

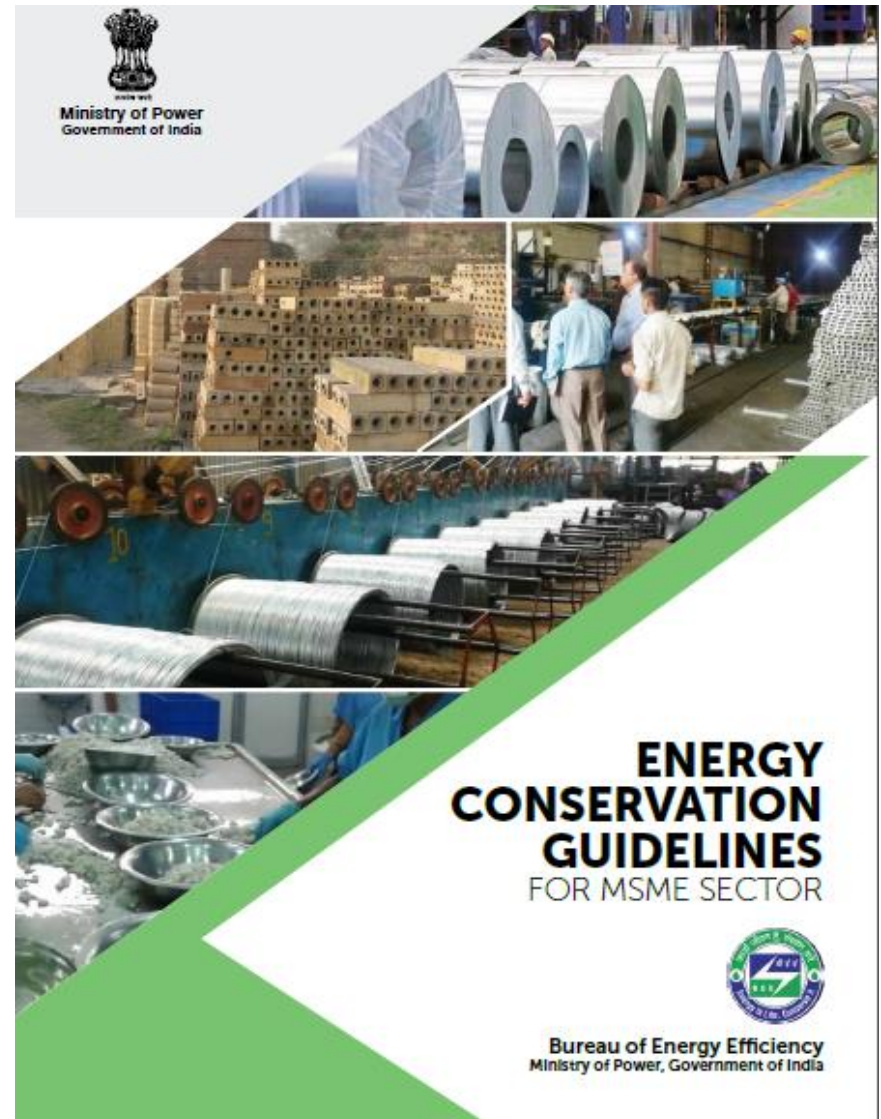
# Energy Conservation Guidelines for MSMEs

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# EC Guidelines

A comprehensive document for the industry with equipment-specific standards to promote energy conservation and improve energy performance in individual industrial units



# Objectives of EC Guidelines

Guide the MSMEs to manage energy consumption efficiently by standardizing energy performance values of various energy intensive equipment and systems deployed in process and utilities.

# Approach to EC Guidelines for MSMEs

- ❑ Data collation, grouping, sanitation and statistical analysis
  - Primary sources – Industries, industry associations
  - Secondary sources – Documents from BEE-SME program, GEF-WB programs, GEF-UNIDO programs, SAMEEEKSHA platform, other literature review, discussions with technical experts
- ❑ Inputs from BEE team and other sectoral/ technology experts
- ❑ Field visits to bridge data and information gaps, and obtain feedback
- ❑ Stakeholder consultations to validation of data and finalization of EC Guidelines for MSME sector

# Interactions in clusters



# Workshop for stakeholder inputs



**MSME-DI, Agra  
PPDC, Agra**



**MSME-DI, Chennai**

# Launch of EC Guidelines for MSMEs

EC Guidelines for MSMEs launched by Shri Nitin Gadkari, Hon'ble Minister of MSMEs and Shri R.K. Singh, Hon'ble Minister of State (IC), Power and New & Renewable Energy, Govt. of India on 23<sup>rd</sup> September 2019.



# Industries covered under MSME sector

S No	Industry Sector	Major process equipment
1	Foundry industry	Cupola, induction furnace
2	Forging industry	Oil/gas fired furnace , induction furnace
3	Sponge iron industry	Rotary kiln
4	Aluminium industry	Bulk / pit furnace, electrical furnace
5	Brass industry	Pit furnace, electrical furnace
6	Machine tools industry	Induction furnace
7	Galvanizing and wire drawing industry	Fuel fired furnace, induction heating furnace
8	Refractory industry	Kilns



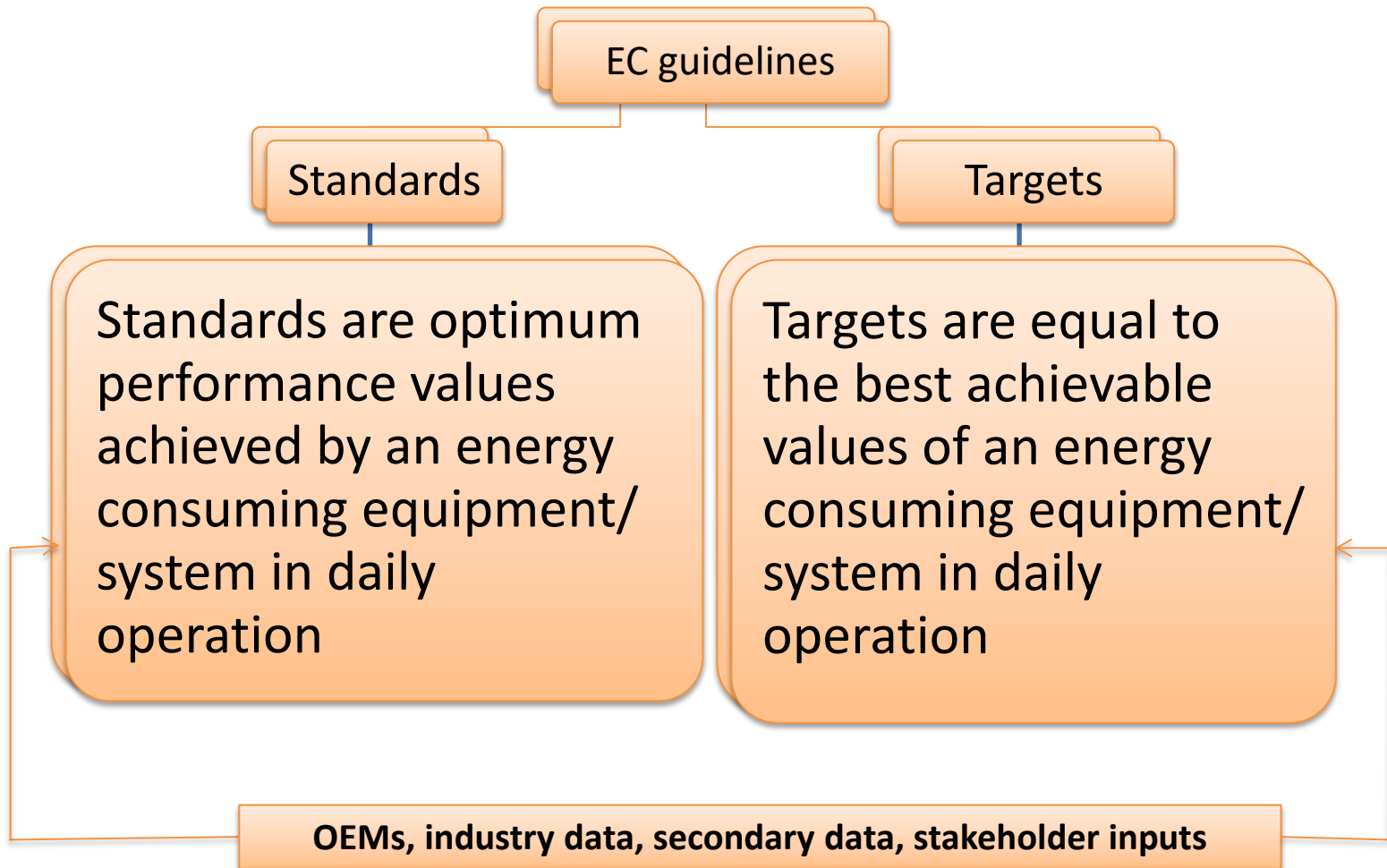
# Industries covered under MSME sector - *contd...*

SI No	Industry Sector	Major process equipment
9	Ceramic industry	Firing kilns
10	Brick industry	Firing kilns
11	Clay tile industry	Firing kilns
12	Glass industry	Melting furnace, annealing lehr, reheating furnace
13	Chemicals and dyes industry	Boilers, thermic fluid heaters, hot air generators
14	Textile industry	Boilers, thermic fluid heaters
15	Paper industry	Boilers
16	Limestone industry	Kilns

# Industries covered under MSME sector - *contd...*

SI No	Industry Sector	Major process equipment
17	Coir industry	Hot water generator
18	Jaggery industry	Furnace
19	Oil Mill	Mill
20	Tea industry	Dryer
21	Rice mill	Boiler
22	Ice making industry	Refrigeration system
23	Seafood industry	Refrigeration system
24	Dairy industry	Boiler, refrigeration system
25	Food processing industry	Boilers, thermic fluid heater, refrigeration system

# Standards and Targets



# Structure of EC Guidelines for MSME sector

## ❑ Section on common equipment

- Air compressor and compressed air network, pump and pumping system, fans and blowers, cooling tower, electric motor, transformer, lighting system, power generation system, harmonics

## ❑ Section on energy intensive process equipment

- Primarily focusing on fuel fired systems
- Data collected from various reports and further consultations with stakeholders and field visits
- Total close to 1200 data points
- Validated through field visits with inputs from industries and industry associations

# Content of EC guidelines for an industrial sector

- ✓ Background
- ✓ Generic production process
- ✓ Energy intensive process equipment
  - Best operating practices and operational aspects with focus on energy savings
  - Common monitorable parameters
  - Performance assessment
  - Typical performance indicators
  - Efficient resource utilization

# Best operating practices (BOPs)

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- ✓ Standard component (4 sub sections)
  - (1) Management and control
  - (2) Measurement and records
  - (3) Maintenance and inspection
  - (4) Necessary measures when installing new facilities
- ✓ Target component

# BOPs...contd.

Component	Focus
Management and control	<ul style="list-style-type: none"><li>❑ Guidelines for managing and controlling of common monitorable parameters through adoption of best operating practices (BOP) – <u>covering both common equipment and process equipment</u><ul style="list-style-type: none"><li>○ Air ratio, surface temperature, flue gas temperature, motor efficiency, lighting system</li><li>○ Load sharing during part load conditions in a multi-facility operation (boiler, air compressor, air conditioning systems)</li></ul></li></ul>
Measurement and recording	<ul style="list-style-type: none"><li>❑ Focuses on monitorable and verifiable parameters including the frequency of measurement and recording<ul style="list-style-type: none"><li>○ Fuel consumption, temperature of steam, temperature of flue gases, analysis of flue gas, inlet &amp; outlet temperatures of heating and cooling media, supply and return temperatures of cooling water</li></ul></li></ul>
Maintenance and inspection	<ul style="list-style-type: none"><li>❑ Areas and frequency of maintenance<ul style="list-style-type: none"><li>○ Cleaning of filters in air compressor</li><li>○ Checking condition of insulation and refractory lining</li><li>○ Maintenance of heat transfer surfaces (boiler, TFH, HAG, WHR)</li></ul></li><li>❑ Frequency of calibration of measuring instruments<ul style="list-style-type: none"><li>○ Schedule calibration of instruments</li></ul></li></ul>

# BOPs...contd.

Component	Focus
Measures when installing new facilities	<ul style="list-style-type: none"><li>❑ Select high end technologies/ equipment. A few examples are:<ul style="list-style-type: none"><li>○ Insulated gate bipolar transistor (IGBT) in induction heating</li><li>○ Use of tunnel kiln technology for refractory firing</li><li>○ Zig-zag firing technology for brick industry</li><li>○ Withering system with built-in PLC for tea industry</li><li>○ Use of IE3 motors for various motive loads</li><li>○ Built-in automation system in burners (air-fuel ratio controller)</li></ul></li></ul>
Target	<ul style="list-style-type: none"><li>❑ Provides measurable bench-marked values to achieve best performance of the system or equipment. For example<ul style="list-style-type: none"><li>○ Maintain compressed air leakage in the range 3% to 10%.</li><li>○ Use IE3 motors</li><li>○ Preheat furnace oil to about 100 OC</li><li>○ Maintain external surface temperature of furnace : 70-120 OC</li><li>○ SEC in iron melting through induction melting is 550 to 650 kWh/tonne; 8%-10% coke consumption in cupola furnace</li><li>○ Restrict flue gas temperature:<ul style="list-style-type: none"><li>➤ 150 – 250 °C (induced draft)</li><li>➤ 250 – 300 °C (natural draft)</li></ul></li></ul></li></ul>



# Common monitorable parameters (CMPs) : Brick manufacturing industry

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Add table 6.57

# CMPs : Air ratio in boilers

Parameter	Boiler capacity (tph)	Load factor (%)	Air ratio			
			Coal	Biomass fuel	Liquid fuel	Gas fuel
Standard	Upto 10	50–100	1.35-1.40	1.49-1.56	1.26-1.33	1.15-1.18
Target	Upto 10	50–100	1.32-1.38	1.32-1.39	1.18-1.24	1.12-1.15

# Benefits of EC guidelines for industries

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- ❑ Helps in planning energy conservation activities
- ❑ Provides a set of instructions i.e. best operating practices for various equipment
- ❑ Provides reference values to control CMPs for efficient operation to achieve optimum energy performance
- ❑ Provides direction for energy efficiency during retrofitting or while installing new equipment
- ❑ Provides direction to achieve energy efficiency targets

# Thank You



ENERGY



AGRICULTURE



ENVIRONMENT



HABITAT



RESOURCE  
SECURITY



CLIMATE



HEALTH  
& NUTRITION