

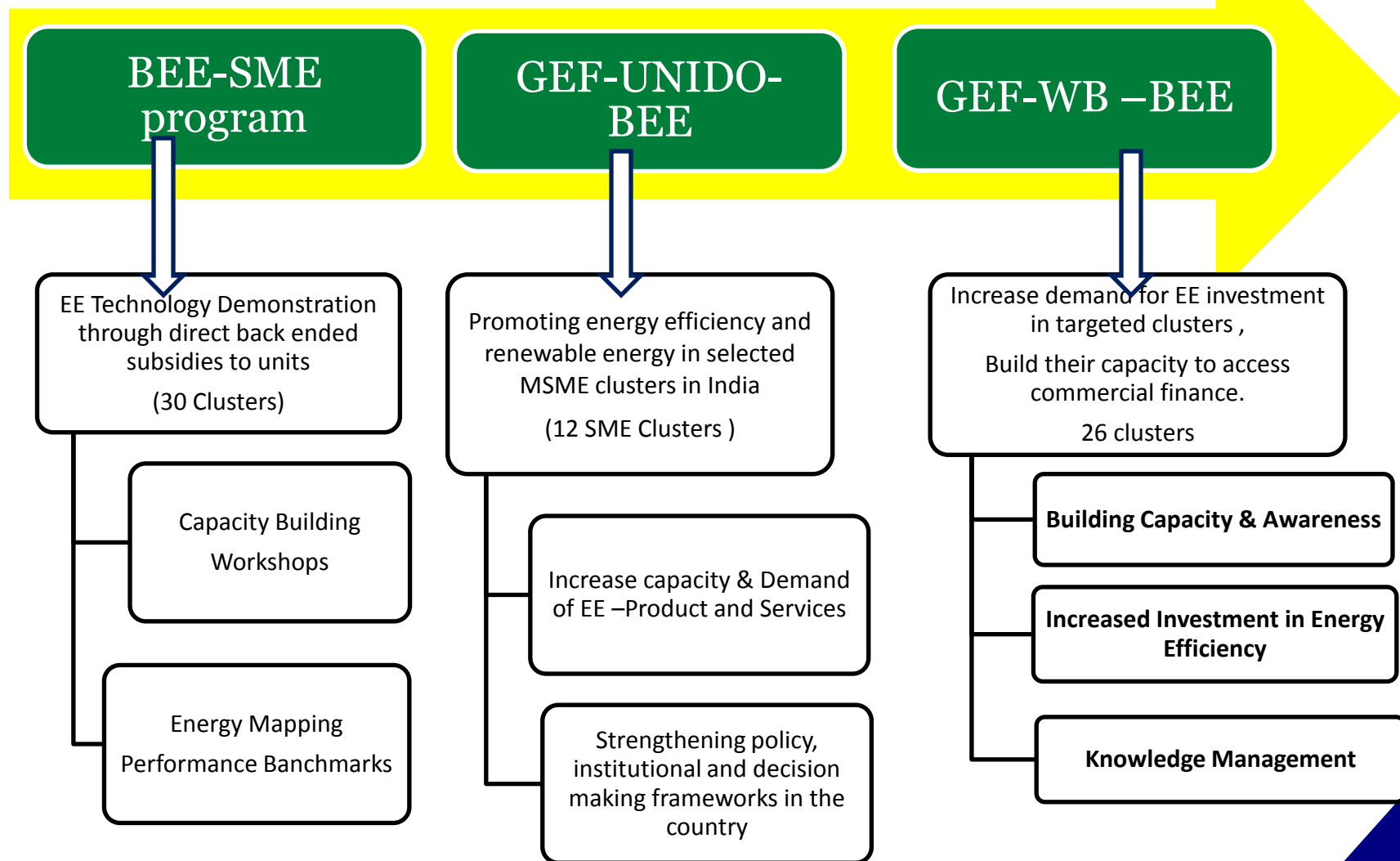


Energy Efficiency Programs for MSME Clusters

15th SAMEEEKSHA Meeting
Milind Deore, Director
Bureau of Energy Efficiency (BEE)



BEE's initiatives in MSME sector





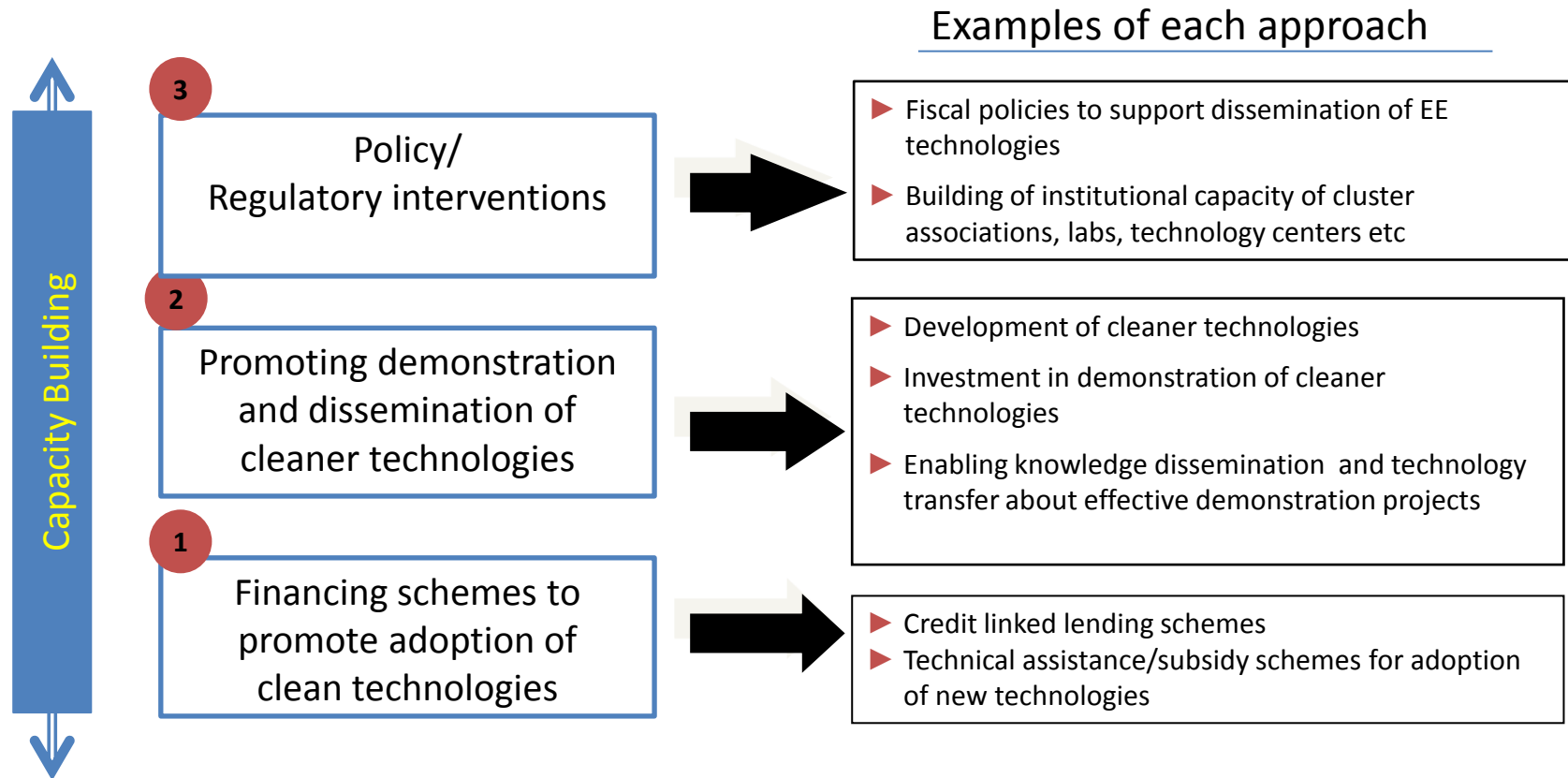
Barriers towards adoption of EE in MSMEs



- **Lack of capacities among MSME unit owners and financial institutions (FIs)**
 - MSME unit owners lack technical expertise on energy efficient technologies
 - Financial Institutions and private investors perceive energy efficiency investments as “**high risk**” investments
- **Less priority of MSME unit owners towards energy efficiency**
 - Less awareness among the MSME unit owners on energy efficiency measures and technologies
 - Lack of knowledge on potential benefits of energy efficiency among unit owners
 - Lack of local EE experts to guide the unit owners in undertaking projects
- **Lack of institutional capacity towards fulfilment of documentation requirements for the program.**



Different approaches towards EE in MSMEs





BEE - SME Program



National programme for SMEs



- BEE's National Programme for SMEs was the first programme of energy efficiency interventions in SMEs at a wide scale.
- The programme was launched in 25 SME clusters from 12 different industrial sectors.
- The specific objective of the programme was to accelerate the adoption of EE technologies and practices through knowledge sharing, capacity building and development of innovative financing mechanisms. The programme had following four major activity components:
 - ✓ Energy Use and Technology Analysis
 - ✓ Capacity Building,
 - ✓ Implementation of EE measures, and
 - ✓ Facilitation of Innovative Financing Mechanisms
- Major achievements
 - ✓ Development of reliable data for the SME sector which wasn't available till then.
 - ✓ More than 1,250 detailed Energy Audits conducted in SMEs established an energy efficiency potential of 20 to 25 % potential reduction
- The financial worth of energy conservation potential is estimated as **Rs 1,400 crores** which in turn, shall generate investment in EE projects to the tune of **3,400 crores in these 25 clusters.**



BEE SME Program



Demonstration Projects

- **Ludhiana: Forging Sector (Auto Parts Clusters)**
- **Indore :Food Sector (Dal , Wheat , Poha clusters)**
- **Pali : Textile Cluster (Dying and Printing)**
- **Kochi : Sea Food Cluster**
- **Varanasi : Brick Cluster (INP , Zig-Zag Kilns)**
- Incentive of 50% cost of the technology or a ceiling amount of Rs10 Lakh.
- Partnering with the MSME-DI s of respective clusters.

Capacity Building

- Workshops for unit owners on best practices and technologies.
- Appointment of Implementation Agency : Carry out pre-post energy audits and assist units with implementation .
- Appointment of Sector Expert
- Empanelment for Local service providers .
- Seek assistance of multi and bilateral programs in sharing experiences

Pan India Energy Benchmarking

- Identify the Energy Intensive clusters in the country
- Benchmark the performance of Energy Intensive clusters in the country .
- Prepare a document on policy /Technology interventions for enhancing EE in these clusters .



Ludhiana - Forging Cluster



- More than 1500 Small and Medium Enterprise (SME) forging units operating in the various industrial pockets in and around Ludhiana, manufacturing products suitable for automotive, industrial and agricultural sector.
- Two technologies identified to enhance energy efficiency of forging units in the cluster – Induction Heating Furnace & Special Purpose Machines
- Baseline audits were completed in all the 20 forging units
- Seven units implemented the suggested technologies – realized energy savings 20 to 40%
- Conducted 5 awareness workshops each in region of Moga, Phagwara, Jalandhar and Ludhiana.





Glimpses of technologies Implemented



Induction heater installed at
C-Forge (India)



Induction heater installed at
Global exports



SPM – turning installed at
NN Products



Induction heater installed at
Soga toka Industries



SPM – turning installed at
Bharat International



SPM – turning installed at
Khalon International



SPM – turning installed at
Mehram Industries



SPM – drilling installed at
Bharat International



Dissemination workshops





Indore – Food Cluster



- ➔ More than 200 (Dal + Poha) processing units in Indore and Ujjain industrial area
- ➔ Baseline audits were completed in 14 units
- ➔ **Identified Technologies – (average energy saving potential is 25 to 30%)**
 - Replacing old and inefficient motors with EE motors
 - Installing Oxygen Sensor, fuel control and damper control
 - Installation of VFDs
 - Replacement of existing compressor with energy efficient compressor system
 - Substitution of fuel - saw dust based to gas based burner
- Seven units (6 Poha and 1 Dal Unit) have already implemented the suggested technologies – realized energy savings 15 to 30%
- Post implementation audit completed in 7 units.



Glimpses of technologies Implemented



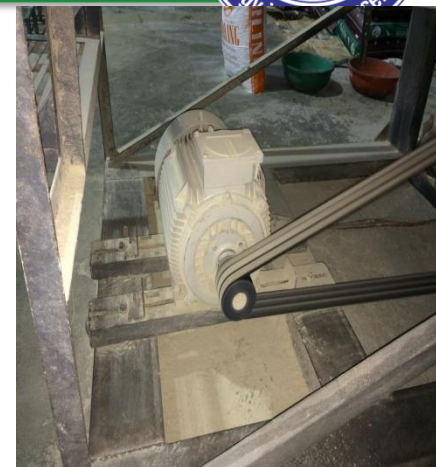
Pakka Counter motor at
Nanak Overseas



Emery Roll Motors at
Nanak Overseas



Roaster Motor at
J P Hansraj



Flacker Motor at
Hira Industries



Poha Machine motor at
Dharmesh Industries



Dhan Elevator motor at
Dharmesh Industries



Flacker motor at Bindal
Process



Poha Machine motor at
Abhishek Industries



Varanasi – Brick Cluster



- About 300 brick manufacturing units in the cluster
- Zig-zag technology is one of the technology options identified to enhance energy efficiency of brick making units in the cluster
- Local industry association (Int Nirmata Parishad) and individual brick kiln entrepreneurs
- TERI, New Delhi is engaged to carry out various planned activities in the cluster
- ***Baseline audits were completed in all the brick kiln units***
- ***Two of the units have already converted their existing kilns into zig-zag design***



Pali – Textile Cluster



- ➔ More than 350 Textile Dyeing and Finishing units with production capacity of 5.5 million meter per day
- ➔ Local industrial bodies
 - ▶ District Industrial Center, Pali
 - ▶ Rajasthan Textile and Hand Processors Association (RTHPA), Pali
- ➔ Post implementation audit completed in 5 units of textile.
- ➔ **Identified Technologies**
 - Economizer in Thermic fluid heater,
 - Air-preheater (APH) in steam boiler,
 - Waste heat recovery (WHR) with kier boiling unit,
 - Temperature Monitoring & Control in Jigger Machines Advanced Float Trap systems
 - Condensate Recovery System (CRS) in Jet Dyeing Machine,
 - Oxygen based automation and control system in boiler,
 - Installation of VFD for blowers of thermopac & boiler
 - New energy efficient boiler



Kochi – Sea Food Cluster



- More than 65 units in Kochi sea food cluster
- Baseline audits were completed in 8 units
- **Identified Technologies – (average energy saving potential is 15 to 20%)**
 - Replacement of reciprocating compressor with Screw compressor with VFD
 - Replacement of water cooled condenser with Evaporative condenser
 - Installation of variable frequency drive for condenser water pumps
 - Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.
 - Automation of refrigeration plant by using PLC controller



Key Achievements



- **Unleashing the Large Potential in SME sector**
 - 63 units out of the 100 industry units agreed to implement the EE measures and adopt energy efficiency technologies.
 - Post implementation audits at **7 units of Forging Cluster** in Ludhiana, **7 units of Food Cluster** in Indore, **5 units of Pali Textile Cluster** and **2 unit of Brick Manufacturing cluster** in Varanasi.
 - Post implementation audit of these 21 verified units has yielded **Energy Savings of about 569 toe per annum**, **Cost Savings of about INR 1.5 crore per annum** and **GHG reductions of about 2426 tCO₂ per annum**.
- **Increased Awareness among the unit owners on the new EE technology**
 - Five Workshops for replication of technologies at Forging Cluster.
 - Five Workshops for replication to technologies is going to be held at Pali Textile cluster during 9th-11th January, 2018.
- **Identification of Local Service Providers and Suppliers**
 - **70 local service providers** have been identified for offering services and supplies of various identifies EE technologies.



GEF-BEE-UNIDO Program



About the Project



- **Title:** Promoting Energy Efficiency and Renewable Energy In selected MSME Clusters In India
- **Objective:** Introduce energy efficiency and enhance use of renewable energy technologies in process applications in the 12 selected energy-intensive MSME clusters in India
- **Project Partners:** GEF, UNIDO, BEE, MOMSME and MNRE

Sectors & Clusters: **Foundry**

Coimbatore
Belgaum
Indore

Brass

Jamnagar

Ceramic

Khurja
Thangadh
Morbi*

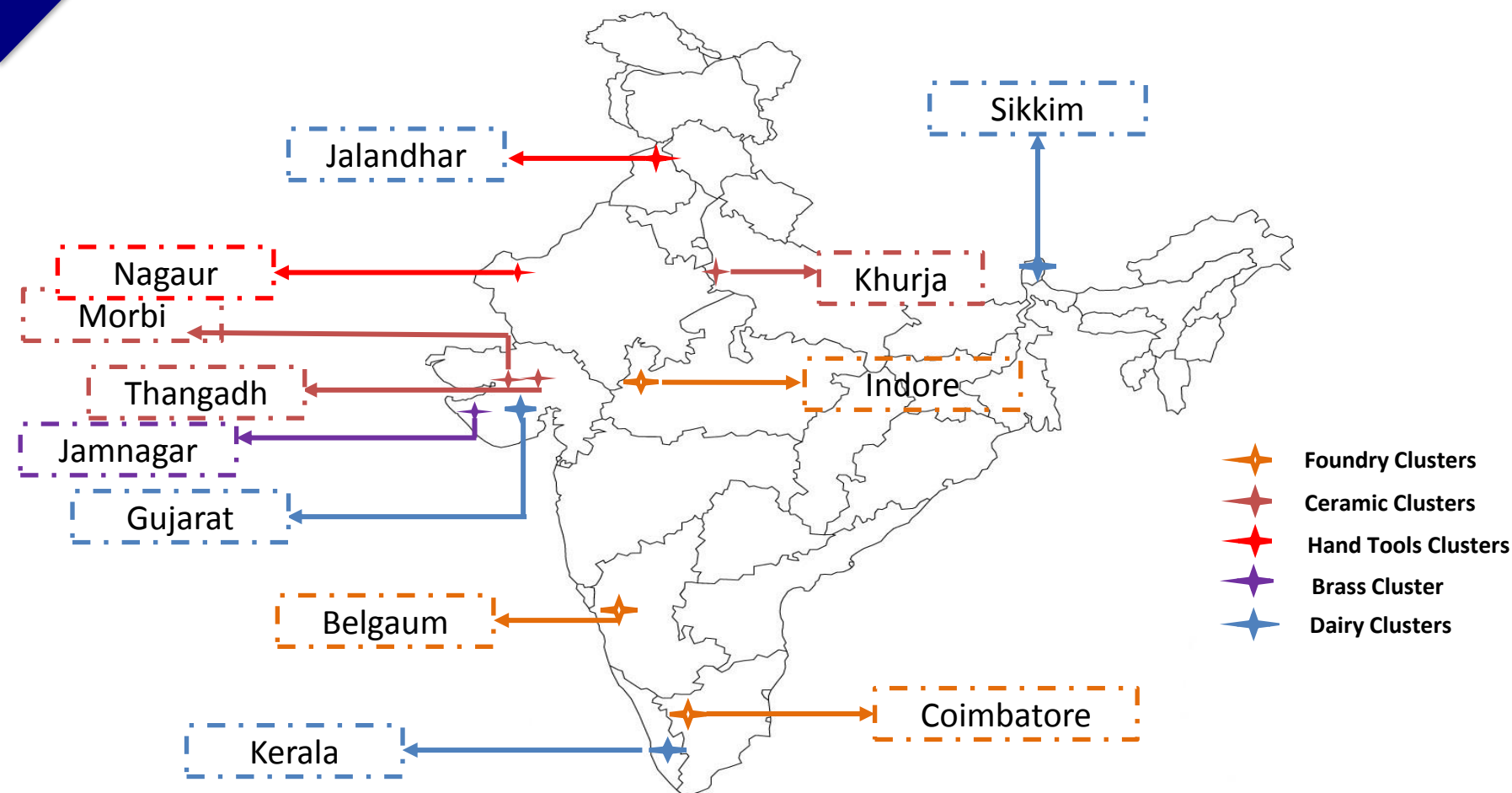
Hand Tools

Nagaur
Jalandhar

Dairy

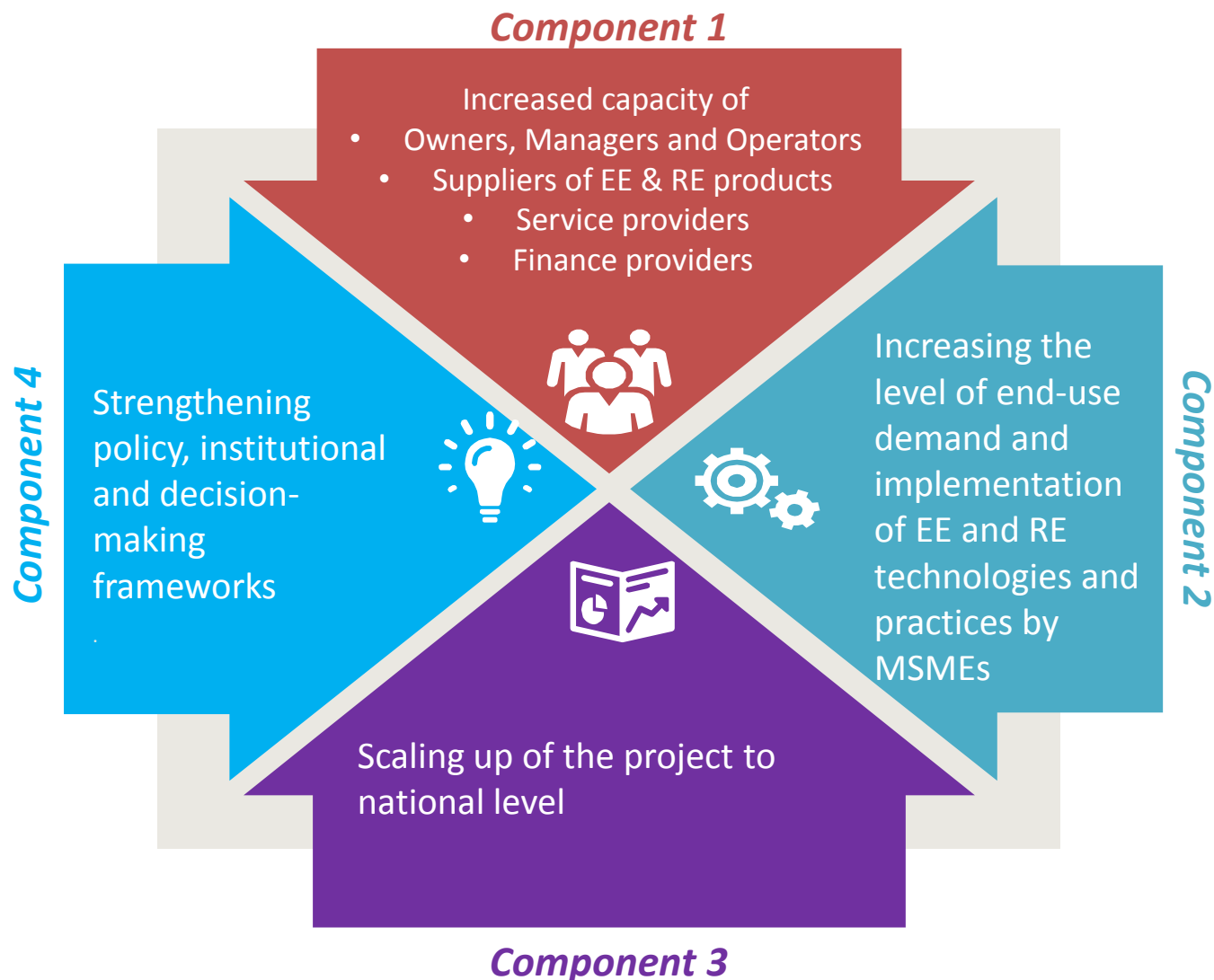
Gujarat
Sikkim*
Kerala*

* Came onboard recently





Key Components





Achievements



Participants attended workshops

2383



Pilot Projects Sanctioned

27



MSME Units Benefited

305



EE & RE Measures implemented

373



Workshops Organized

84



Energy Savings Achieved
(TOE/Year)

8162



Case Studies Prepared

250



Monetary Savings Achieved
(Lakhs/year)

3734



DPRs Developed

135



Carbon Emissions Avoided
(Tonnes/year)

43845



Pilot Projects



Solar Thermal Steam Generation at Amulfed Dairy



Biomass Gasifier for Sand Drying at Belgaum Foundry Cluster



Cloud Based Data Analytics for Foundries





Small Scale Implementation



Cluster Name	Small Scale Projects	Energy Savings (TOE/year)	CO ₂ Reduction (Tonnes/year)	Monetary Savings (Lakh ₹ /year)	Investment (Lakh ₹/year)
Jalandhar	58	247	1892	179	119
Coimbatore	39	111	1079	130	79
Nagaur	39	19	190	21	5
Jamnagar	38	113	667	137	270
Khurja	5	357	1271	54	14
Indore	19	63	164	32	15
Gujarat	92	5565	29337	2428	3563
Belgaum	71	325	2417	212	260
Thangadh	7	798	5424	499	867
Morbi	5	564	1404	42	18
Total	373	8162	43845	3734	5210

109
technologies
have been
identified and
some of them
replicated
multiple times



Energy Management Centers



12 energy management centers are established and functioning successfully. Three more centers will be opened by August 2018



Energy Management Centre for foundries opened

SPECIAL CORRESPONDENT

Foundries that need support in energy management can now approach the energy management centre set up here under the UNIDO-BEE-GEF project.

B. P. Pandey, Director General of Bureau of Energy Efficiency (BEE), inaugurated the centre here on Friday at a function organised by COINDIA.

While COINDIA has provided space for the centre and will manage it too, the equipment were provided under the project.

Set up at a cost of ₹. 15 lakh, the foundry cluster members can hire equipment from the centre at a

lower cost, go in for energy audits, identify potential energy saving areas, get consultancy on best operating practices, and guidance on latest technologies.

According to a press release, the "Energy Efficiency and Renewable Energy in MSMEs" project was launched for the foundries here in 2013 and will go on for three more years.

About 60 units of COINDIA are covered under the project. The aim is to develop and promote a energy efficiency among micro, small and medium-scale units and enhance the use of renewable energy.

Workshops, trainings, energy audits, and capacity

building exercises are taken up. Detailed Project Reports are prepared for several energy-related issues.

Several innovative projects were taken up at the foundries. This included installing harmonics filters and going in for energy conservation in cupola furnace.

Three more demonstration projects are under consideration for future implementation in three of the 12 clusters where the project is being implemented in the country.

Mahendra Ramdass, president of COINDIA, said at the meeting that the project encourages MSMEs to go in for renewable energy.



LSP Training Programs



Trained around 1000 LSPs as well as unit owners through 38 capacity building workshops in 11 clusters. Six more workshop are scheduled in July and August 2018.

Thangadh



Gujarat Dairy



Jamnagar



Jalandhar



Sikkim



Nagaur



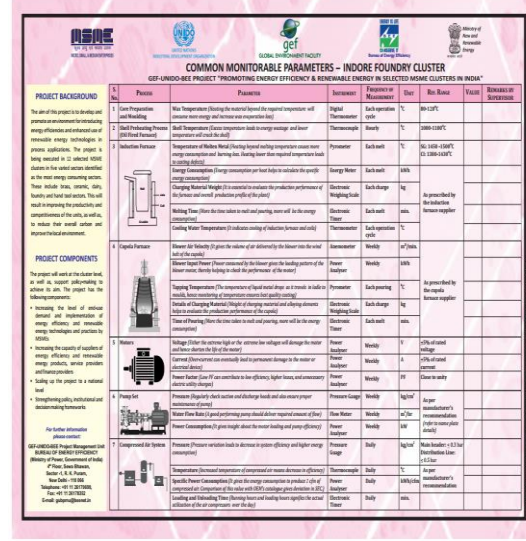
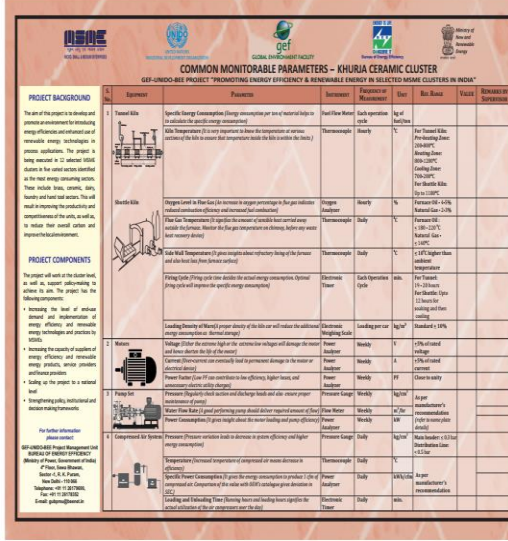
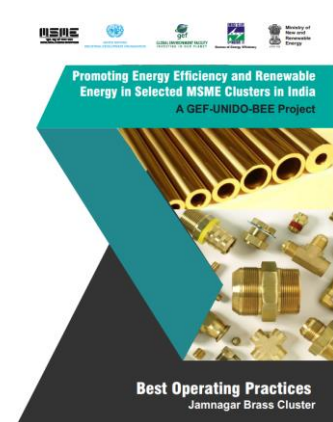
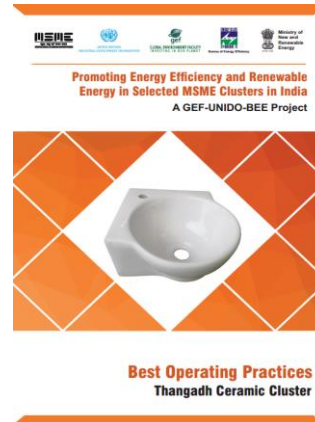
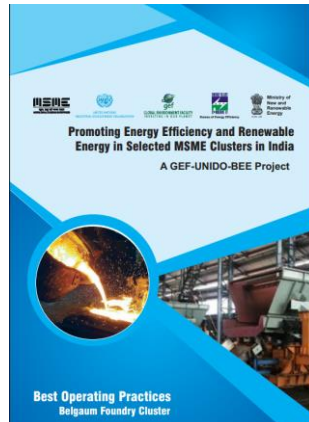
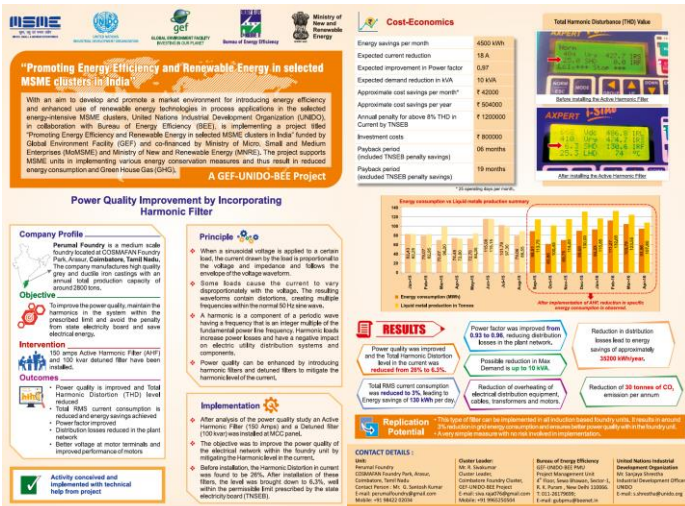
In-house Training Programs at AIP-NPC, Chennai



Seven in-house (3-days) residential training programs were completed on “Best Operating Procedures for Energy Management in MSMEs” and trained more than 120 entrepreneurs and cluster leaders. Six more workshops will be organized by November 2018



Knowledge Dissemination Materials





GEF-BEE-WB Program



Project Objectives:

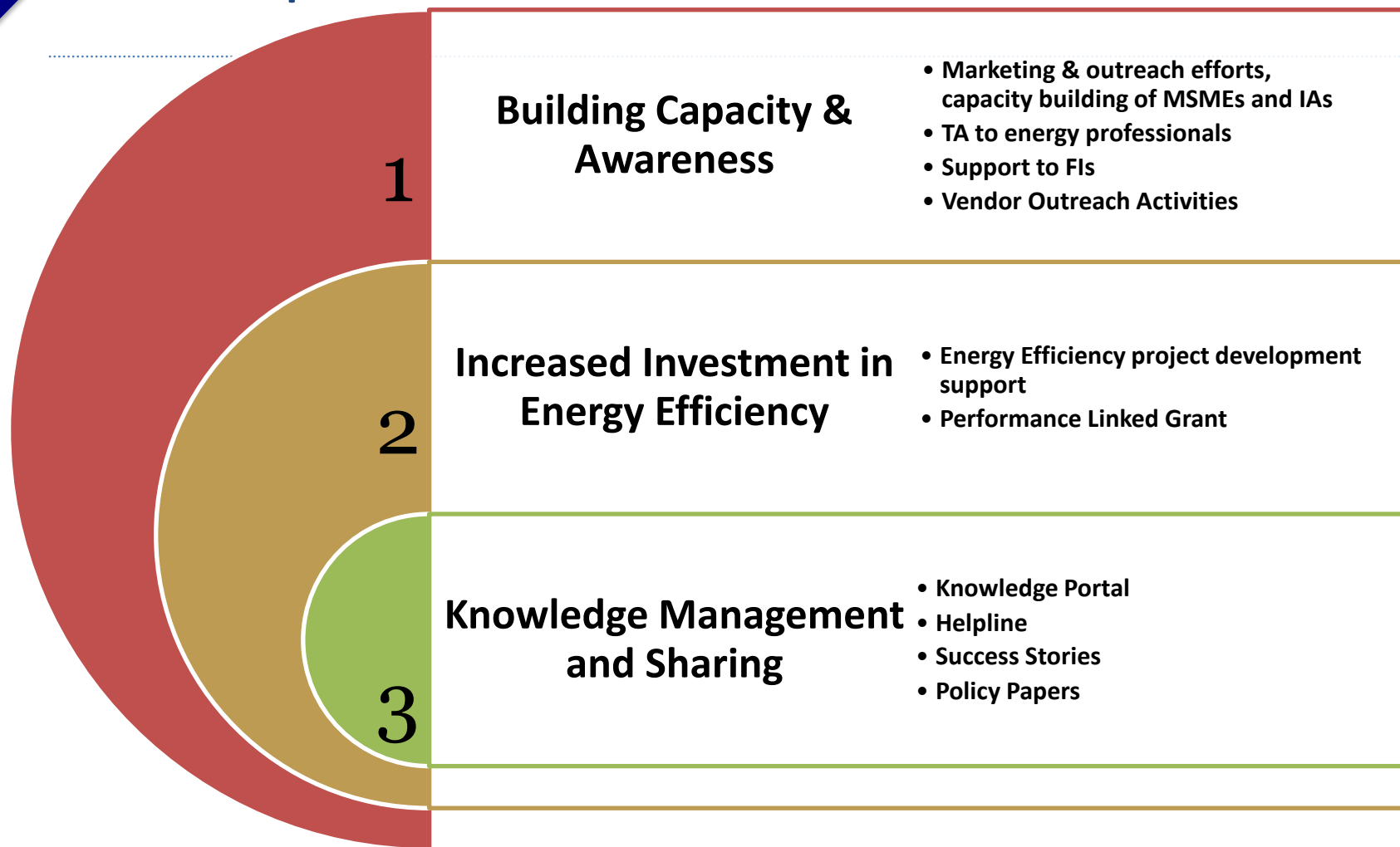
- ❖ Increase demand for energy efficiency investments in MSMEs
- ❖ Facilitate MSME capacity to access commercial finance
- ❖ Support GHG emission reduction
- ❖ Improve Energy Efficiency investments resulting in energy savings



Programme Design and Components



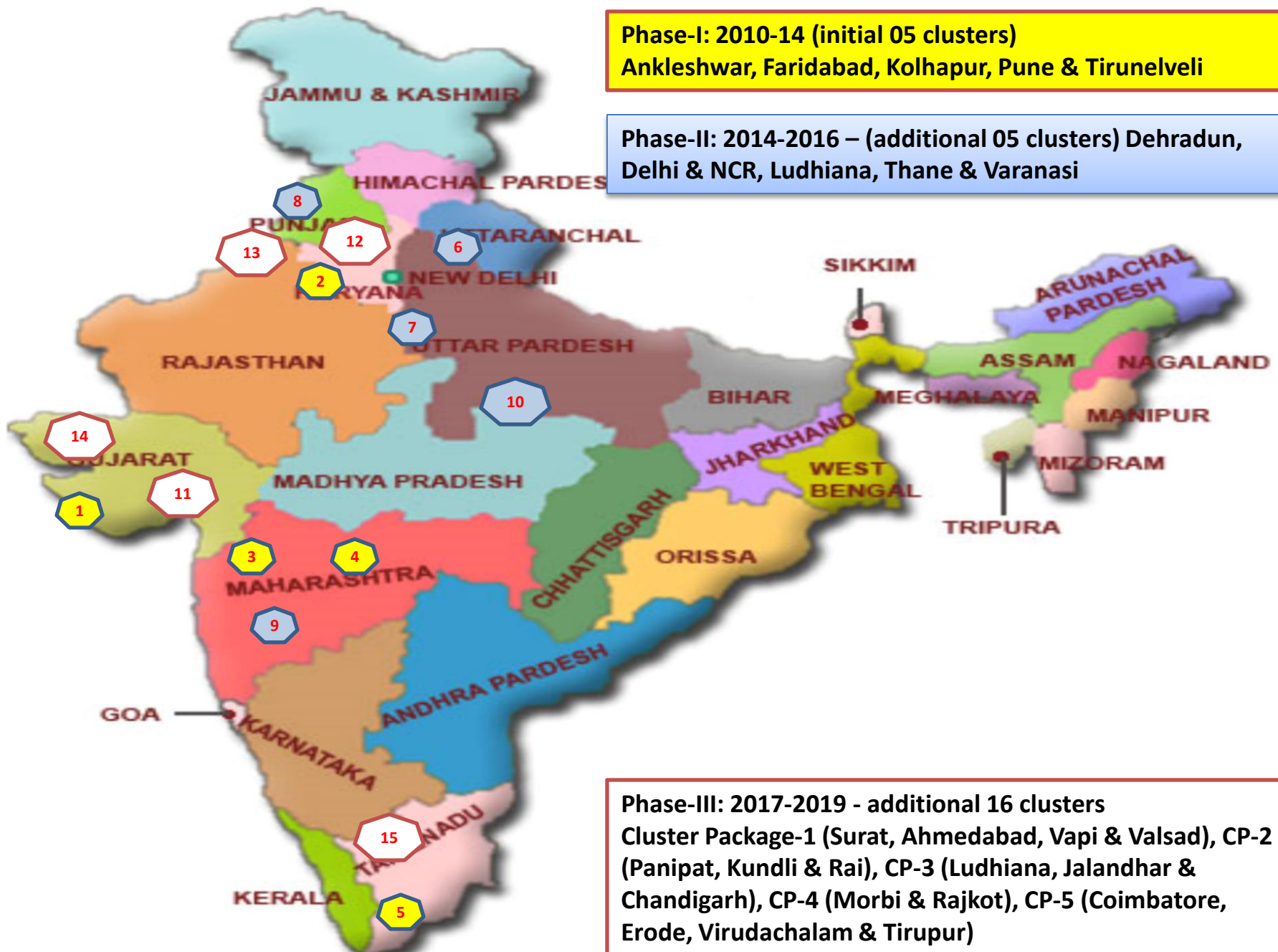
3 core components



Phase-I: 2010-14 (initial 05 clusters)

Ankleshwar, Faridabad, Kolhapur, Pune & Tirunelveli

Phase-II: 2014-2016 – (additional 05 clusters) Dehradun, Delhi & NCR, Ludhiana, Thane & Varanasi



Phase-III: 2017-2019 - additional 16 clusters

Cluster Package-1 (Surat, Ahmedabad, Vapi & Valsad), CP-2 (Panipat, Kundli & Rai), CP-3 (Ludhiana, Jalandhar & Chandigarh), CP-4 (Morbi & Rajkot), CP-5 (Coimbatore, Erode, Virudachalam & Tirupur)



Key Features of the Project



Implementation focused approach (Performance based Consultancy approach for achieving Project objectives – First of its kind)



Technology Demonstrations – Veneering (Forging), Rotary Vacuum Dryers (Dyes), Energy Monitoring Systems, WHR, Automation systems for boiler, Thermopac, Furnaces, etc.



Evolution of Intervention from EE to Resource Efficiency which includes **Lean Manufacturing and Cleaner Production** also



Innovative Financial Mechanisms – Performance linked Grant and Revolving Fund

Effective Utilization of Media for awareness & outreach activities.



Other Achievements



➤ Awareness & Capacity Building

- Capacity Building of Local IAs, Academic and Technical Institutions on EE Projects (**more than 4000 participants**)
- Technical Assistance to Energy Professionals (**750 Nos.**)
- Training Programs for Bankers/FI on EE Projects and Appraisals (**1120 nos. from 75 Govt., Private & Cooperative Banks / FIs / NBFCs**)

➤ Centre of Excellence for Motor (In Process)

- Improving the Rewinding Skills in Local Market
- Awareness Generation on VFD and EE motors
- Demonstration and Scalability of Technology

➤ **RVD Technology:** Demonstrated successfully at Ankleshwar Chemical Cluster and Providing support for implementation in Large Scale through Industry Associations (Initially 70 Nos.)



Knowledge Management and Sharing



- **Subject Expert Presentations**
 - ☐ EE & RE technologies for MSMEs
 - ☐ Environment & Social issues (E&S)
 - ☐ Benefit of M&V exercise
 - ☐ Appraisal of EE projects
- **Cluster Profiling**
- **IGDPR preparation Guideline**
- **Communication need & gap analysis,**
- **EE Posters,**
- **Market Research** report on EE
- **Brochures on**
 - ☐ E&S risk management
 - ☐ Cluster Specific information
 - ☐ General Project Information
- **Training Manuals on**
 - ☐ E&S risk management manual,
 - ☐ Sector Specific manuals – 05,
 - ☐ Utility based manual – 01
 - ☐ ICRM
 - ☐ Appraisal of EE Projects
- **Guide Book on**
 - ☐ Best practices Foundries in India through International renowned Foundry Expert
 - ☐ E&S risk management

Pilot activity to demonstrate the techno-economic feasibility of Zig-Zag natural draft kiln with biomass fuel have been initiated at M/s Periwal Brick Kiln, Abohar

Knowledge Portal (www.indiasavesenergy.in) – 41,160 viewers in 2 years

Discussions are being held with Energy Efficiency Services Limited (EESL) for undertaking the pilots to establish the potential energy savings from Implementing IE3 motors in various production processes.



Up-scaling of Project Activities



- ☐ Linking with Loan Event – Loan Extension Services
- ☐ Leveraging Green Climate Fund to upscale the project for 25 MSME clusters, worth US\$ 50 Mn.
- ☐ Developing EE Tool and interactive online vendor database based on credible & verified data developed under the project and SIDBI's EE LoCs for due diligence of vendors and technologies.
- ☐ Digitalization of Energy Audit Process
- ☐ Benchmarking of 2 sectors namely Forging and Ceramic
- ☐ EnMS as per ISO 50001
- ☐ M&V through online metering and cloud based data sourcing mechanism
- ☐ Cross-cluster learning
- ☐ Aligning with ZED and Green-co rating systems



Thank You

Please visit....

www.beeindia.gov.in

www.indiasavesenergy.in



Proposed Activities and Deliverables



Year				
Planned Activities along with Year wise Measureable Indicators		2017 – 2018	2018 – 2019	2019 – 2020
<ul style="list-style-type: none">▪ Promoting Energy Efficiency and Technology Upgradation in SMEs through ESCO route<ul style="list-style-type: none">• Engaging ESCO companies in 10 energy intensive clusters for identification of 20 EE technologies and implementation of demonstration projects• Procurement of Monitoring and Verification equipments for units implementing EE technologies• Conduct Monitoring and Verification (M&V) of demonstration projects		<ul style="list-style-type: none">✓ No. of ESCO companies selected for technology identification and implementation✓ No. of EE technologies identified in each cluster✓ No. of local service providers identified for the technology✓ Amount of fund utilized and it's percent share in total fund allocated	<ul style="list-style-type: none">✓ No. of demonstration projects in each cluster✓ No. of units with installation of M&V equipments✓ No. of units that have completed M&V of demonstrated technologies✓ Amount of fund utilized and it's percent share in total fund allocated	<ul style="list-style-type: none">✓ No. of demonstration projects in each cluster✓ No. of units with installation of M&V equipments✓ No. of units that have completed M&V of demonstrated technologies✓ Amount of fund utilized and it's percent share in total fund allocated
<ul style="list-style-type: none">▪ Technical Assistance and Capacity Building<ul style="list-style-type: none">• Conduction of awareness workshops and capacity building sessions for replication of identified technologies		<ul style="list-style-type: none">✓ Collaboration with technical institutions and other countries for identification of best practices and opportunities	<ul style="list-style-type: none">✓ No. of Dissemination workshops completed✓ Amount of fund utilized and it's percent share in total fund allocated	<ul style="list-style-type: none">✓ No. of Dissemination workshops completed✓ Amount of fund utilized and it's percent share in total fund allocated



Proposed Activities and Deliverables



Year			
Planned Activities along with Year wise Measureable Indicators	2017 – 2018	2018 – 2019	2019 – 2020
<ul style="list-style-type: none"> Constitution of technology specific forums <ul style="list-style-type: none"> Engaging a consultant through competitive bidding for design and setting up Technology Specific Forum Conducting 2 National level workshops to disseminate the purpose and objectives of the forum Convening monthly meetings 	<ul style="list-style-type: none"> ✓ Hiring of consultant to develop a business model for the technology forum ✓ National workshop on dissemination information about the forum ✓ Amount of fund utilized and it's percent share in total fund allocated 	<ul style="list-style-type: none"> ✓ National workshop on dissemination information about the forum ✓ No. of meetings convened by the forum ✓ Amount of fund utilized and it's percent share in total fund allocated 	<ul style="list-style-type: none"> ✓ No. of meetings convened by the forum ✓ Amount of fund utilized and it's percent share in total fund allocated
<ul style="list-style-type: none"> Promoting participation by financial institutions from project genesis <ul style="list-style-type: none"> Capacity Building of bankers and other FIs in energy intensive clusters Develop technology specific risk assessment studies in the 10 clusters 		<ul style="list-style-type: none"> ✓ No. of capacity building workshops conducted for bankers and FIs in clusters ✓ No. of risk studies completed in the cluster ✓ Amount of fund utilized and it's percent share in total fund allocated 	<ul style="list-style-type: none"> ✓ No. of capacity building workshops conducted for bankers and FIs in clusters ✓ No. of risk studies completed in the cluster ✓ Amount of fund utilized and it's percent share in total fund allocated



Proposed Activities and Deliverables



Year				
	Planned Activities along with Year wise Measureable Indicators	2017 – 2018	2018 – 2019	2019 – 2020
■	Development of a master database for energy intensive sectors <ul style="list-style-type: none"> Development of a master database of all LSPs, technologies, best practices etc. for 10 energy intensive sectors Development of a mobile App and web enabled version of master database 	<ul style="list-style-type: none"> ✓ Identification of 10 energy intensive sectors 	<ul style="list-style-type: none"> ✓ Hiring of agency for development of database in the identified sectors ✓ Hiring of software agency for development of mobile app and web enabled version of database ✓ Amount of fund utilized and it's percent share in total fund allocated 	<ul style="list-style-type: none"> ✓ Development of master database for all sectors ✓ Usage of the mobile app by MSME unit owners ✓ Amount of fund utilized and it's percent share in total fund allocated
■	Energy mapping of the SMEs on Pan India basis <ul style="list-style-type: none"> Selection of energy intensive sectors/Clusters which have high energy consumption Development of pan India level Sector specific reports and policy plans for development of Sector Launching of National Policy Document on energy efficiency in SMEs 	<ul style="list-style-type: none"> ✓ Selection of clusters to be covered under the project ✓ No. of units covered under the mapping 	<ul style="list-style-type: none"> ✓ No. of units covered under the mapping ✓ Database developed for collating all the data of SMEs ✓ Amount of fund utilized and it's percent share in total fund allocated 	<ul style="list-style-type: none"> ✓ No. of units covered under the mapping ✓ Database developed for collating all the data of SMEs ✓ Launch of national level policy document ✓ Amount of fund utilized and it's percent share in total fund allocated