

Tools for Energy Efficiency in MSMEs



Good things in life begin small

Jan 09, 2018

Key Barriers in large scale adoption of EE in MSMEs

- No data / information
 - How many other MSMEs have implemented EE measures so far?
 - How many of them were from my sector & making similar product?
 - What were the benefits / savings achieved?
 - Investments? Payback?
 - What is the surety of savings to be achieved after investments made?
- Need for sectoral benchmarks
 - How do my unit compare with my peers?
 - How much savings potential is there in my unit?

Key Barriers in large scale adoption of EE in MSMEscontd.

- MSMEs are cost sensitive
 - How to keep the cost of energy audits nominal and yet ensure the quality of services?
 - Can I get the DPR within 2-3 days after the detailed energy audit?
 - How do I know that what the Energy Auditor is telling is right?
- Simple DIY tools required
 - Can I check the savings potential in my unit before going in for detailed energy audit?
 - Knowledge bank for energy auditor?

Tools for Energy Efficiency in MSMEs

Tools

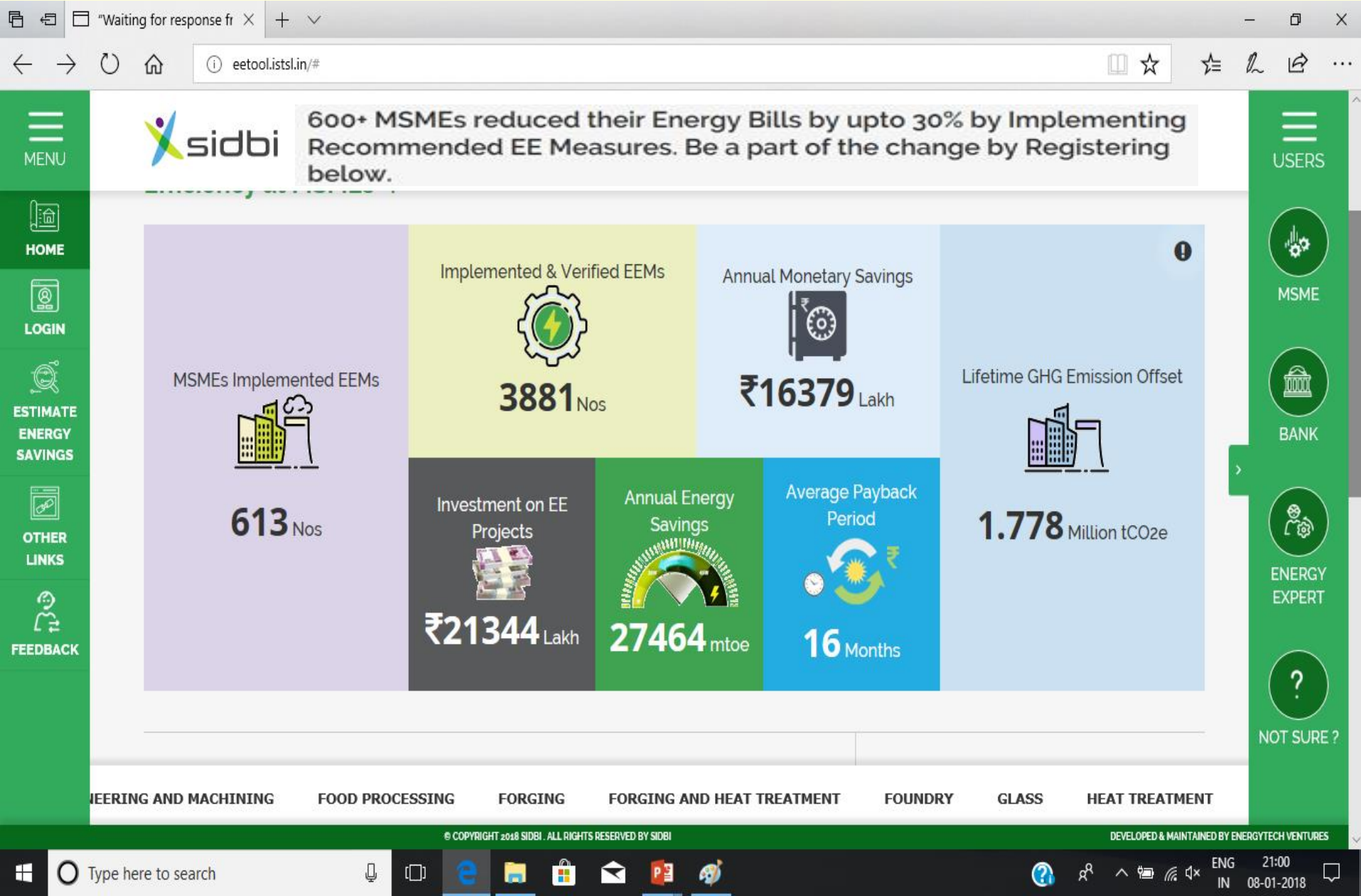
- Energy Efficiency Assessment Tool
- Mobile App for Resource Efficiency Audits
- EE equipment vendor database

Present Status

- Launched
- Under testing
- Being initiated

Energy Efficiency Assessment Tool

Energy Efficiency Assessment Tool



Estimation of Potential Energy Savings-Example



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INDIA SME TECHNOLOGY SERVICES LIMITED



MENU



Gap Analysis Form

Basic Analysis

Advanced Analysis

Sector: *

Annual Production (Ton): *

Foundry

912.4

Select Energy Source: *

Annual Consumption (l): *

GCV (kCal/l): *

GHG Emission Factor
(tCO₂e/l): *

Cost (INR/l): *

High Speed Diesel

135138.6

9783

0.00253674

70

Energy Source: *

Annual Consumption
(kWh): *

GCV (kCal/kWh): *

GHG Emission Factor
(tCO₂e/kWh): *

Cost (INR/kWh): *

Electricity

317220.3

860

0.00089

7



ADD ROW

Basic Gap Analysis

In basic gap analysis, a unit is being compared with other units belonging to the same sector. For example, a foundry unit is compared with other foundry units irrespective of the process it follows (here it may be induction furnace or cupola furnace), product material type (here CI castings or SG castings), final product (here valves, gears, engine housing etc.) and whether it is finished or unfinished product. But in advanced gap analysis, the user may select the processes it follows (sub-sectors), product material types, final product etc., however the analysis will be done considering the selected majors of the aforesaid particular. Therefore, the advanced gap analysis facilitates more realistic comparison and the gap in energy consumption.



HOME



PROFILE



DASHBOARD



GAP
ANALYSIS



UTILITY
TOOL

Display Results

MENU



HOME



PROFILE



DASHBOARD



GAP ANALYSIS



HOME



PROFILE



DASHBOARD



GAP ANALYSIS



UTILITY TOOL



Basic Gap Analysis Report of Foundry

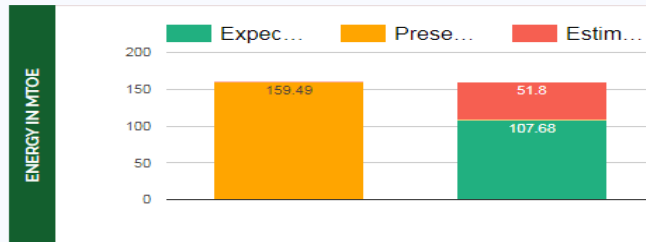
Gap Analysis Result

Estimated Gap in Energy Consumption **51.8 mtoe/year**

Equivalent Gap in Electricity Consumption **602357.7 kWh/year**

Maximum Saving Potential **INR 37.94 Lakhs/year**

Gap Analysis Graph



Number of units that matches from DB *Sector(Foundry) : 121*

Best 5 values of Specific energy consumption (SEC) with respective Equivalent Specific Electricity Consumption and Specific Energy Cost

	A	B	C	D	E
Specific Energy Consumption(SEC) in mtoe/Ton	0.116	0.118	0.119	0.12	0.121
Equivalent Specific Electricity Consumption in kWh/Ton	1351.33	1374.05	1384.57	1398.17	1405.77
Specific Energy Cost in INR/Ton	8511.1	8654.2	8720.5	8806.1	8853.99

No. of Available Recommendation **78** *(Total 345 Implemented by 91 MSME units and verified energy savings achieved 1145.2 mtoe and monetary savings achieved INR 885.13 lakh).*

Average SEC for the units that matches selected sector : **0.104 mtoe/Ton**

Note : How the gap analysis is being done...

- Step 1: Search for the units matching the selected sector, sub-sector (major) and product material type (major)
- Step 2: Find the benchmark SEC of the units
- Step 3: Find the gap between the SEC of the unit and benchmark SEC
- Step 4: Extrapolate the gap in SEC to estimate total gap in annual energy consumption

Disclaimer: Please note that the EE Tool has been created using actual production and energy consumption data from MSME units participated in the World Bank-GEF and 4E program. The recommendations are selected from a pool of actual energy conservation measures that were implemented and verified in the participating MSME units. The resulting energy and monetary savings generated by the EE Tool are estimations of what can be achieved by implementing the energy conservation measures. Actual savings from implementing these energy conservation measures may vary. For further information please contact the System Administrator.

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Generate PDF

Show Recommendations

EE Assessment Tool- Display Results



Summary of Benefits Achieved and Feasibility of EE Measures Implemented under WB-GEF Programme and 4E Scheme (based on options selected above)

Arresting leakages in compressed air system

Automation in heat treatment process

Automation in metal pouring system for induction furnace

Convert Off Circuit tap changer of transformer to On Load Tap Changer

24. Conversion of transformer from Off Circuit tap changer to On Load Tap Changer

Actual Total Energy Savings (mtoe) : 2.94 | Actual Monetary Savings (₹ lakh) : 2.68 | Actual Investment (₹ lakh) : 4.13 | Simple Payback (Months) : 18

Downsizing of existing induction furnace to meet process requirement

Improve operating practices of cupola

26. Improving operating practices of cupola

Actual Total Energy Savings (mtoe) : 1.46 | Actual Monetary Savings (₹ lakh) : 1.63 | Actual Investment (₹ lakh) : 0 | Simple Payback (Months) : 0

27. Improving operating practices of cupola Furnace - 2

Actual Total Energy Savings (mtoe) : 22.58 | Actual Monetary Savings (₹ lakh) : 10.54 | Actual Investment (₹ lakh) : 0 | Simple Payback (Months) : 0

28. Improving operating practices of cupola

Actual Total Energy Savings (mtoe) : 6.9 | Actual Monetary Savings (₹ lakh) : 6.46 | Actual Investment (₹ lakh) : 2.24 | Simple Payback (Months) : 40

29. Improving operating practice of cupola melting

Actual Total Energy Savings (mtoe) : 2.02 | Actual Monetary Savings (₹ lakh) : 0.81 | Actual Investment (₹ lakh) : 0 | Simple Payback (Months) : 0

Install automatic voltage stabilizer

Install capacitor bank to improve power factor and reduce maximum demand

Install energy monitoring system

35. Installation of energy monitoring system

Actual Total Energy Savings (mtoe) : 0.58 | Actual Monetary Savings (₹ lakh) : 0.53 | Actual Investment (₹ lakh) : 0.88 | Simple Payback (Months) : 20

Install ladle preheater

Install lid mechanism for crucible of induction furnace

Install pneumatic moulding machine to reduce rejection due to bad mould quality

Install shot blast machine for runner and riser

Install timer for ladle preheater



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List of Applicable Energy Efficiency Measures

Recommendation List

- ☐ Replace existing cupola furnace with energy efficient induction furnace
- ☒ Replace existing induction furnace with energy efficient induction furnace

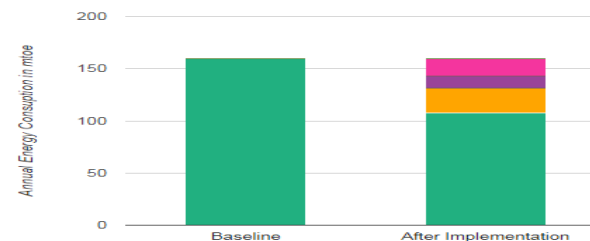
Total Recommendation	Estimated Energy Savings Potential (mtoe/year)	Estimated Monetary Savings Potential (Rs./Year)
11	16.17	1184445.06

- ☒ Improve operating practices of cupola

Total Recommendation	Estimated Energy Savings Potential (mtoe/year)	Estimated Monetary Savings Potential (Rs./Year)
4	12.18	892086.69

- ☐ Down-size air compressor
- ☐ Replace existing transformer by energy efficient transformer
- ☐ Reduction in melting time by melting process optimization

Graph



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EE Tool : Benefits to stakeholders

MSMEs	<ul style="list-style-type: none">➤ Information about EE measures implemented by similar MSMEs➤ Estimate potential energy savings in their units➤ Identifying the potential Energy Savings measures, associated investment and payback.
Banks /Financial Institutes	<ul style="list-style-type: none">➤ Evaluate the EE proposals➤ Able to suggest suitable equipments to their MSME clients based on available information in the tool.
Technical Consultants/ Energy Auditors	<ul style="list-style-type: none">➤ Cross verify estimated energy savings potential, assessment of various equipment, utilities, etc.➤ Idea on the various EE measures implemented by MSMEs throughout India.

EE Tool links

<http://eetool.istsl.in>

Links will be available soon in following websites

S.No	Organisation	Web Site
1	Small Industries Development Bank of India (SIDBI)	www.sidbi.in
2	India SME Technology Service Limited (ISTSL)	www.istsl.in
3	WB –GEF Knowledge Management Portal	www.indiasavesenergy.in

Mobile app for Resource Efficiency Audits

Mobile app for Resource Efficiency Audits

Automation of audit process

- Walk through audits & detailed audits through mobile app.
- Standardization of detailed project report, implementation report & M&V report
- Removal of errors through automation of calculations
- Skill development through in-built feature of Artificial Intelligence for learners / practitioners

Admin Screen

Web browser window showing the SIDBI Admin Dashboard.

Browser Address Bar: `sidbidevweb.azurewebsites.net/SIDBI/fmSIDBIDashBoard.aspx`

Browser Tabs: Logged in as SIDBI::

Browser Extensions: Apps, gmail, erail, rail, IRCTC, En, TLV, steam, cars, glass, plasma, HPgas, course1, OUP, Course2, KVR, ceme, cem2, cement, mech, OneDrive

SIDBI ADMIN / Dashboard

User: Prakash

Dashboard Menu (Left Sidebar):

- Dashboard
- Add Cluster
- Add Sector
- Add Sub Sector
- Add Equipment
- Map Equipment To Sector
- Add Agency
- Approve MSME
- Mapping Of MSME to Agency
- Design Data Report
- PDF Report

Main Dashboard Content:

AGENCIES	ASSESORS	SA SUBMITTED
ACCEPTED SA	PENDING SA	IN PROGRESS SA
COMPLETED SA		

Windows Taskbar (Bottom):

- Icons: Windows Start, Internet Explorer, File Explorer, Mail, VLC, Chrome, Firefox, Word, Excel, PowerPoint, PDF Reader, Bluetooth.
- System Tray: 17:03, 08-01-2018, Network, Volume, Power.



SIDBI

(Small Industries Development Bank Of India)

Enter User Id

Password



Login

[Forgot Password?](#)

[Register](#)

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sidbi

Name of the Unit

Constitution of MSME

Registration number of MSME

Date of Incorporation

Date of commencement of Business

Address

Register

Already have an account



DPR

ICR

M&V

OPEN MEETING

SITE TOUR

RESOURCE EFFICIENCY AUDIT

INVENTORY

EQUIPMENT INFO

OPERATIONAL INFO

RECOMMENDATIONS

CLOSE MEETING

CLEAN

LEAN

ENERGY AUDIT



Add Inventory

16:26

16:26

— 2 +

— 1 +

— 2 +

— 2 +

— 2 +

— 4 +

— 2 +

— 2 +

— 2 +

— 2 +

Equipment Info

Complete



Compressor (2)



Cooling Tower (2)



Pumps (2)



Fans (2)



DG Set (1)



HVAC (1)



Equipment Info

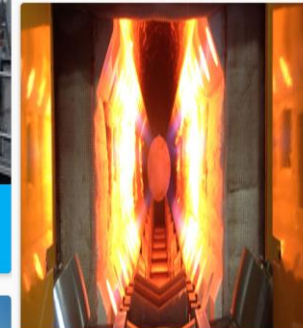
Complete



Boiler (2)



Steam System (1)








Furnace (2)




Insulation & Refra...








16:27




Input Compressor


Set Point-1 for Compressor pressure(bar)




Set Point-2 for Compressor pressure(bar)




Yes




Compressor Load Power(kW)




Pressure at farthest user(bar)




Pressure required at farthest user (Design or...)







Investment(INR Lakh)




CALCULATE





16:29



Output Compressor

Proposal 3

% Leakage in system(%)

29.2

CFM Leakage in system(CFM)

45.8

Saving Potential(kW)

8.2

Annual Savings(INR Lakh)

1.97

Payback Period(months)


1.0





Proposal 4

Total Operating time of compressor(hrs)


12500.0

SAVE





16:29



Recommendations

Reduce operating pressure of compressor

☐

Replace inefficient compressor with new compressor to reduce specific Energy Consumption

☐

Reduce compressed air leakages in the plant

☐

Avoid compressor unloading by installing VFD

☐

Others

☐

Confirm

Lean Manufacturing (LM)

Commitment
Empowerment
Training
StrategyHoshinPlanning
ContinuousImprovement
Metrics
ValueStreamMapping
SetUpReduction

FiveS1

Expected standards are posted and workplace indicates that 5S activities are in compliance. Aisleways and workstations are unobstructed, organized, and clean.
Regular audits/inspections are taking place and audit scores are posted with action items necessary to raise the score.
Results of audits are posted and communicated as they occur.
Audit action items are resolved in a timely, appropriate time frame.
Machine leaks have been eliminated.
A regular red tag process has been established.
Operators can explain the importance of 5S as it relates to the overall Lean initiative.

Clean

Update

Company

Consent to Operate

Category of Industry

Effluent Treatment

Hazardous Waste Disposal

Critical Pollution Control Equipment Installed

PROCEED

Job skills training exists for all major processes and includes Standard Work documentation posted in the work area for all positions.

Performance criteria is clearly established and is enforced (jobs skills training).

Metrics in place to measure the training effort, including effectiveness; a direct link to productivity has been established.

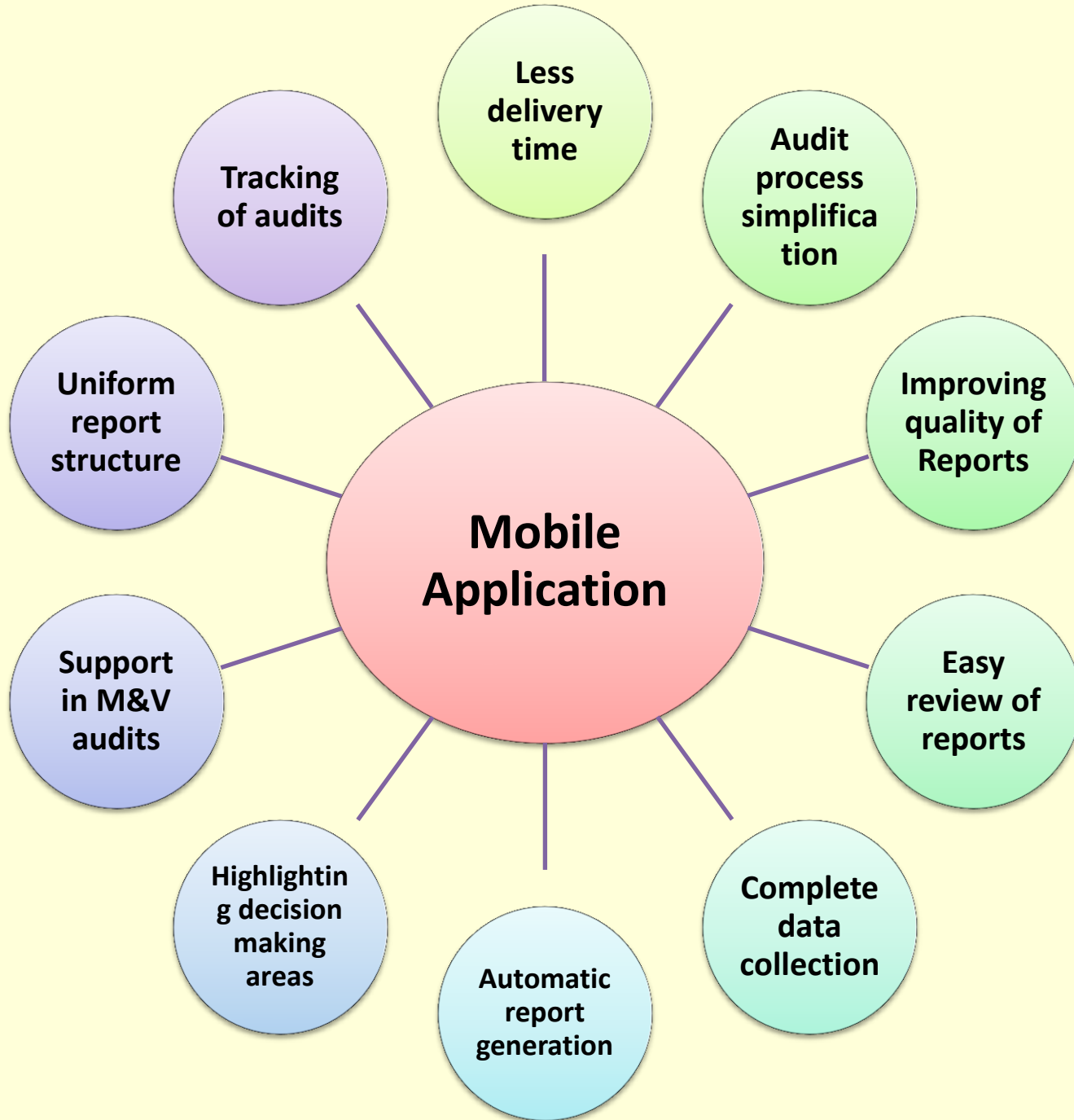
Training program includes all key ESH elements but is largely focused on job skills and improved flexibility.

Deployment of training program is planned and delivered per a set schedule; resources are planned for.

A cross training matrix exists for each major process and is updated and visually posted.

The Continuous Improvement Manager

BENEFITS



BENEFITS

Green Impact

Paper savings
1 DPR @ 100 pages

+

1 ICR @ 30 pages

+

1 M&V report @ 30 pages
= 160 papers

**Standardization of Report
Formats**

**Removal of human
calculation errors**

Skill development

Report preparation time - Nil

Normal time -

1 DPR = 3 weeks

+

1 ICR = 2 weeks

+

1 M&V = 2 weeks
= 7 weeks (49 days)

Request for support

- Critically review the tools and provide feedback for improvements from time to time
- Contribute data of DPRs, ICRs & M&V reports under their projects to make the tool more robust, covering many sectors
- Help in dissemination for increased usage of the tools



Thank You

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