/industry Led initiatives
Implementation RECP in MSMEs

**RECP Audits** – Material, Energy Balances, waste audits, lean manufacturing etc.

**Rating & Certification** – GreenCo, ZED Rating, ISO

**Tools**
MFCA, LCA, Chemical Leasing, Industrial Ecology, Green Chemistry etc.
RECP Audit

- Measurement and analysis in various sections
  - Total amount of energy used
    - Thermal, Electrical
  - Total material flow
    - Raw, Waste Production Information
  - Total water consumption
  - Waste Mapping
  - Analysis of water and air emissions
  - Quantification of emissions
- Evaluation of results
- Identification of opportunities
  - Feasibility Analysis
    - Techno-commercial analysis
Objective: To pilot, upscale and upstream RECP activities in SME

Pilot Sectors
- Engineering (5 units)
- Food & Beverage (5 units)

Focus for improvements:
- Rejection reduction
- Material Conservation (process, utilities, packaging)
- Yield Improvement
Approach

- New concept
- 2-3 months implementation
- Material Inputs/Loss Identification
- Implementation
- Identification of Opportunities
- Focus on consumables also
- Collaborative approach
- Involvement at all levels
- Capacity Development
- Handholding & Systems
- Identification of Opportunities
- Quantification of Savings

© Confederation of Indian Industry
Case Study – 1 - Storage solutions - Manufacturing
<table>
<thead>
<tr>
<th>QC</th>
<th>QC Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC1</td>
<td>Blanking 1</td>
</tr>
<tr>
<td>QC2</td>
<td>Blanking 2</td>
</tr>
<tr>
<td>QC3</td>
<td>Turret Punching</td>
</tr>
<tr>
<td>QC4</td>
<td>Press Shop</td>
</tr>
<tr>
<td>QC5</td>
<td>Pre Treatment</td>
</tr>
<tr>
<td>QC6</td>
<td>Powder Coating</td>
</tr>
<tr>
<td>QC7</td>
<td>PC Oven</td>
</tr>
<tr>
<td>QC8</td>
<td>Stores (sizing and repacking)</td>
</tr>
<tr>
<td>QC9</td>
<td>Packing &amp; Dispatch</td>
</tr>
<tr>
<td>QC10</td>
<td>Customer Acceptance (order fulfillment)</td>
</tr>
</tbody>
</table>
## Case Example 1 – Pilot Studies

### Material Input

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Input</th>
<th>Quantity (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steel</td>
<td>282370.0</td>
</tr>
<tr>
<td>2</td>
<td>Electricity</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Coil Packing Material</td>
<td>1785.0</td>
</tr>
<tr>
<td>4</td>
<td>Rust Prevention Oil</td>
<td>16.2</td>
</tr>
<tr>
<td>5</td>
<td>Hydraulic Oil</td>
<td>3.7</td>
</tr>
<tr>
<td>6</td>
<td>PPE Kit</td>
<td>18.3</td>
</tr>
<tr>
<td>7</td>
<td>H Diesel</td>
<td>32.2</td>
</tr>
<tr>
<td>8</td>
<td>Tools</td>
<td>0.8</td>
</tr>
<tr>
<td>9</td>
<td>3m Tape nylon braided</td>
<td>5.0</td>
</tr>
<tr>
<td>10</td>
<td>Banian Cloth</td>
<td>10.0</td>
</tr>
<tr>
<td>11</td>
<td>Cotton Waste</td>
<td>3.0</td>
</tr>
<tr>
<td>12</td>
<td>Masking Tape</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>284246.2</strong></td>
</tr>
</tbody>
</table>

### Material Loss

<table>
<thead>
<tr>
<th>No.</th>
<th>Material loss</th>
<th>Quantity (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steel</td>
<td>4274.0</td>
</tr>
<tr>
<td>2</td>
<td>Electricity</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Coil Packing Material</td>
<td>1785.0</td>
</tr>
<tr>
<td>4</td>
<td>Rust Prevention Oil</td>
<td>1.6</td>
</tr>
<tr>
<td>5</td>
<td>Hydraulic Oil</td>
<td>3.7</td>
</tr>
<tr>
<td>6</td>
<td>PPE Kit</td>
<td>18.3</td>
</tr>
<tr>
<td>7</td>
<td>H Diesel</td>
<td>32.2</td>
</tr>
<tr>
<td>8</td>
<td>Tools</td>
<td>0.8</td>
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<tr>
<td>11</td>
<td>Cotton Waste</td>
<td>3.0</td>
</tr>
<tr>
<td>12</td>
<td>Masking Tape</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>6133.6</strong></td>
</tr>
</tbody>
</table>
## Insights - Scrap Generation

<table>
<thead>
<tr>
<th>QC Description</th>
<th>Percentage of Scrap</th>
<th>No of Machines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanking 1</td>
<td>10%</td>
<td>1</td>
</tr>
<tr>
<td>Blanking 2</td>
<td>14%</td>
<td>1</td>
</tr>
<tr>
<td>Turret Punching</td>
<td>40%</td>
<td>2</td>
</tr>
<tr>
<td>Press Shop</td>
<td>35%</td>
<td>37</td>
</tr>
<tr>
<td>Pre Treatment</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Powder Coating</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>PC Oven</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Stores (sizing and repacking)</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Packing &amp; Dispatch</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Customer Acceptance (order fulfillment)</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Constructing the flow model helped in figuring out where high amount of scrap is generated.
Turret punching was generating more scrap as opposed to thought of press shop being the major contributor

Kaizens Proposed

- Instead of punching out the entire component from turret, take zero reference from machine bed and punch out the remaining two sides for accuracy.
- Repositioning machine clamp so that components can be punched out near to zero reference
- Punching out “C” class items (small components) from the blank which goes unused
Insights - Replacement

Storage Solution Company (reorder) → Product → Shipping → Customer

Storage Solution Company → Product → Shipping → Customer

Reorder – Missing or damaged items

Component Cost: Rs. 681
Re-order Component Cost: Rs. 820 – Rs. 13,000
Opportunity Cost: Rs. 1,30,000

Suggestion: Inclusion/Improvement of Quality Check before Dispatch

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## Insights - Replacement

<table>
<thead>
<tr>
<th>Cost Heads</th>
<th>Component Cost</th>
<th>Cost of replacement (ordinary case)</th>
<th>Cost of replacement (extreme case)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material</td>
<td>189</td>
<td>189</td>
<td>189</td>
</tr>
<tr>
<td>Press Shop cost</td>
<td>428</td>
<td>554</td>
<td>554</td>
</tr>
<tr>
<td>Paint shop cost</td>
<td>37</td>
<td>37</td>
<td>2,604</td>
</tr>
<tr>
<td>Packing Cost</td>
<td>5</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Packing Material Cost</td>
<td>11</td>
<td>11</td>
<td>65</td>
</tr>
<tr>
<td>Freight, Documentation &amp; Clearance (approx)</td>
<td>10</td>
<td>10</td>
<td>10,500</td>
</tr>
<tr>
<td>Total Cost (INR)</td>
<td>681</td>
<td>820</td>
<td>13,930</td>
</tr>
<tr>
<td>Opportunity Cost (Products that can be produced during that time period)</td>
<td>1,12,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Case Study 2 – Beverage Company
Process

Mixing
Pasteurising
Filling
Cooling
Sleeving
Packing
# Overall Juice Product and Reject (Conventional)

<table>
<thead>
<tr>
<th>No.</th>
<th>Input</th>
<th>Quantity (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Material A</td>
<td>13760.0</td>
</tr>
<tr>
<td>2</td>
<td>Material B</td>
<td>19720.0</td>
</tr>
<tr>
<td>3</td>
<td>Material C</td>
<td>123.3</td>
</tr>
<tr>
<td>4</td>
<td>Material D</td>
<td>174.0</td>
</tr>
<tr>
<td>5</td>
<td>RO water (only for Juice)</td>
<td>89900.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Input</strong></td>
<td><strong>123692</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap</td>
<td>1130.4</td>
</tr>
<tr>
<td>180 ML Bottle</td>
<td>5156.3</td>
</tr>
<tr>
<td>250 ML Bottle</td>
<td>111.0</td>
</tr>
<tr>
<td>500 ML Bottle</td>
<td>1516.6</td>
</tr>
<tr>
<td>1000 ML Bottle</td>
<td>46.9</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td><strong>7961</strong></td>
</tr>
</tbody>
</table>

Total Input: 131923 kgs

Product: 127389.7 kgs

Resource Productivity: 96%
# MFCA Productivity

<table>
<thead>
<tr>
<th>No.</th>
<th>Input</th>
<th>Quantity (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Material A</td>
<td>13760.0</td>
</tr>
<tr>
<td>2</td>
<td>Material B</td>
<td>19720.0</td>
</tr>
<tr>
<td>3</td>
<td>Material C</td>
<td>123.3</td>
</tr>
<tr>
<td>4</td>
<td>Material D</td>
<td>174.0</td>
</tr>
<tr>
<td>5</td>
<td>RO water (only for Juice)</td>
<td>89900.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Input</strong></td>
<td><strong>123692</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input</th>
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<tr>
<td>180 ML Bottle</td>
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</tr>
<tr>
<td>250 ML Bottle</td>
<td>111.0</td>
</tr>
<tr>
<td>500 ML Bottle</td>
<td>1516.6</td>
</tr>
<tr>
<td>1000 ML Bottle</td>
<td>46.9</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td><strong>7961</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input</th>
<th>Kgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam</td>
<td>9300.0</td>
</tr>
<tr>
<td>RO Water for Cleaning</td>
<td>27000.0</td>
</tr>
<tr>
<td>RO water for rinsing</td>
<td>29000.0</td>
</tr>
<tr>
<td>Caustic Soda</td>
<td>72.0</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td><strong>65372</strong></td>
</tr>
</tbody>
</table>

Total Input: 197025 kgs  
Resource Productivity: 65%  
Product: 127389.7 kgs
Identification of Waste

- Start-up Losses
- Filling Losses
- Defect Losses
- Unaccounted Losses
- Customer Requirement/Supplier Losses
- Machine Losses
- Energy Efficiency Improvement (more than 15 measures)
Life Cycle Assessment Study – Glass Industry

LCA Methodology

- Initial Meeting
- Discussion on process & operations
- Preparation of questionnaire
- Data collection & coordination
- Data validation
- Preparation of Life Cycle Inventory
- Life Cycle Assessment

Glass Manufacturing Process

- Raw Materials
- Batch-house
- Furnace, F/H & Distributor
- IS/Forming
- Annealing
- Cold End Sampling
- Packing
- Finished Goods Warehouse

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LCA – Impact Contribution

Impact – Contribution (Cradle to Gate)

- Climate change
- Ozone depletion
- Human toxicity, non-cancer effects
- Human toxicity, cancer effects
- Particulate matter
- Ionizing radiation HH
- Photochemical ozone formation
- Acidification
- Terrestrial eutrophication
- Freshwater eutrophication
- Marine eutrophication
- Freshwater ecotoxicity

- Batch-house
- Melting
- Others

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## Cradle to Cradle Impact Reduction (Per tonne glass)

<table>
<thead>
<tr>
<th>Impact category</th>
<th>% - Impact Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>13.70%</td>
</tr>
<tr>
<td>Ozone depletion</td>
<td>15.75%</td>
</tr>
<tr>
<td>Human toxicity, non-cancer effects</td>
<td>17.73%</td>
</tr>
<tr>
<td>Human toxicity, cancer effects</td>
<td>17.84%</td>
</tr>
<tr>
<td>Particulate matter</td>
<td>11.40%</td>
</tr>
<tr>
<td>Ionizing radiation HH</td>
<td>17.45%</td>
</tr>
<tr>
<td>Photochemical ozone formation</td>
<td>14.96%</td>
</tr>
<tr>
<td>Acidification</td>
<td>16.30%</td>
</tr>
<tr>
<td>Terrestrial eutrophication</td>
<td>16.76%</td>
</tr>
<tr>
<td>Freshwater eutrophication</td>
<td>9.18%</td>
</tr>
<tr>
<td>Marine eutrophication</td>
<td>19.80%</td>
</tr>
<tr>
<td>Freshwater ecotoxicity</td>
<td>16.32%</td>
</tr>
<tr>
<td>Land use</td>
<td>6.81%</td>
</tr>
<tr>
<td>Water scarcity</td>
<td>22.35%</td>
</tr>
<tr>
<td>Resource use, energy carriers</td>
<td>11.84%</td>
</tr>
<tr>
<td>Resource use, mineral and metals</td>
<td>26.86%</td>
</tr>
</tbody>
</table>
## Impacts – Increasing Renewable Energy

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>% Reduction in Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>6.20%</td>
</tr>
<tr>
<td>Ozone depletion</td>
<td>4.33%</td>
</tr>
<tr>
<td>Human toxicity, non-cancer effects</td>
<td>7.48%</td>
</tr>
<tr>
<td>Human toxicity, cancer effects</td>
<td>7.97%</td>
</tr>
<tr>
<td>Particulate matter</td>
<td>7.39%</td>
</tr>
<tr>
<td>Ionizing radiation HH</td>
<td>5.32%</td>
</tr>
<tr>
<td>Photochemical ozone formation</td>
<td>4.97%</td>
</tr>
<tr>
<td>Acidification</td>
<td>6.67%</td>
</tr>
<tr>
<td>Terrestrial eutrophication</td>
<td>6.26%</td>
</tr>
<tr>
<td>Freshwater eutrophication</td>
<td>14.61%</td>
</tr>
<tr>
<td>Marine eutrophication</td>
<td>6.56%</td>
</tr>
<tr>
<td>Freshwater ecotoxicity</td>
<td>5.62%</td>
</tr>
<tr>
<td>Land use</td>
<td>-</td>
</tr>
<tr>
<td>Water scarcity</td>
<td>6.17%</td>
</tr>
</tbody>
</table>

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RECP provides a great opportunity to reduce environmental impacts, create customer satisfaction and generate greater profits

Many tools for implementation of RECP
- ZED, GreenCo, MFCA, quality tools, supply chain support

A few international agencies have ongoing programs for RECP

Some banks have specific products for EE
- Specific products for other RECP initiatives not available yet
  - Many bank interested in such products – may be available in the near future

Many government schemes also support some elements of RECP

RECP implementation ecosystem is available in the country
CII would be glad to support MSMEs in their RECP journey
THANK YOU!

For any queries related to energy efficiency log in @

CII Energy Efficiency Helpdesk

http://energy.greenbusinesscentre.com/sup/

For latest updates on energy efficiency please visit

http://www.energy.greenbusinesscentre.com/
QUESTION & ANSWER SESSION I
Which of the following are examples of RECP practices?

Poll Results (single answer required):

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better Process Control</td>
<td>9%</td>
</tr>
<tr>
<td>Technology Change</td>
<td>9%</td>
</tr>
<tr>
<td>Onsite Reuse and Recycling</td>
<td>5%</td>
</tr>
<tr>
<td>All of the Above</td>
<td>77%</td>
</tr>
</tbody>
</table>
PART II: OPERATIONALIZING RECP
RESOURCE EFFICIENCY: EXPERIENCE SHARING OF AN MSME

Kathiresan Arunachalam, Owner, Syndicate Impex
● Video Clip 1: https://www.youtube.com/watch?v=Wk5-rZr2O5Q&t=78s
To produce garments with least environmental impact and create awareness across boundaries on sustainable fashion.

To evolve as a sustainable textile solutions company by adopting closed loop manufacturing with Mission ZERO program; creating ZERO landfill with our products.

www.ecohike.in
Ecohike is brought to you by:

Syndicate Impex
Garment Manufactures & Exporters

- First generation entrepreneurs
- India’s first GreenCo certified green garment facility
- Production capacity: 3 Lakh T-shirts per month
- Adherence to leading green standards:
Statistics:

- Number of garments sold in INDIA in 2019 - 300 cr.
- Garments made of polyester >50%.
- Sales expected to increase by 11.6% YoY.
- Less than 1% of the garments recycled after life cycle.
- 99% of Old / damaged garments go to landfill.
- Polyester garments take about 800 years to decompose, much like PET.
- Recycling PET to polyester, the life cycle is extended by another 3-5 yrs and eventually the garments still end up in landfills.
- Currently we have almost 100 garments landfill / capita in India which will never be recycled.
Ecohike manufacturing video: https://youtu.be/aFxc586lPPU
Mission for MiZo(Mission Zero):

We, as a brand not only manufacture and promote sustainable t-shirts to brands, but also collect the old t-shirts after their lifecycle with discounts / minimum buy back price from the customers and recycle them back to a product of same quality; with complete traceability data creating Zero Landfill with our products.
Our contributions to UN-SDGs:

We are proud to say that through our unique and sustainable way of manufacturing, our products contribute directly and indirectly to the following Sustainable Development Goals (SDGs) defined by UNDP.
What is Ecohike tee:

It takes about 2,600 litres of water to make one cotton T-shirt. The water consumption starts from the cotton farms, continues to the dyeing and post-production washing in the factories. Ecohike T-shirts need a fraction of that water as they are entirely made of recycled PET plastic bottles and are non-dyed!

- 12 PET Bottles Recycled
- No Dyeing or Bleaching done
- 2600 Liters of Water Saved
- No Pesticides & Fertilizers Used
- 70% less CO2 Emmission
- 250 grams of Landfill Saved

*The above saving comparison based on normal cotton M size t-shirt*
Performance Features of an Ecohike tee:

- Odour Free
- Fast Drying
- Premium Quality
- Anti-Microbial Finish
- Long Lasting Performance
- Easy Care
- Moisture Wicking
- Superior Comfort
- Soft & Skin Friendly

www.ecohike.in
Sustainable labeling and Packing:

**Label:**
The product label is another sustainable innovation, where the user rather than discarding it, can plant the tag and grow an organic plant.

**Packaging:**
As part of our zero-poly-bag initiative, each t-shirt is roll packed in a re-purposed draw-string pouch. This can also be re-used beyond the intended purpose.
Problem Statement....

- Growing PET bottle waste in India
- Need for effective management of textile waste in India
- Need for Marine conservation - life decreasing due to PET bottle / Textile waste
- Impact on water Pollution due to textile dying in India
- Growing numbers of overcapacity Textile landfills
Product Variations:

POLO COLLAR T-SHIRT
ROUND NECK T-SHIRT
SIZE RANGE
XS-3XL

REUSABLE NAPKINS

www.ecohike.in
Life Cycle Assessment (ENVIRONMENTAL SAVING):

- 14,600 Kg of CO2 / Yr.
- 438,000 Ltrs of water / Yr.
- 6,000 Kg of landfill / Yr.
Awards & Accolades:

- One of the 10 finalists among 900 contestants for UNO – SEED AWARD 2019, Germany.
- MoU with Indian Railways for Circular Economy Program.
- First company Listed in GeM (Government e-Market) portal under Clean tech category.
- First garment company in India to work on CLOSED LOOP program to ensure ZERO LANDFILL from product.
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● Video Clip 2: https://www.youtube.com/watch?v=aFxc586lPPU
CLEAN PRODUCTION: RENEWABLE ENERGY

Ashok K Thanikonda, Manager, Energy Programme, WRI India
Renewable Energy for MSMEs

Ashok Thanikonda

WRI INDIA

10/03/2021
Why Renewable Energy (RE)?

FIGURE B-1 | BENCHMARK COST OF WIND AND SOLAR POWER VERSUS ELECTRICITY TARIFFS IN MAJOR INDIAN STATES

Note: The figures for the cost of power are sourced from the latest available tariff orders of the respective states. The solar power costs correspond to grid-connected, MW-scale projects—and usually exclude Accelerated Depreciation (AD) (a Government-of-India-approved methodology in which RE projects depreciate at a higher rate in the initial years of the project, a concept useful for minimizing taxable income). The wind and solar costs are at the bus bars of the respective plants; additional grid usage charges and surcharges will apply. Even considering these, C&I consumers gain Rs. 1-2 in comparison with the utility tariff. Maharashtra’s wind tariff is applicable for Zone 4 as classified by Maharashtra Energy Development Agency (MEDA). High tension (HT) tariffs usually correspond to 33 kilovolts (KV).
Solar PV for MSMEs!

• Cheaper
• Modular
• On-site
• Easy maintenance
• More predictable and easier to store
Barriers for MSMEs to access RE

- **Low awareness** about techno-commercial aspects
- Operating out of leased premises, and utility meter being on landlord’s name
- No tailor-made net/gross metering, and subsidy schemes
- 65 million MSMEs, representing 40% of all the MSMEs in 128 countries, are credit constrained. This is a barrier to sign Power Purchase Agreements (PPAs) with Independent Power Producers (IPPs)
- Cannot invest in on-site renewable energy (solar) plants
- Risk of delaying or defaulting on payments to IPPs is called counterparty credit risk, and in case of India adds as much as 1.07% of additional risk premium to the cost of debt for RE projects.
Models to scale up clean energy in MSMEs
Scale up technical assistance for MSMEs interested in capex model for solar

WRRI successfully demonstrated this model with 160 kWp of rooftop solar in two MSME clusters in Naroda and Aurangabad. Another 441 kWp is underway.
Drive policy changes conducive for rooftop solar aggregation in SEZs

- Remove requirement of deemed distribution license for rooftop solar aggregation in SEZs
- Support utility owned rooftop solar projects in MSME clusters
Drive policy changes conducive for rooftop solar aggregation in SEZs
Mobilize corporate ambition to create risk mitigation funds for their supply chains

- Standardize the business model by capitalizing on various corporate sustainability initiatives (GPMDG, RE100, REScale, REDE etc.)
- Contribute to the payment guarantee fund
Devise sector-specific incentives, policies, and pilots

- Electroplating clusters require DC power. Such clusters may be solarized without inverters and net-metering.
- Food-processing clusters need solar dryers.
Which of these indicators can be used by an enterprise to track RECP progress?

Poll Results (single answer required):

- **Product output per unit of energy used**: 0%
- **Product output per unit of material used**: 5%
- **Greenhouse gas emissions per unit output**: 5%
- **Waste generation per unit output**: 0%
- **All of the Above**: 89%
CLOSING REMARKS

Atik Sheikh, *Counsellor, CII-GBC*
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