

User Manual Energy Savings Assessment Tool for MSMEs

For Banks & FI User



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for EE Tool by



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2 Introduction

Under the World Bank – GEF Program ‘Financing Energy Efficiency in selected MSME Sectors in India’ and the 4E Scheme of ISTSL, energy audits had been carried out for more than 800 MSME Units. These reports have been digitized in a common format and converted into a relational database which can be analysed by computer programming to generate actionable insights to reduce energy consumption and green house gas emission.

The entire database i.e. the master database covers 30 MSME sectors. There are total 800+ MSME units for which the 2000+ energy audit reports have been digitized consisting nearly 5000 EE measures.

Based on the master database, this tool has been developed which will be useful for MSMEs in assessing own energy performance and generate logic driven actionable insights.

3 Home Page

3.1 Widgets

The home page shows the combined outcome of the World Bank-GEF projects conducted by SIDBI and Energy Efficiency projects under 4E Scheme by ISTSL. The achievements have been shown in terms of total annual GHG emission offset in ton CO₂e, total no. of Energy Conservation Measures implemented, total annual energy savings and total annual monetary savings. All the figures have been verified by third party auditors or SIDBI.

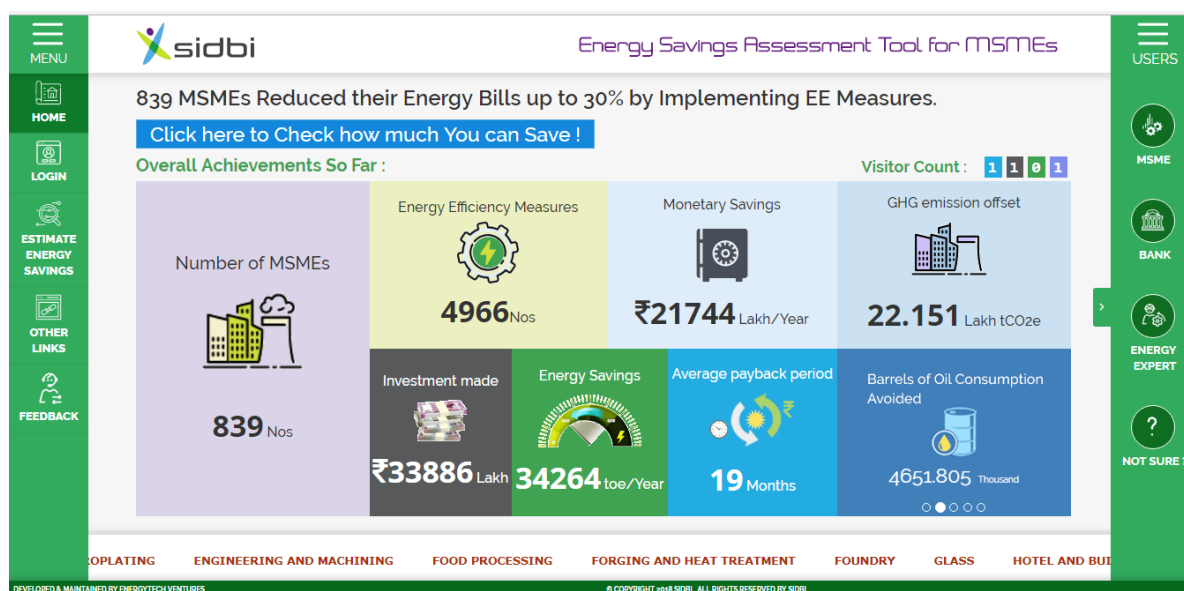


Image 1: Home Page

It is to be mentioned over here that mouse click on any MSME sector name on the ticker (a marquee with the names of MSME sectors), changes the values of the widgets corresponding to that particular sector, the values get restored on moving the cursor away.

3.1.1 Carbon Visualization

For easy understanding of the GHG emission offset, visualization of the same has been provided. There is a slider below the widget for GHG emission offset that shows the amount of GHG emission offset in terms of Incandescent Bulbs replaced with LEDs, Barrels of Oil Consumption Avoided, Acres of Forest Preserved, Power Generation avoided and Coal burn avoided.

3.2 Menu Bar

There is a menu bar in the left-hand side of the page. Here links has been provided for different features available in EE Tool. If the user is not logged in, it will only show the features available in pre-log in stage as follows:

- Home
- Login
- Estimate Energy Savings
- Other Links
 - About Us
 - Contact Us
 - Energy Audit Equipment
 - Other Websites
- Feedback

The menu bar is available in each page of the EE Tool; however, the user can hide it by clicking on the 'Menu' button at upper left corner. The same action makes it visible again.

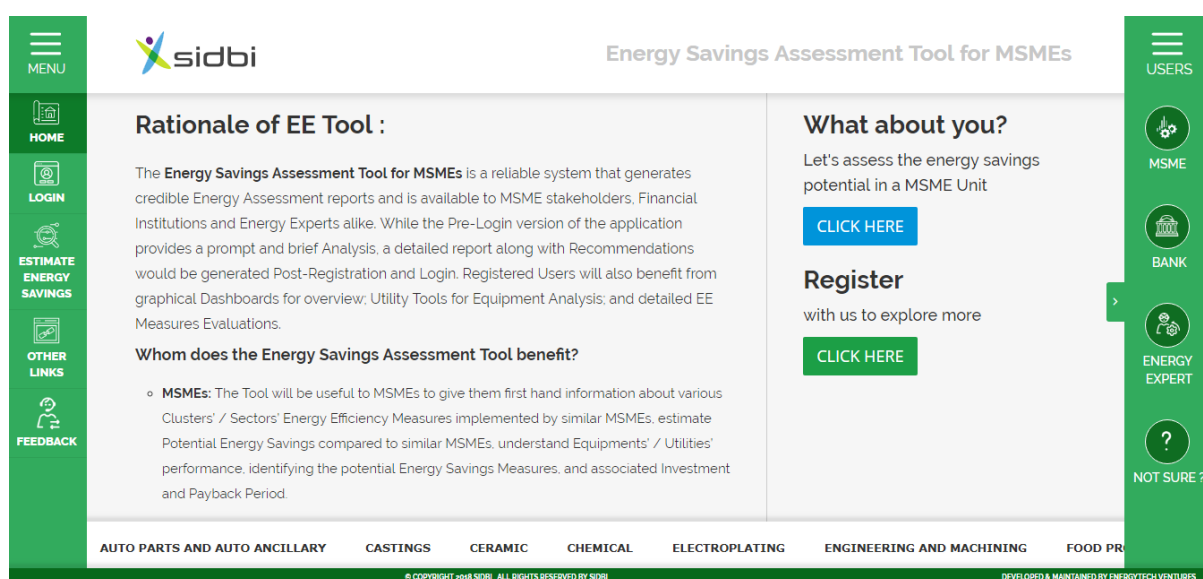


Image 2: Links in Dashboard

There is another link on the right-hand side with the links for the dashboards for the relevant user groups (MSMEs, Banks & FIs and Technical Experts). If some user is not among these categories, there is another link 'NOT SURE?'. The 'NOT SURE?' page shows the important figures and a brief description of the EE Tool.

This page also has the Rationale behind the development of the Energy Savings Assessment Tool along with shortcut buttons for Estimation of Energy Savings along with a Registration button.

4 About Us Page

This page contains a brief description of the Energy Savings Assessment Tool and all the stakeholders (SIDBI, ISTSL and Shakti) who have significant contribution in its development.

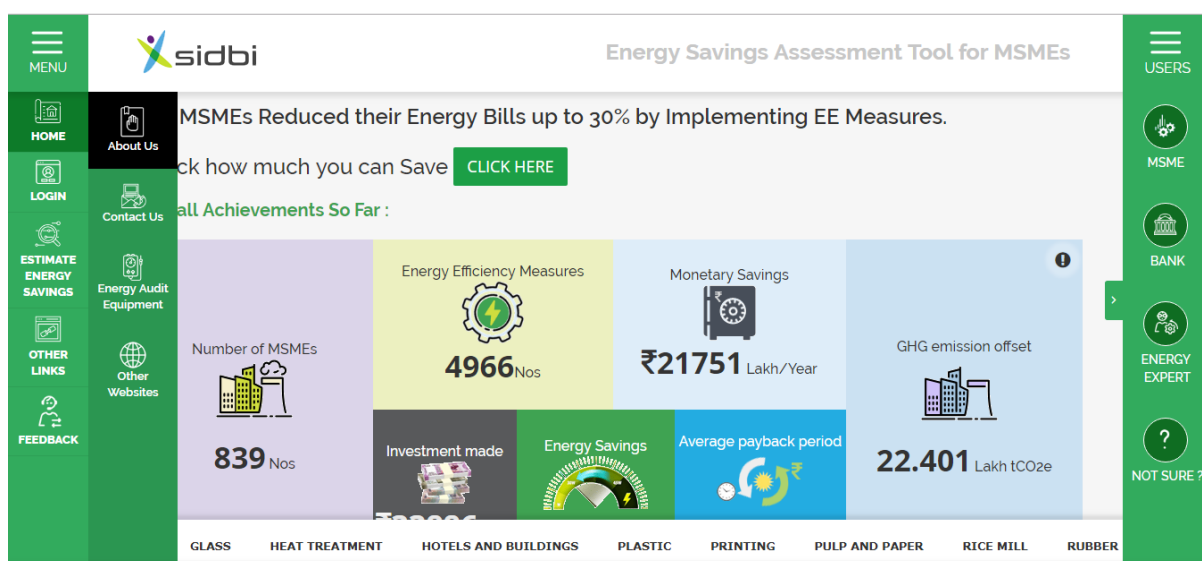


Image 3: Link of About Us Page

About the Energy Savings Assessment Tool

As a part of World Bank and GEF's initiative, the "Financing Energy Efficiency at MSMEs" project has created a substantial Data pool based on various reports prepared i.e. IGDPs, ICRs, and M&V reports, from Resource Efficiency studies including Energy Audits in over 800 MSMEs across various MSME Sectors / Clusters throughout the country. The need to collate this data and upload it on an Application based Database arose from the fact that:

- Data was significantly large and diverse.
- Significant number of MSMEs covered in each Sector / Cluster.
- Pertains to real Energy Efficiency Implementations by MSMEs in various Sectors / Clusters.
- Implemented EE measures are Credible and Verified by Third-Party Independent Agencies

Such a Database would naturally be of immense use to similar MSME sectors in India for replications.

Taking this vision further ahead, SIDBI along with funding support from Shakti Sustainable Energy Foundation developed the Tool to generate simplified Benchmarking for MSMEs belonging to various Sectors i.e. Foundry, Forging, Textile, Engineering, Plastic, etc. The Tool Assesses the MSME units. Analyses the findings by comparing with Existing Reports on the Database, and offers suitable Energy Efficiency Measures (EEMs). It also offers guidance on Monetary Implications such as Savings, Investment required and Payback period.

Broad functions of the tool include:

- Assessment of Current Scenario to Benchmark the MSME based on existing MSMEs in the Database
- Recommend suitable EE Measures
- Calculation of Monetary, Energy & Emission Reduction implications of the same
- Provide EE measures implemented in nearby MSMEs locations

This tool can help

MSMEs	Bankers	Energy Experts / Professionals
<ul style="list-style-type: none"> Benchmark their unit in terms efficiency To undertake a simplified opportunity / feasibility analysis Possible EEMs Improve reliability of assessment (WTA) in order to make an informed decision for DEA; justify cost for DEA as WTA assessment is structured and standardized 	<ul style="list-style-type: none"> Identify potential lending opportunities for EE projects in the SME sector Understand the monetary implications of implementing EEM without extensive technical knowledge Benchmark customers in terms of energy efficiency 	<ul style="list-style-type: none"> Improve quality of output by using a standardised / structure tool: as WTA so far is based on individual experience and not very structured, not supported by a tool which covers the whole process To provide timely advise and to reduce gap between assessment / factory visit and WTA report

About the Stakeholders

	WB GEF Project "Financing Energy Efficiency at MSMEs in India"	+
	Small Industrial Development Bank of India (SIDBI)	+
	India SME Technology Services Limited (ISTSL)	+
	Shakti Sustainable Energy Foundation	+

Image 4: About Us Page - About the Energy Savings Assessment Tool

5 Pre-Login Page for MSMEs

This page contains an overall snapshot of what has been covered by the Database in the Tool along with Achieved Impacts. The widgets show numbers which are relevant for MSMEs. There is a drop-down option at the top of the screen through which any particular Sector can be selected and the numbers below will change accordingly.

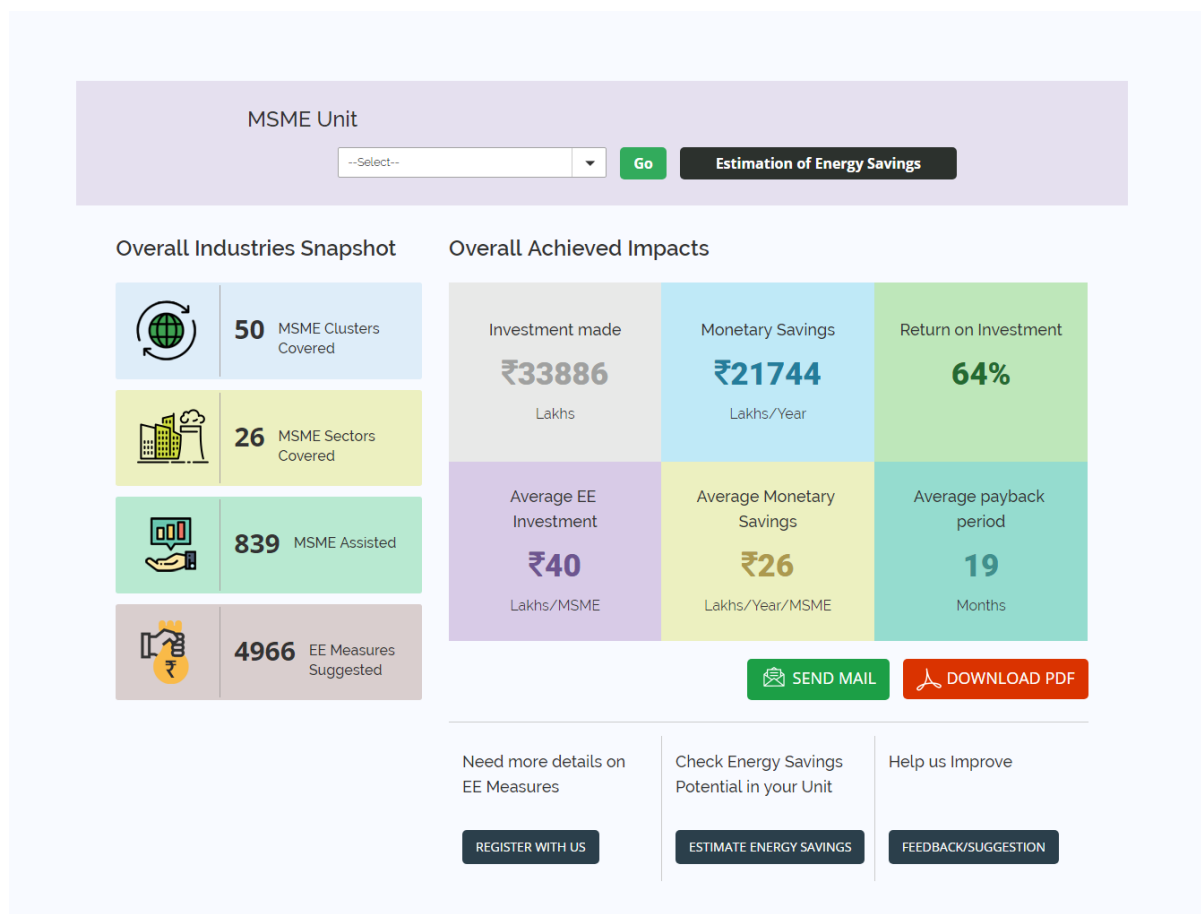


Image 5: Pre-login Dashboard for MSME Units

The user can download a PDF of the information on the screen and also send it to any email id directly. There are buttons for Registration, Estimation of Energy Savings, and Feedback as well.

6 Pre-Login Page for Banks & Financial Institutions

This page contains an Overall Snapshot of what has been covered by the Database in the Tool along with Achieved Impacts. The widgets show numbers which are relevant for Banks & FIs. There is a drop-down option at the top of the screen through which any particular Sector can be selected and the numbers below will change accordingly.

BANK Go Estimation of Energy Savings

Overall Industries Snapshot

- 50** MSME Clusters Covered
- 26** MSME Sectors Covered
- 839** MSME Assisted
- 4966** EE Measures Suggested
- 58** MSMEs Availed Loans
- 5884** Total Loan Sanctioned in ₹ Lakh

Overall Achieved Impacts

Investment made ₹33886 <small>Lakhs</small>	Monetary Savings ₹21744 <small>Lakhs/Year</small>	Return on Investment 64%
Average EE Investment ₹40 <small>Lakhs/MSME</small>	Average Monetary Savings ₹26 <small>Lakhs/Year/MSME</small>	Average payback period 19 <small>Months</small>

SEND MAIL
DOWNLOAD PDF

Need more details on EE Measures

REGISTER WITH US

Check Energy Savings Potential in your Unit

ESTIMATE ENERGY SAVINGS

Help us Improve

FEEDBACK/SUGGESTION

Image 6: Pre-Login Dashboard for Banks & Financial Institutions

The user can download a PDF of the information on the screen and also send it to any email id directly. There are buttons for Registration, Estimation of Energy Savings, and Feedback as well.

7 Pre-Login Page for Energy Experts

This page contains an Overall Snapshot of what has been covered by the Database in the Tool along with Achieved Impacts. The widgets show numbers which are relevant for Energy Experts like Technical/Energy Consultants, Auditors, etc. There is a drop-down option at the top of the screen through which any particular Sector can be selected and the numbers below will change accordingly.

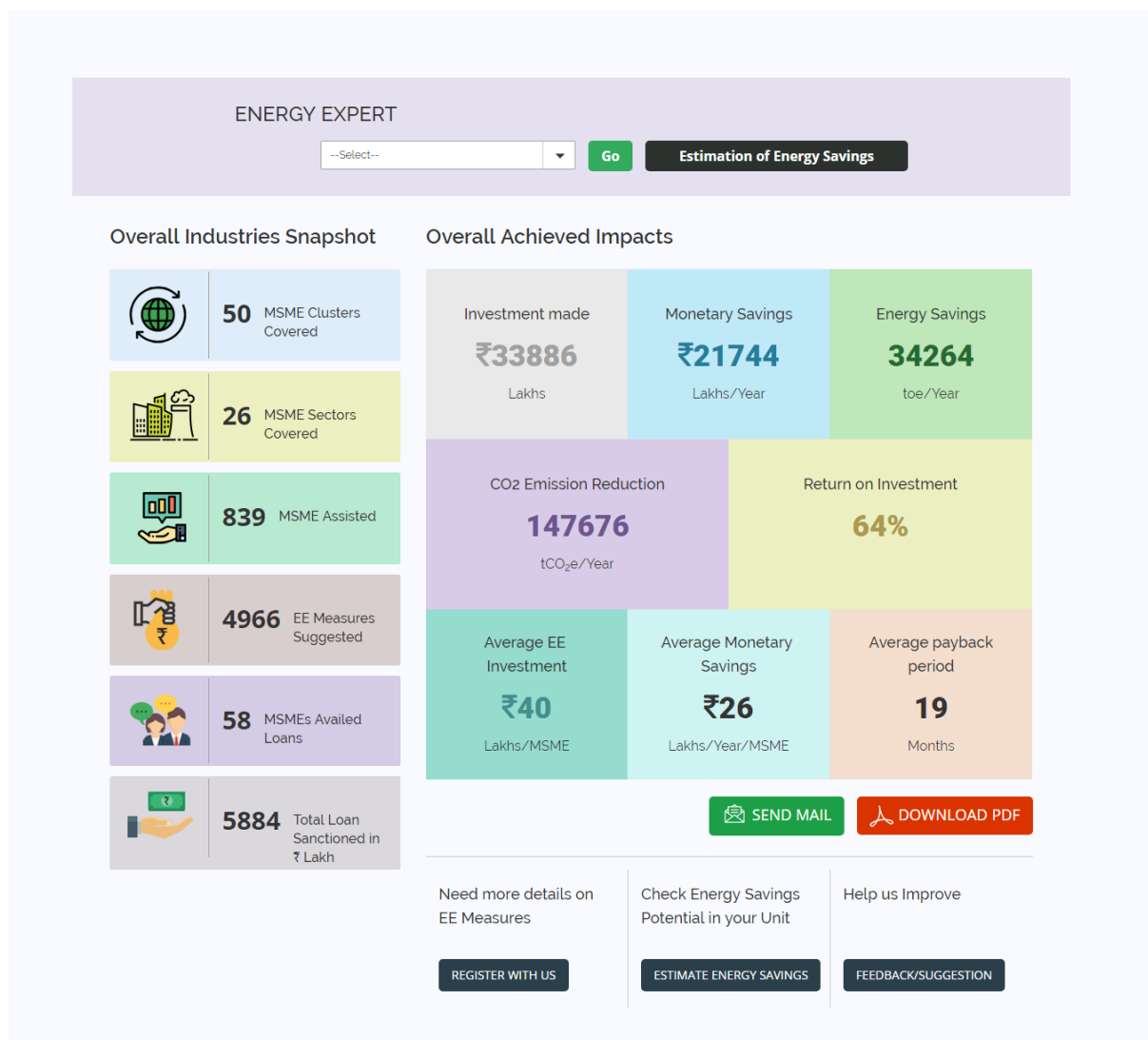


Image 7: Pre-Login Dashboard for Energy Experts

8 'Not Sure?' Page

This page is for the visitors who have not yet registered and are unsure about the relevance of the Energy Savings Assessment Tool. This page mentions a number of benefits of the Tool so that after reading it, the visitor will be able to realize the utility and complete registration.

Benefits of EE Tool



Robust Database



Current Trends in EEMs



Energy Savings Potential



Energy Efficiency Investment



Estimate Energy Savings



Sectoral Benchmarks



Logic Driven Recommendations



Performance Evaluation of EEMs



Feasibility of EE Measures



Overview of EEMs in Loan Proposals

Based on the information available from IGDPs, ICRs and M&V Reports for a number of Units, a Master Database has been created and a Tool has been developed to access this information.

The EE Assessment tool can be useful to MSMEs for preliminary assessment, and understanding their equipments/ utilities' performance and identifying the measures towards Energy Efficiency so that these MSMEs can further go in for detailed assessment & implementations of the same.

This tool will also help Bankers to do the preliminary assessment of Energy Efficiency Equipments / measures for getting an estimated Energy & Cost savings from EE measures mentioned in loan proposal. Bankers may also further suggest suitable measures to their MSME customers based on available information in the EE tool.

Image 8: 'Not Sure?' Page

9 Registration

To go for registration, click on 'Login' in the left hand side menu, it will open the login page. Here 3 links have been provided for registration for each type stakeholder (MSMEs, Banks, and Energy Experts).

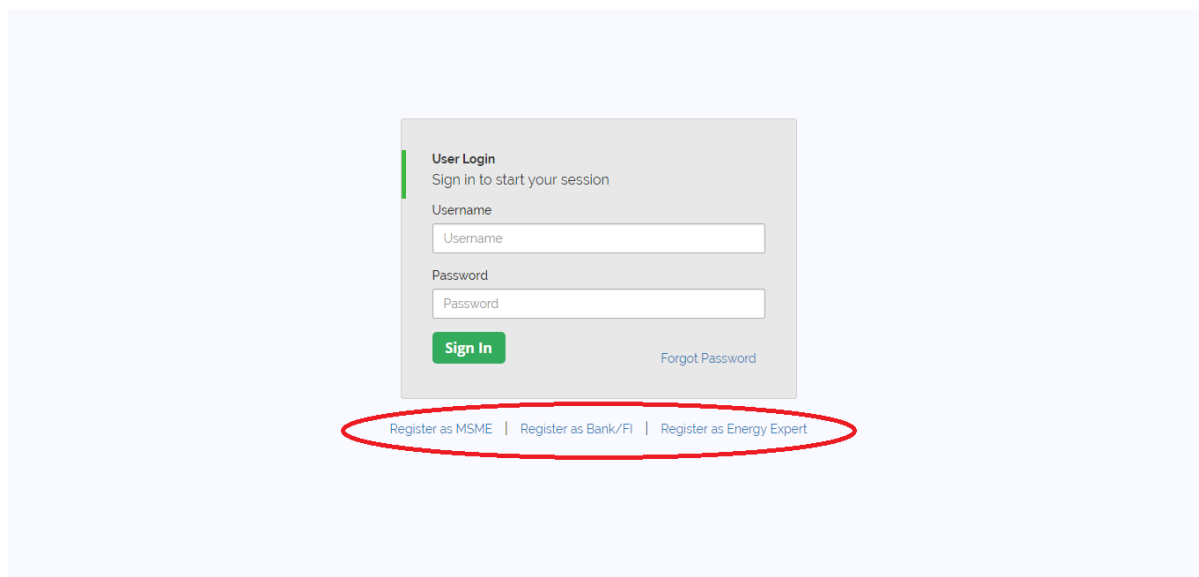


Image 9: Login Page and Links for Registration

9.1 Register as Bank/FI

Click on the link 'Register as Bank/FI' and a registration form will be opened. Here the user needs to enter the following information:

9.1.1 Address Details of the Bank

- Name of the user – to be entered by the user



- Address – to be entered by the user
- City/Town/Village – to be entered by the user
- State – to be selected by the user from dropdown
- District – to be selected by the user from dropdown
- PIN Code – to be entered by the user
- Phone No. – to be entered by the user
- Mobile No – to be entered by the user
- Fax No. – to be entered by the user
- Organization Type – to be selected by the user, either Bank or Financial Institution
- Name of the Bank/Financial Institution – to be entered by the user
- Branch Name – Branch Name of the Bank/Financial Institution – to be entered by the user
- Existence of Bank – to be selected by the user, either Pan India or Regional
- If Regional selected then the user must provide the following:
 - State – to be selected by the user from dropdown
 - District – to be selected by the user from dropdown

9.1.2 User Details of the Bank

Register as Bank/FI or Independent User – to be selected by the user, either Representing Bank or Independent User

Email (This will be Your User ID) – to be entered by the user, this will be the username for login

- Password – to be entered by the user, minimum of 6 characters
- Confirm Password – the same entered in 'Password' to be entered by the user

Bank/Financial Institution Registration

Address Details of the Bank

Name of the User :*	Address :*	City/Town/Village :*	State :*
<input type="text"/>	<input type="text"/>	<input type="text"/>	-- Select --
District :*	Pin Code :*	Phone Number :	Mobile Number : *
<input type="text"/>	<input type="text"/>	<input type="text"/>	+91 <input type="text"/>
Fax Number :	<input type="text"/>		
Organization Type :*	Name of the Bank : *	Branch Name : *	
<input checked="" type="radio"/> Bank <input type="radio"/> Financial Institution	<input type="text"/>	<input type="text"/>	
Existence of Bank : *			
<input type="radio"/> Pan India <input checked="" type="radio"/> Regional			
State : *	District		
Select Here	Select Here		

User Details of the Bank

Register as Bank/FI Or Independent User : *

Representing Bank Independent User

Email (This will be Your User ID) :*	Password :*	Confirm Password :*
<input type="text"/>	<input type="text"/>	<input type="text"/>

Image 10: Registration Form for Banks and Financial Institutions

Now click on the 'Register' button. A verification mail will be sent to the provided Email ID, click on the link given in the mail and login using the username i.e. the Email ID and Password.

10 Login

For login, click on 'Login' tab in the left hand side menu bar. It will open the login page, where the user needs to enter the username (i.e. the registered email id) and password.

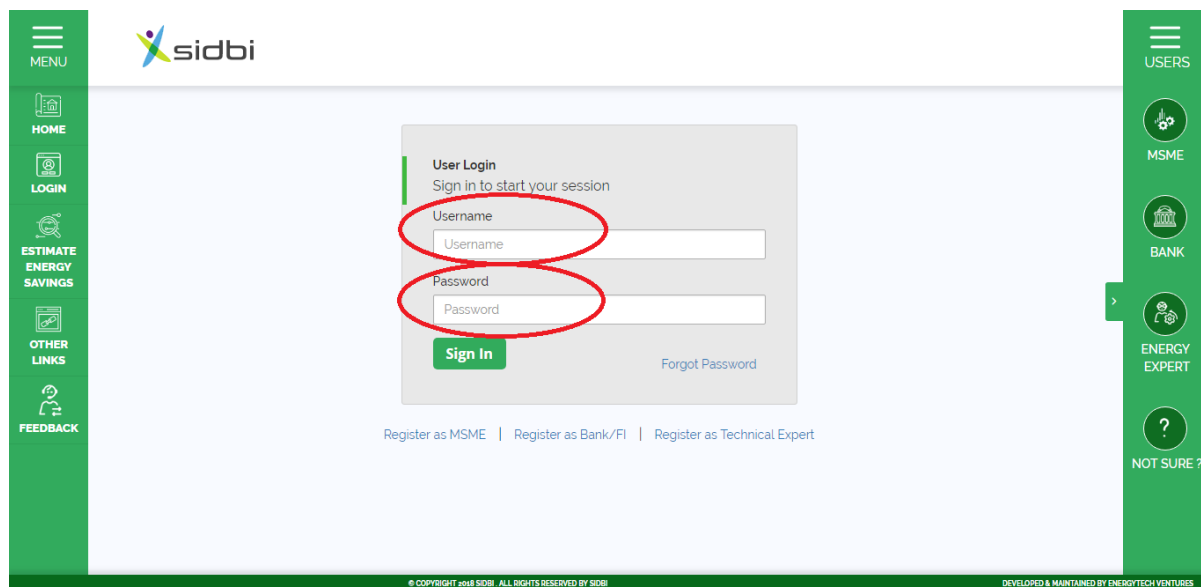


Image 11: Login Page

After entering the login credentials, click on the 'Submit' button.

10.1 Reset Password

To reset password, click on the link 'Forgot Password'.

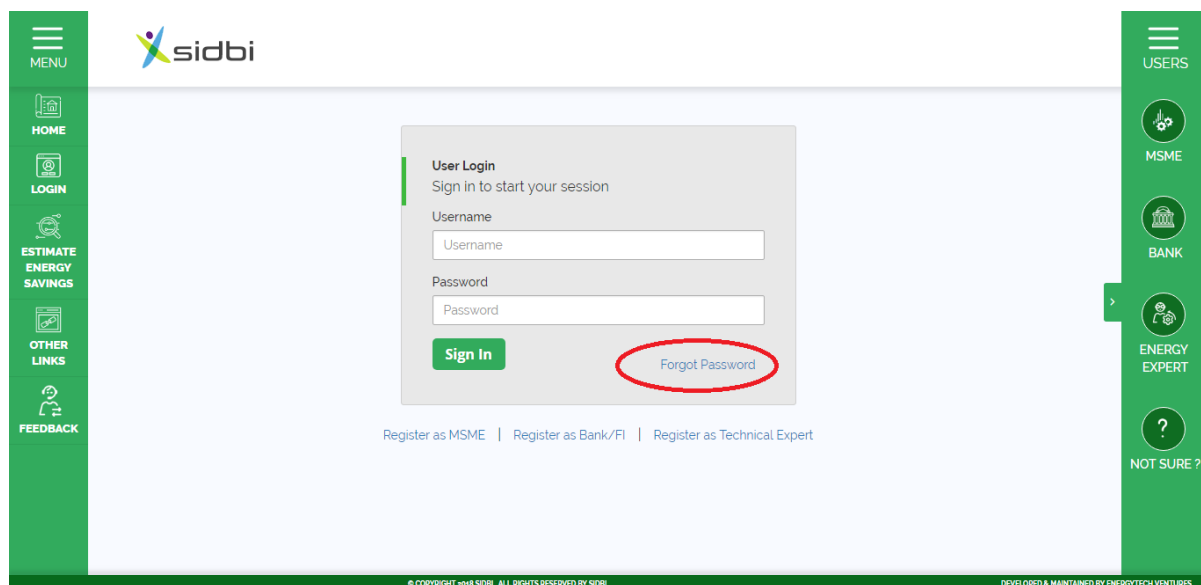


Image 12: Password Reset Link

The password reset option will be opened, here the user needs to enter the registered email id and click on 'Reset Password' button.

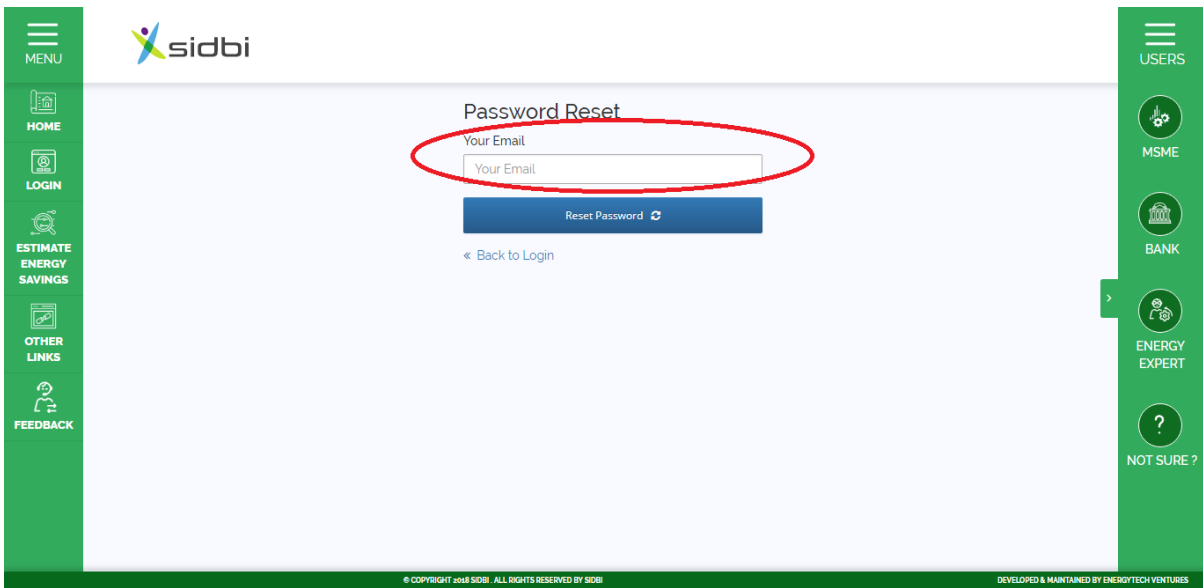


Image 13: Link for Submission of Email ID for Password Reset

A system generated email will be sent to the user’s registered email id containing a link for reset the password.

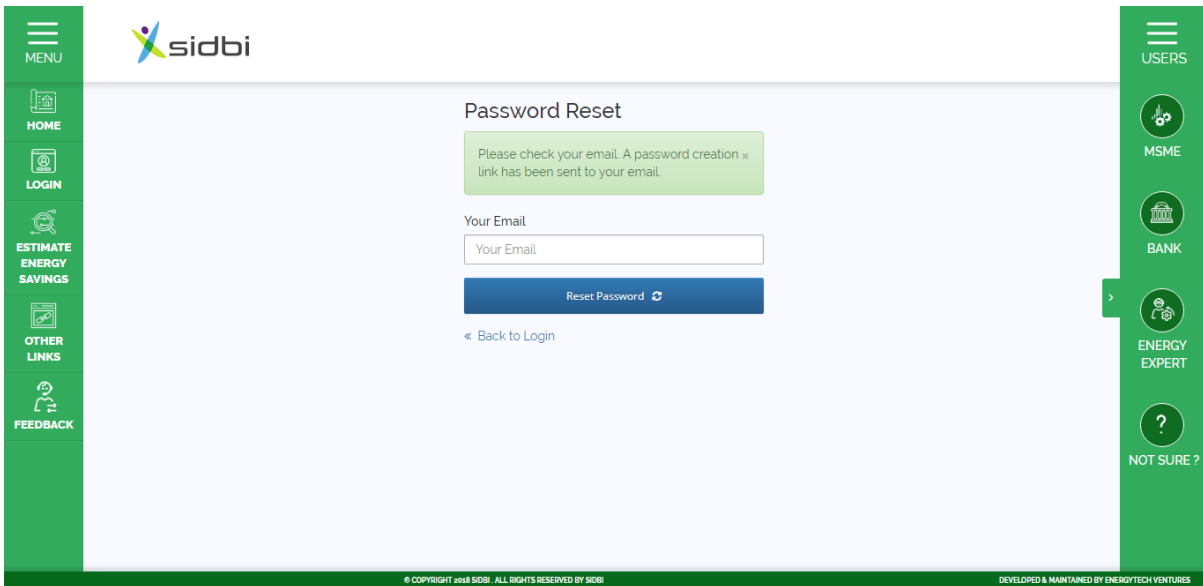


Image 14: Acknowledgement of Password Reset

User must click on the link to open the password reset page. Here the user will enter the new password and confirm it by re-entering the password and click on ‘Reset Password’ button.

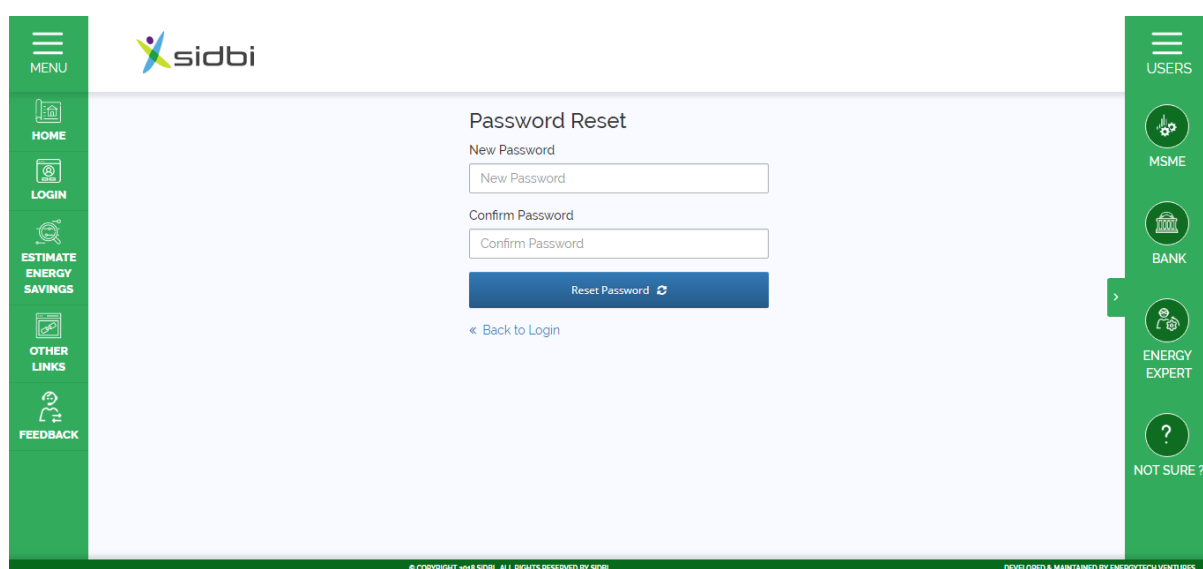


Image 15: Set New Password

A success message on password reset will be shown and the user will be able to login using the new password.

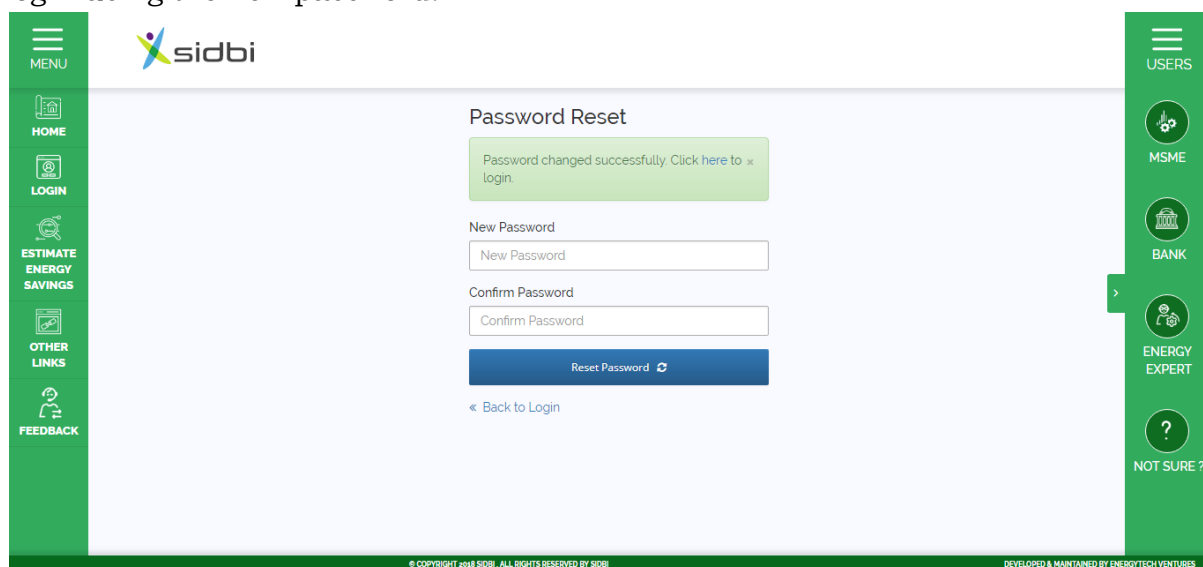


Image 16: Acknowledgement of Password Change

11 Post Login Dashboard

The post login dashboard is same for all stakeholders (MSMEs, Banks, Energy Experts). This dashboard consists of three graphs – the first graph shows cluster wise information, second graph shows sector wise information and the third graph shows EE measure wise information. The first graph remains open by default; other graphs can be selected by clicking on the check boxes in “Choose/Select preferred Clusters/Sectors/Energy Efficiency (EE) measures to display”.

After selecting the check boxes, user can select preferred cluster, sector or EE measures from the dropdown and after selecting click on ‘OK’ button below the dropdown menu.

All the graphs has two vertical (Y) axis and there are 7 parameters can be selected for plotting on each axis, however parameter selected for one axis will not be available to select on other axis. For “Banks & FIs” these parameters are as follows:

- Number of MSMEs – No.
- Investment – in Lakh INR
- Return on Investment – in %
- Payback Period – in months
- Number of MSMEs Aailed Loan – no.
- Total Loan Amount – in Lakh INR
- Emission Reduction – in ton of Carbon Dioxide Equivalent

By default, Number of MSME plotted in primary vertical axis (left hand side) and Investment plotted in secondary vertical axis (right hand side).

These graphs will show only the top 10 values. If one cluster is selected for 1st graph, the filter will be automatically applied to the other two graphs and selecting sector for 2nd graph will be automatically applied to the 3rd graph.

On hovering the mouse over the bars will display the values. Clicking on the legends or the bars will display all the values corresponding to that.

To reset the graph to default, click on the ‘Reset’ button.

Bank Dashboard

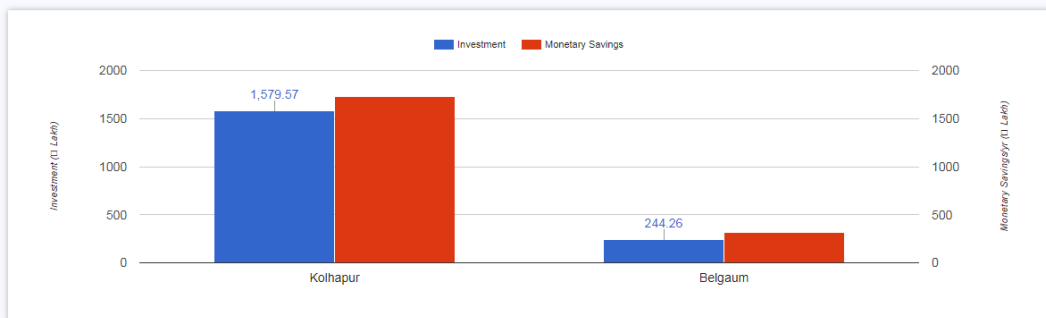
Choose preferred parameter to display in graph

Reset

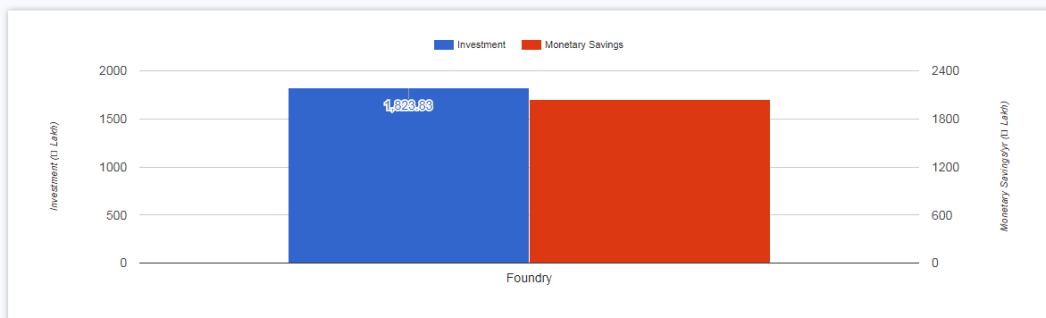
Choose/Select preferred Clusters/Sectors/Energy Efficiency(EE) measures to display

Select Cluster
 Select Sector
 EE Measures

Cluster Wise



Sector Wise



EE Measures Wise

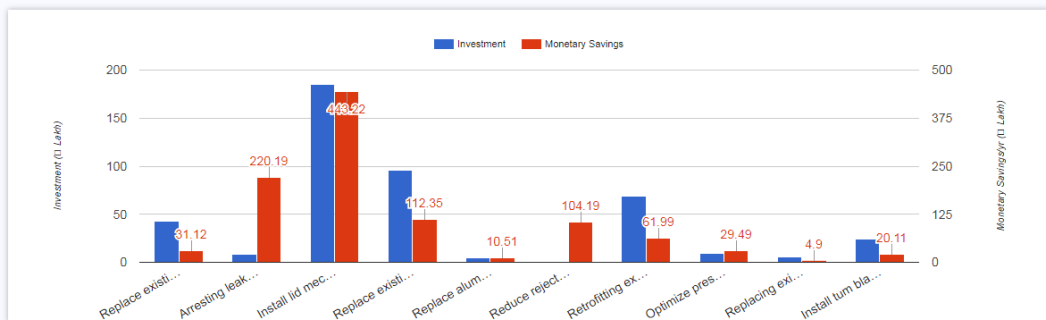


Image 17: Post-login Dashboard

12 Estimation of Energy Savings Analysis

This analysis allows the users to compare the energy productivity of a given MSME unit with the other similar units studied under the WB-GEF Programme and 4E Scheme. For running the Analysis, please click on the 'Estimate Energy Savings' tab in the left hand side menu bar.

There are two different data input for this analysis available for a user – a) Basic Analysis & b) Advanced Analysis.

In basic 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 the advanced 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.

12.1 Basic Estimation of Energy Savings

For basic analysis, the following information is required (all are mandatory):

- Sector Name – to be selected from dropdown menu
- Annual Production – Annual production of the plant in the specified unit, to be entered by the user
- Energy Sources – to be selected from dropdown menu. Multiple energy sources can be selected by clicking on Add button.
- Annual Consumption – annual consumption of energy sources in specified unit (mandatory)
- GCV – Gross Calorific Value (GCV) or thermal energy equivalency of energy sources in specified unit (mandatory). This is auto filled with standard value for the selected fuel; however user can edit the value.
- GHG emission Factor – green house gas emission factor of energy sources in specified unit (mandatory). This is auto filled with standard value for the selected fuel; however user can edit the value.
- Cost – cost of energy sources, to be entered by the user in specified unit

Multiple energy sources can be added by clicking on ‘ADD ROW’ button. Any row added can also be deleted by clicking on the bin icon. On selection of energy source, the GCV and GHG emission factor gets auto filled with standard values. However the users can change it.

For basic analysis, sector name, annual production and data for minimum one energy source must be provided. After entering all data, click on ‘Estimate Energy Savings’ button.

Estimate Energy Savings Form

Basic Analysis
Advanced Analysis

Sector: * Annual Production (Ton): *

Select Energy Source: * Annual Consumption: * GCV: * GHG Emission Factor: * Cost: * + ADD ROW

Basic Estimate Energy Savings

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.

Image 18: Estimate Energy Savings Form – Basic Analysis

12.2 Basic Analysis Report

12.2.1 Analysis Result

The result of basic gap analysis shows the gap in annual energy consumption in mtoe and kWh (mtoe converted into kWh, 1 mtoe = 10⁷/860 kWh) and maximum monetary savings potential in Lakh INR per year.

12.2.2 Analysis Graph

The graph shows the values of annual energy consumption at present, gap in annual energy consumption and the expected annual energy consumption after covering the gap by means of implementation of energy conservation measures (ECMs).

In addition, the report shows how many similar units it found in the database of the EE Tool, best 5 values of Specific Energy Consumption (SEC) with respective Equivalent Specific Electricity Consumption and Specific Energy Cost.

It also shows the average SEC for the similar units, no. of implemented & verified ECMs applicable for the Unit with total no. of implementation (replication included) and no. of units where ECMs have been implemented. This report can be downloaded and saved as portable document file (.pdf).

12.2.3 Calculation Methodology

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

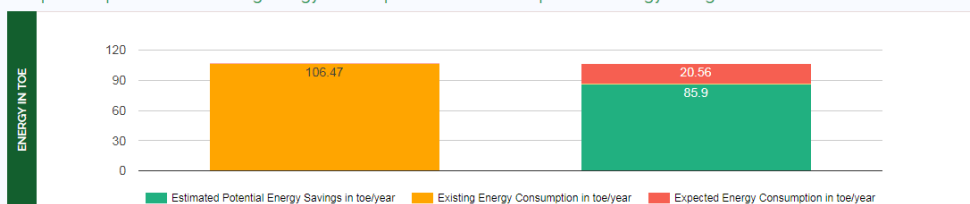
Step 4: Extrapolate the gap in SEC to estimate total gap in annual energy consumption

Basic Report on estimated Potential energy savings for your Industry-Foundry

Estimated Potential Energy Savings -Results

Existing Energy Consumption and Cost of your Industry		Estimated potential Savings from Tool		% Savings
Present Energy consumption:	106.47 toe/year	Estimated potential Energy Savings:	20.56 toe/year	19.31
Present energy consumption equivalent to Electricity:	1237990.33 kWh/year	Estimated energy savings equivalent to Electricity:	239103.42 kWh/year	19.31
Present Energy consumption cost:	₹ 76.92 Lakhs /year	Estimated potential Energy Cost Savings:	₹ 14.86 Lakhs/year	19.31

Graphical representation existing energy consumption and estimated potential energy savings



Basic Analysis Results-Sector Wise MSMEs participated

Sector	Foundry
Technical Assistance provided to similar MSMEs	Sector(Foundry) : 151
Total Number of energy savings measures	1030
Total energy savings from energy savings measures	5196.2 toe
Total monetary savings from energy savings measures	₹3831.41 lakh

Best Specific Energy Consumption (SEC) of MSMEs from our data base

	A	B	C	D	E
Specific Energy Consumption(SEC) in toe/ton	0.132	0.132	0.133	0.134	0.134
Equivalent Specific Electricity Consumption in kWh/ton	1534.98	1537.43	1541.52	1554.48	1557.95
Specific Energy Cost in ₹/ton	9536.65	9551.9	9577.29	9657.81	9679.41

Average SEC for the units that matches selected sector : 0.032 toe/ton

Note : How the estimation of energy savings 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 JEE 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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Image 19: Analysis Report of Estimate Energy Savings

12.2.4 Recommendations:

Only the Bank and FI users and Technical Experts can see the applicable recommendations for the MSME unit based on Analysis after log in.

A no. of recommendations can be selected from a list and for each selection, the estimated energy saving will be deducted from the Gap in the graph i.e. the gap will be reduced and the expected energy consumption of the unit after implementation of such projects will approach the benchmark value.

List of Applicable Energy Efficiency Measures

Recommendation List

- Replacement of LDO fired melting cum holding furnace with electrical melting cum holding furnaces
- 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 (₹/Year)
11	10.8	779964

- Improve operating practices of cupola

Total Recommendation	Estimated Energy Savings Potential (mtoe/year)	Estimated Monetary Savings Potential (₹/Year)
4	8.13	587444.3

- Optimisation of excess air or oxygen percentage

Total Recommendation	Estimated Energy Savings Potential (mtoe/year)	Estimated Monetary Savings Potential (₹/Year)
4	8.13	587444.3

Graph

Back Generate PDF

*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 JEE 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.

Image 20: List of Applicable Energy Efficiency Measures or Recommendations

Energy Savings Assessment Tool for MSMEs

List of Applicable Energy Efficiency Measures

Recommendation List

- Replacement of LDO fired melting cum holding furnace with electrical melting cum holding furnaces
- 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)
11	10.8

- Improve operating practices of cupola

Total Recommendation	Estimated Energy Savings Potential (mtoe/year)	Estimated Monetary Savings Potential (₹/Year)
4	8.13	587444.3

- Optimisation of excess air or oxygen percentage

Congratulations

You can achieve the benchmark after implementing the selected ECMs!

OK

Image 21: Message on if the selected Energy Efficiency Measures can help to reach the Benchmark SEC

Once it reaches the benchmark value, no more recommendations can be selected from the list. However, if the user wants to select other recommendations, he/she

must unselect some recommendations till its energy consumptions become higher than the benchmark and then again the user can select other recommendations from the list.

Energy Savings Assessment Tool for MSMEs

List of Applicable Energy Efficiency Measures

Recommendation List

4	8.13	587444.3
<input checked="" type="checkbox"/> Optimisation of excess air or oxygen percentage		
Total Recommendation	Estimated Energy Savings Potential (mtoe/year)	Estimated Monetary Savings Potential (₹/Year)
41	4.15	299917.18

Down-size air compressor
Please uncheck some recommendations to select other.

Replace existing transformer by energy efficient transformer

Reduction in melting time by melting process optimization

Install lid mechanism for crucible of induction furnace

Replace existing inefficient sand mixer with energy efficient sand mixer

Graph

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Image 22: No more Energy Efficiency Measures can be selected if the selected ones can help to reach the Benchmark SEC

12.2.5 Sample Data Set for Basic Estimation of Energy Savings

Table 1: Sample Data Set for Basic Estimation of Energy Savings

Sector	Annual Production	Energy Source 1	Energy Source 1 Consumption	Energy Source 1 Cost	Energy Source 2	Energy Source 2 Consumption	Energy Source 2 Cost	Energy Source 3	Energy Source 3 Consumption	Energy Source 3 Cost
Die Castings	52	Furnace Oil	37340	40	Electricity	25155	7	-	-	-
Die Castings	119.5	High Speed Diesel (HSD)	61200	70	Electricity	167727	7	-	-	-
Die Castings	452	High Speed Diesel (HSD)	60400	70	Electricity	980590	7	-	-	-
Forging and Heat Treatment	500	High Speed Diesel (HSD)	51412	70	Furnace Oil	53602	40	Electricity	113151	7
Forging and Heat Treatment	812	High Speed Diesel (HSD)	65575	70	Furnace Oil	68369	40	Electricity	190827	7
Plastic and Rubber	342.45	High Speed Diesel (HSD)	119043	70	Electricity	87295	7	-	-	-
Plastic and Rubber	601	High Speed Diesel (HSD)	187069	70	Electricity	326487	7	-	-	-
Plastic and Rubber	279.49	High Speed Diesel (HSD)	66200	70	Electricity	762136	7	-	-	-
Sheet Metal	474	High Speed Diesel (HSD)	25999	70	Electricity	99080	7	-	-	-
Textile	36	High Speed Diesel (HSD)	26272	70	Electricity	15804	7	-	-	-
Forging and Heat Treatment	496	Furnace Oil	96948.29	40	Electricity	66498	7	-	-	-
Forging and Heat Treatment	2458	Furnace Oil	422827.4	40	Electricity	1082541	7	-	-	-
Forging and Heat Treatment	2178	Furnace Oil	425805.4	40	Electricity	712063	7	-	-	-
Foundry	912.4	High Speed Diesel (HSD)	135138.6	70	Electricity	317220.3	7	-	-	-
Foundry	650	High Speed Diesel (HSD)	101196.4	70	Electricity	86827	7	-	-	-
Foundry	1642	High Speed Diesel (HSD)	93216.7	70	Electricity	2467680	7	-	-	-
Chemical	149	High Speed Diesel (HSD)	142992.9	70	Electricity	19956	7	-	-	-

Sector	Annual Production	Energy Source 1	Energy Source 1 Consumption	Energy Source 1 Cost	Energy Source 2	Energy Source 2 Consumption	Energy Source 2 Cost	Energy Source 3	Energy Source 3 Consumption	Energy Source 3 Cost
Chemical	48	High Speed Diesel (HSD)	47102.1	70	Electricity	33780	7	-	-	-
Engineering and Machining	960	High Speed Diesel (HSD)	66000	70	Electricity	187697	7	-	-	-
Engineering and Machining	1200	High Speed Diesel (HSD)	60000	70	Electricity	424684	7	-	-	-
Engineering and Machining	466	High Speed Diesel (HSD)	29810	70	Electricity	629040	7	-	-	-
Chemical	130	High Speed Diesel (HSD)	97130	70	Electricity	245100	7	-	-	-
Sheet Metal	700	High Speed Diesel (HSD)	53761	70	Electricity	25000	7	-	-	-
Sheet Metal	1524	High Speed Diesel (HSD)	118765	70	Electricity	214329	7	-	-	-
Textile	80	High Speed Diesel (HSD)	60342	70	Electricity	399853	7	-	-	-
Textile	235	High Speed Diesel (HSD)	182657	70	Electricity	33170	7	-	-	-

12.3 Advanced Analysis

The only difference in basic and advanced analysis is the detail-level of data that required to be entered. Since in basic analysis very less data is required, the recommendations are more generic whereas in advanced analysis more data required and results in more specific recommendations.

For advanced analysis, the following information is required:

- Sector Name – to be selected from dropdown menu (mandatory)
- Sub Sector Name – to be selected from dropdown menu (non mandatory)
- Major Sub Sector Name – it is one of the selected sub sectors that have majority of the production, to be selected from dropdown menu (non mandatory)
- Major Equipment – the equipments used in the plant, to be selected from dropdown menu (non mandatory). Multiple equipments can be selected by clicking on Add button.
- Tag Name – it is the code name by which it is known in the plant, to be entered by the user (non mandatory)
- Capacity – Annual production capacity of the plant in the specified unit, to be entered by the user (non mandatory)
- Operating Hours per Day – average operating hour of the plant per day, to be entered by the user (non mandatory)
- Operating days per Year – average operating days of the plant per year, to be entered by the user (non mandatory)
- No. of Years in Operation – no. of years of the plant functioning, to be entered by the user (non mandatory)
- Product Material Type – to be selected from dropdown menu (non mandatory)
- Major Product Material Type – it is one of the selected Product Material Types that have majority of the production, to be selected from dropdown menu (non mandatory)
- Final Product Name – to be selected from dropdown menu (non mandatory)
- Major Final Product Name – it is one of the selected Final Product Names that have majority of the production, to be selected from dropdown menu (non mandatory)
- Final Product Type – to be selected from dropdown menu (non mandatory)
- Major Final Product Type – it is one of the selected Final Product Types that have majority of the production, to be selected from dropdown menu (non mandatory)
- Annual Production – annual production of the plant in the specified unit, to be entered by the user (mandatory)
- Energy Sources – to be selected from dropdown menu (mandatory). Multiple energy sources can be selected by clicking on Add button.
- Annual Consumption – annual consumption of energy sources in specified unit (mandatory)

- GCV – Gross Calorific Value (GCV) or thermal energy equivalency of energy sources in specified unit (mandatory). This is auto filled with standard value for the selected fuel; however user can edit the value.
- GHG Emission Factor – green house gas emission factor of energy sources in specified unit (mandatory). This is auto filled with standard value for the selected fuel; however user can edit the value.
- Cost – cost of energy sources, to be entered by the user in specified unit (mandatory)

Estimate Energy Savings Form

Basic Analysis **Advanced Analysis**

PROCESS DETAILS

Sector: * Sub Sector: Major Sub Sector:

Abrasive Select Here -- Select --

Major Equipment: Tag Name

100W Incandescent Lamp Enter Tag Name **ADD ROW**

OPERATIONAL DETAILS

Capacity (TPA): Operating Hours per Day: Operating Days per Year: No. of Years in Operation:

PRODUCT DETAILS

Product Material Type: Major Product Material Type:

Select Here -- Select --

Final Product Name: Major Final Product Name:

Select Here -- Select --

Final Product Type: Major Final Product Type:

Select Here -- Select --

Annual Production (Ton): *

ENERGY DETAILS

Select Energy Source:*	Annual Consumption *	GCV :*	GHG Emission Factor *	Cost :*
-- Select --	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ADD ROW

Advanced Estimate Energy Savings

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.

Image 23: Estimate Energy Savings Form – Advanced Analysis

12.3.1 Sample Data Set for Advanced Analysis:

Table 2: Sample Data Set for Advanced Analysis – for Foundry Sector

Process Details			
Sector		Sub Sector	Major Sub Sector
Foundry		CI Casting SGI Casting	CI Casting
Major Process Equipment		Tag Name	
Induction Furnace		IF 1	
(ADD ROW)			
Major Process Equipment		Tag Name	
Sand Plant		SP 1	
(ADD ROW)			
Major Process Equipment		Tag Name	
Shot Blast Machine		SBM 1	
Operational Details			
Capacity (TPA)	Operating Hours per Day	Operating Days per Year	No. of Years in Operation
2400	8	300	20
Product Details			
Product Material Type		Major Product Material Type	
CI Castings SGI Castings		CI Castings	
Final Product Name		Major Final Product Name	
Agriculture Parts Automobile Components		Automobile Components	
Final Product Type		Major Final Product Type	
Finished		Finished	
Annual Production (Ton)			
2342			
Energy Details			
Select Energy Source	Annual Consumption (kWh)	Thermal Energy Equivalent/GCV (kCal/kWh)	GHG Emission Factor (tCO ₂ e/kWh)
Electricity	2467680	860	0.00089
High Speed Diesel (HSD)	90314.6	9783	0.00253674
			Cost (INR/kWh)
			7
			70

Table 3: Sample Data Set for Advanced Analysis – for Forging and Heat Treatment Sector

Process Details			
Sector		Sub Sector	Major Sub Sector
Forging and Heat Treatment		Forging Heat Treatment	Forging
Major Process Equipment		Tag Name	
FO fired Forging Furnace		FOF 1	
(ADD ROW)			
Major Process Equipment		Tag Name	
Electrical Heat Treatment Furnace		EHTF 1	
(ADD ROW)			
Operational Details			
Capacity (TPA)	Operating Hours per Day	Operating Days per Year	No. of Years in Operation
4800	16	300	15
Product Details			
Product Material Type		Major Product Material Type	



“KEEP BLANK”		“KEEP BLANK”				
Final Product Name		Major Final Product Name				
“KEEP BLANK”		“KEEP BLANK”				
Final Product Type		Major Final Product Type				
“KEEP BLANK”		“KEEP BLANK”				
Annual Production (Ton)						
2548						
Energy Details						
Select Energy Source	Annual Consumption (kWh)	Thermal Equivalent/GCV (kCal/kWh)	Energy	GHG Factor (tCO ₂ e/kWh)	Emission	Cost (INR/kWh)
Furnace Oil	422827.4	9870		0.0028954		40
Electricity	1082541	860		0.00089		7

The Analysis Report and recommendations in Advanced Analysis are same as described for Basic Gap Analysis.

13 EE Assessment Tool

This feature is available for the registered users only. This tool is helpful in reviewing the actual benefits achieved by implementation of energy efficiency measures. User can use different filters to trim the search results of the tool.

EE ASSESSMENT TOOL Reset

General Recommendation

Sector: Sub Sector:

State: Location:

No. of Years in Operation: Category: Operating Hours per Day: Operating Days per Year:

Product Material Type: Final Product Name: Final Product Type:

Annual Thermal Energy Consumption (mtoe): Annual Electricity Consumption (kWh): Annual Total Energy Consumption (mtoe): Annual GHG Emission (tCO₂e):

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

Image 24: Filters under General Tab of EE Assessment Tool

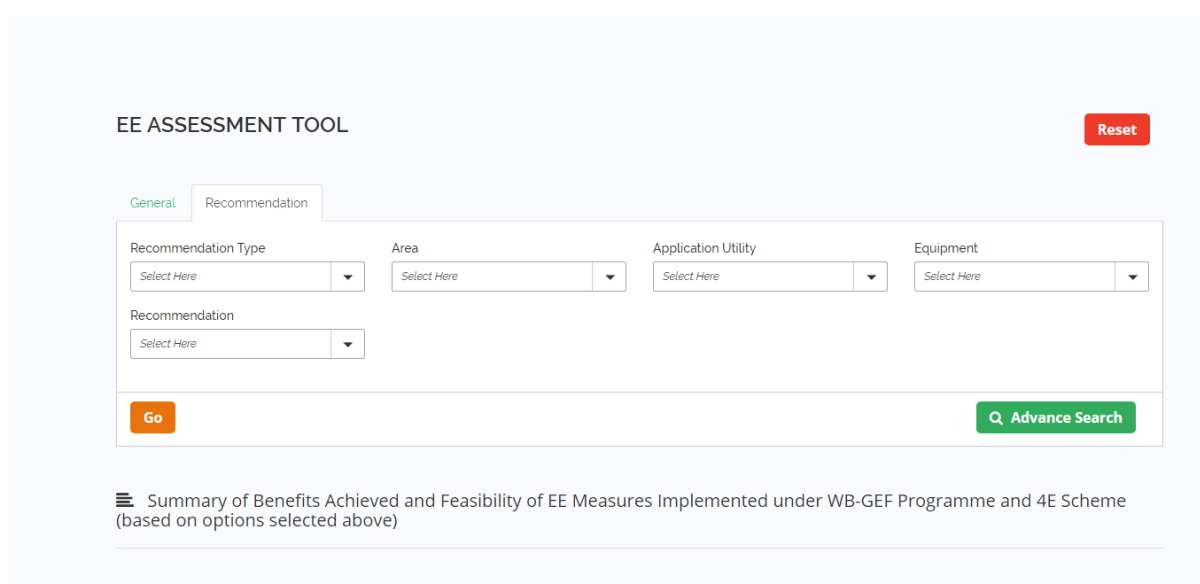


Image 25: Filters under Recommendation Tab of EE Assessment Tool

The filters are categorized as General and Recommendation and available in two separate tabs. In general tab, the filters are based on factory details whereas in recommendation tab, the filters are based on recommendation details. Here some of the filters are in dropdown menu and some are ranges. In dropdowns, after selection the “OK” button should be clicked to apply the filters.

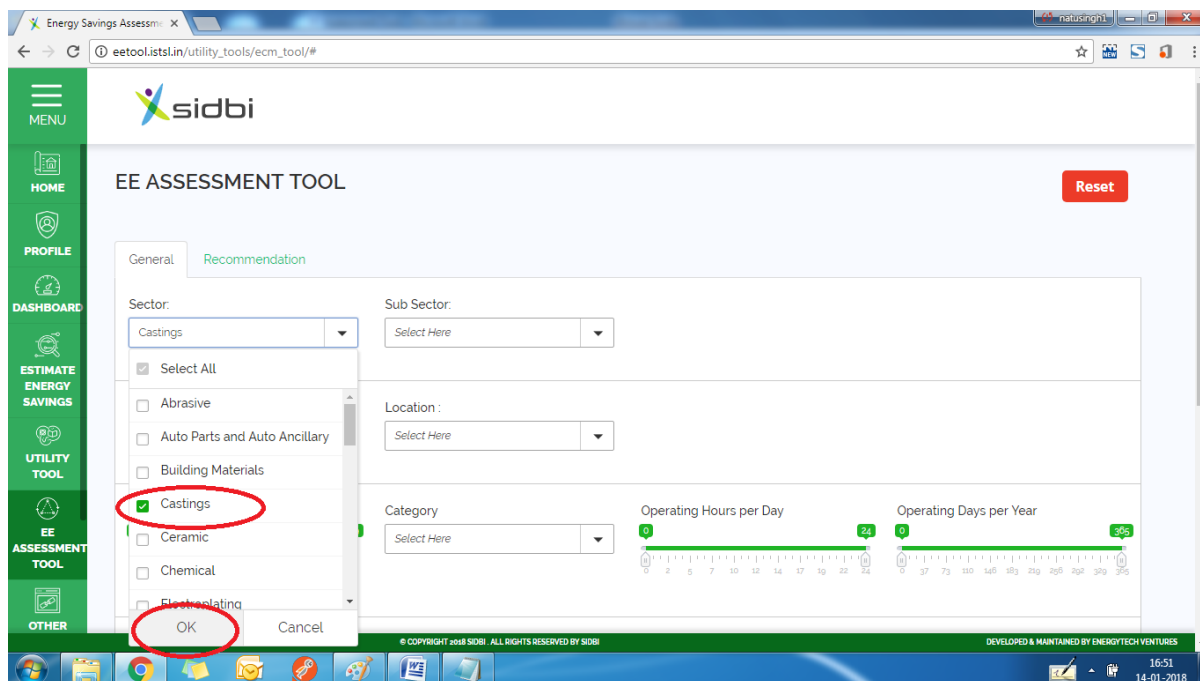


Image 26: Selection from Dropdowns

After applying the filter, the no. matches i.e. the no. of implemented and verified recommendations will be shown below. It is to be mentioned that applying too many filters may result no matches.

13.1 Search Results of EE Assessment Tool

After applying all the required filters, click on the ‘Go’ button and it will show the summarized result in the same page. The summarized result consists of

- Total Annual Energy Savings Achieved
- Total Annual GHG Emission Reduction
- Total Annual Monetary Savings Achieved
- Total Investment Done
- Average Payback Period

Total Annual Energy Savings Achieved 314.69 mtoe	Total Annual GHG Emission Reduction 933.63 tCO₂e	Total Annual Monetary Savings Achieved ✕ ₹133.11 Lakh
Total Investment Done ₹207.18 Lakh		Average Payback Period 19 Months

Image 27: Summarized Search Result of EE Assessment Tool

Now for further details click on the ‘Advance Search’ button. It will show “Summary of Benefits Achieved and Feasibility of EE Measures Implemented under WB-GEF Programme and 4E Scheme” based on options selected. Here a list of energy efficiency measures will be populated.

☰ 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
Convert Off Circuit tap changer of transformer to On Load Tap Changer
Downsizing of existing induction furnace to meet process requirement
Improve operating practices of cupola
Install capacitor bank to improve power factor and reduce maximum demand
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
Installation of temperature controller for core oven
Optimize pressure setting of air compressor
Optimize process to reduce interruptions

Image 28: Summary of Benefits Achieved and Feasibility of EE Measures Implemented under WB-GEF Programme and 4E Scheme

Now, the user can click on a particular energy efficiency measure. It will further populate a list of all the projects under that energy efficiency measure. Here Energy Savings, Monetary Savings, Investment and Simple Payback will be shown for each project.

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	
Convert Off Circuit tap changer of transformer to On Load Tap Changer	
Downsizing of existing induction furnace to meet process requirement	
11. Downsizing of existing induction furnace to meet process requirement	+
Actual Total Energy Savings (mtoe) : 15.17 Actual Monetary Savings (₹ lakh) : 13.93 Actual Investment (₹ lakh) : 11.34 Simple Payback (Months) : 10	
Improve operating practices of cupola	
12. 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	
13. Improving operating practices of cupola	+
Actual Total Energy Savings (mtoe) : 0.9 Actual Monetary Savings (₹ lakh) : 0.45 Actual Investment (₹ lakh) : 2.24 Simple Payback (Months) : 60	
14. 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 capacitor bank to improve power factor and reduce maximum demand	
Install lid mechanism for crucible of induction furnace	

Image 29: List of all the Projects under a particular Energy Efficiency Measure

Now, the user can click on a particular project for further details. It will show the following information:

- Recommendation Type
- Area
- Application Utility
- Equipment
- Actual Electrical Energy Savings
- Actual Thermal Energy Savings
- Fuel Type
- Actual Total Energy Savings
- Actual Monetary Savings
- Actual Investment
- Simple Payback
- Actual Annual GHG Reduction
- District

If any of the above listed information is not applicable for a particular project, it will not be shown.

Improve operating practices of cupola					
12. Improving operating practices of cupola Furnace - 2					
Recommendation Type	Area	Application Utility	Equipment	Actual Thermal Energy Savings (mtoe)	Fuel Type
Operational Practices and Management	Furnace	Cupola Furnace	Others	22.58	Coke
Actual Total Energy Savings (mtoe)	Actual Monetary Savings (₹ lakh)	Actual Annual GHG Reduction (tCO2)	District		
22.58	10.54	109.61	Kolhapur		
13. Improving operating practices of cupola					
Actual Total Energy Savings (mtoe) : 0.9 Actual Monetary Savings (₹ lakh) : 0.45 Actual Investment (₹ lakh) : 2.24 Simple Payback (Months) : 60					
14. 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					

Image 30: Energy Efficiency Project wise details

14 Utility Tool:

The utility tool is available for registered users for assessing the performance of the common utilities including Boiler, Compressor, Fan, Motor, Pump and Furnace. First click on the “Utility Tool” in the left hand side menu bar, it will open a sub-menu where links for all aforesaid utilities will be available. Now user needs to click on the utility name for which assessment is required.

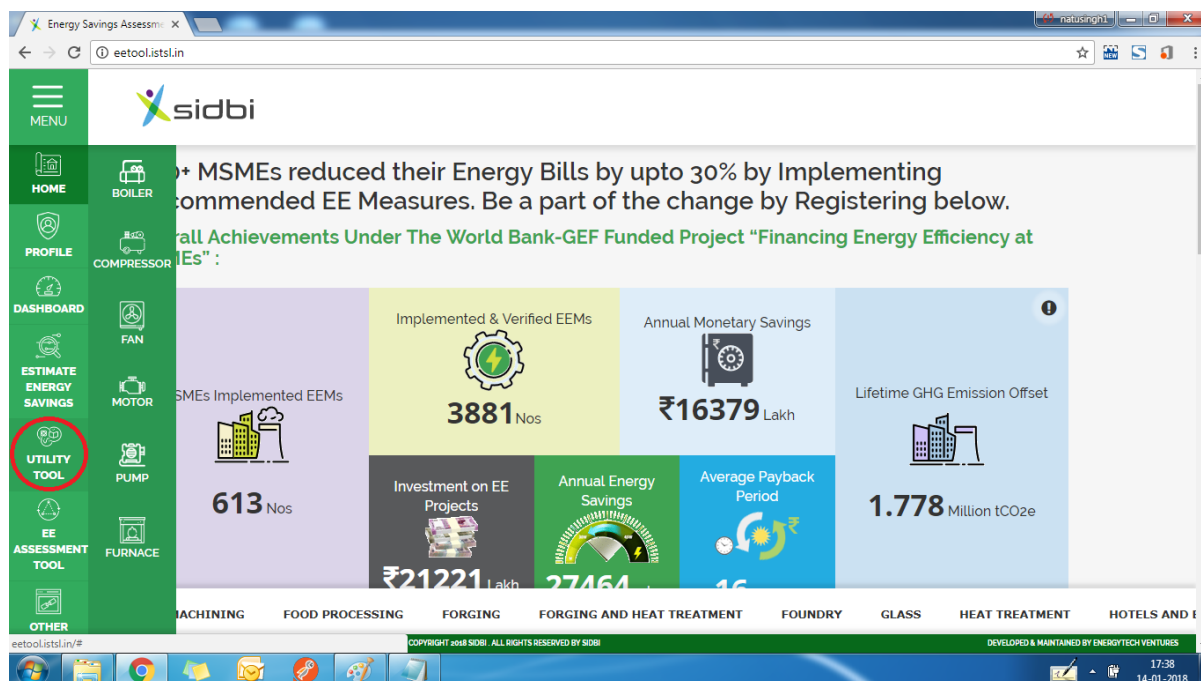


Image 31: Link of Utility Tool

14.1 Boiler Tool:

To start using boiler tool, the user first need to click on ‘Add New Boiler’ button.

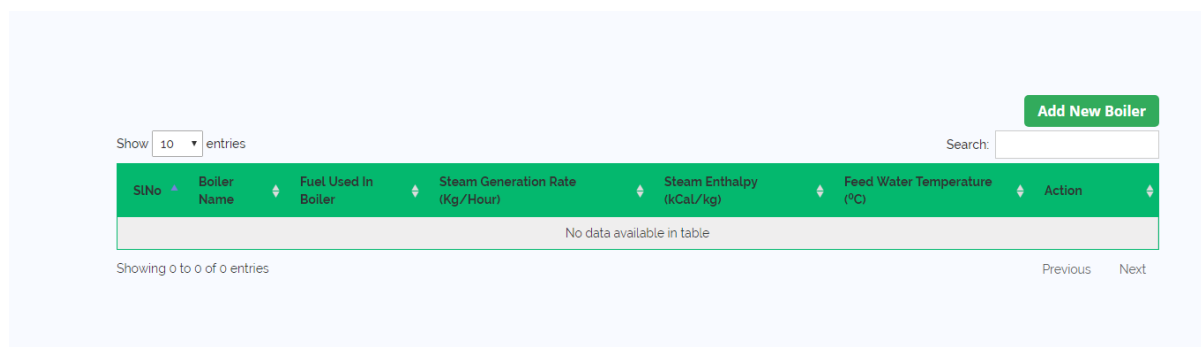


Image 32: Add a Boiler

Adding a new boiler will open a data entry form. Here the user needs to enter the following data:

- Boiler Name – to be entered by the user
- Energy Source Used – to be selected by the user from dropdown menu
- GCV – Gross Calorific Value of the selected fuel, it will auto filled with standard value for the selected fuel; however user can edit the value.

- Steam Generation Rate – the rate at which steam is being generated from the boiler, to be entered by the user in Kg/Hour
- Steam Enthalpy – Enthalpy of the generated steam can be obtained from steam table using temperature and pressure of the steam. It is to be entered by the user in kCal/kg.
- Feed Water Temperature – to be entered by the user in kCal/kg
- Fuel Firing Rate – the rate at which fuel combustion takes place in the boiler, to be entered by the user in the specified unit

Image 33: Boiler Data Entry Form






After entering the data, click on the ‘Submit’ button, this will show the boiler efficiency with the data entered.

Image 34: Boiler Performance Analysis

This can be downloaded in pdf file by clicking on ‘Download PDF’.

All the boilers added will be available in the boiler tool. The user can delete any boiler by clicking on the bin icon (red) and can edit the entered data by clicking on edit icon (green).

Showing 1 to 6 of 6 entries

SINo	Boiler Name	Fuel Used In Boiler	Steam Generation Rate (Kg/Hour)	Steam Enthalpy (kCal/kg)	Feed Water Temperature (°C)	Action
1	b1	High Speed Diesel (HSD)	7896	126	12	 
2	b1	High Speed Diesel (HSD)	7896	126	12	 
3	b1	High Speed Diesel (HSD)	7896	126	12	 
4	b1	Natural Gas	343	660	120	 
5	Boiler	Coal	200	660	120	 
6	Boiler111	Coal	200	660	120	 

Showing 1 to 6 of 6 entries

Previous 1 Next

Image 35: Boiler List

Editing a boiler will open previous data in edit mode, user can change the data and submit it again and get the current performance.

Edit Boiler

Boiler Tool

Boiler Name: Energy Source Used: GCV (kCal/kg): Steam Generation Rate (Kg/Hour): Steam Enthalpy (kCal/kg):

Feed Water Temperature (°C): Fuel Firing Rate (kg/Hour):

Image 36: Edit Existing Boiler Data

14.2 Compressor Tool:

To start using compressor tool, the user first need to click on 'Add New Compressor' button.

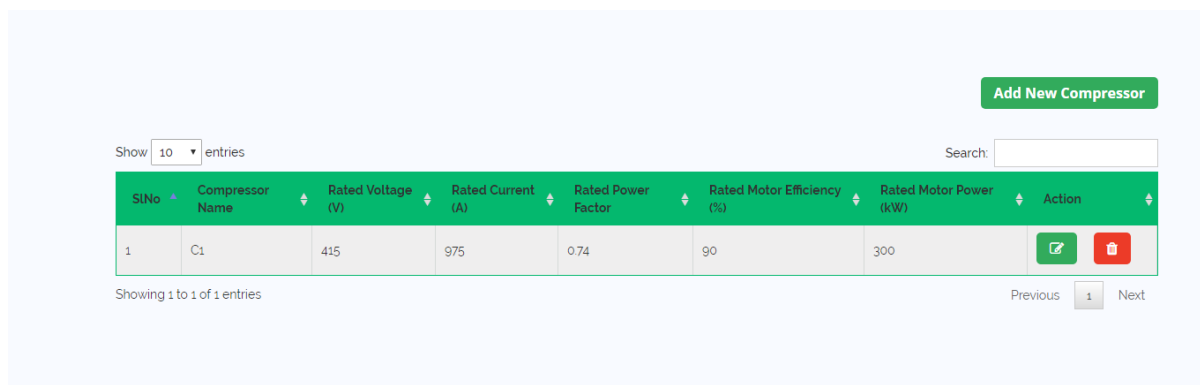


Image 37: Add a Compressor

Adding a new compressor will open a data entry form. Here the user needs to enter the following data:

- Compressor Name – to be entered by the user
- Rated Voltage – to be entered by the user in Volt from nameplate or specification
- Rated Current – to be entered by the user in Ampere from nameplate or specification
- Rated Power Factor – to be entered by the user(0<value<1) from nameplate or specification
- Rated Efficiency – to be entered by the user(0<value<100) from nameplate or specification
- Rated kW – to be entered by the user in kW from nameplate or specification
- Compressor Design Delivery Rate – to be entered by the user in cubic meter/minute from nameplate or specification
- Total Fresh Air Suction Area – to be entered by the user in square meter from nameplate or specification
- Measured Voltage – to be entered by the user in Volt from measurement
- Measured Current – to be entered by the user in Ampere from measurement
- Measured Power Factor – to be entered by the user(0<value<100) from measurement
- Measured kW – to be entered by the user in kW from measurement
- Average Air Velocity – to be entered by the user in meter/sec from measurement
- Compressed Air Delivery Pressure – to be entered by the user in kg/square cm from measurement

Add Compressor

Compressor Tool

Compressor Name:	Rated Voltage (V):	Rated Current (A):	Rated Power Factor:	Rated Efficiency(%):
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Rated kW:	Compressor Design Delivery Rate(m ³ /minute):	Total Fresh Air Suction Area(m ²):		
<input type="text"/>	<input type="text"/>	<input type="text"/>		
Measured Voltage(V):	Measured Current(A):	Measured Power Factor:	Measured kW:	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Average Air Velocity in m/s:	Compressed Air Delivery Pressure(kg/cm ²):			
<input type="text"/>	<input type="text"/>			

Submit
Go Back

Image 38: Compressor Data Entry Form

After entering the data, click on the ‘Submit’ button, this will show the capacity utilization and specific energy consumption of the compressor with the data entered.

Compressor Tool

Compressor Name:	Rated Voltage (V):	Rated Current (A):	Performance Analysis <div style="border: 1px solid #ccc; background-color: #d1ecf1; padding: 5px; margin-bottom: 5px;">Capacity Utilized - 2.5 %</div> <div style="border: 1px solid #ccc; background-color: #d1ecf1; padding: 5px;">Compressor Specific Energy Consumption - 0.01 kWh / m³</div>
<input type="text" value="Air Compressor3"/>	<input type="text" value="415"/>	<input type="text" value="975"/>	
Rated Power Factor:	Rated Efficiency(%):	Rated kW:	
<input type="text" value="0.74"/>	<input type="text" value="90"/>	<input type="text" value="300"/>	
Compressor Design Delivery Rate (m ³ /minute):	Total Fresh Air Suction Area(m ²):	Measured Voltage(V):	
<input type="text" value="12000"/>	<input type="text" value="2"/>	<input type="text" value="402"/>	
Measured Current(A):	Measured Power Factor:	Measured kW:	
<input type="text" value="863.7"/>	<input type="text" value="0.72"/>	<input type="text" value="250"/>	
Average Air Velocity in m/s:	Compressed Air Delivery Pressure(kg/cm ²):		
<input type="text" value="2.5"/>	<input type="text" value="71"/>		

Go Back
DOWNLOAD PDF

Image 39: Compressor Performance Analysis

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All the compressors added will be available in the compressor tool. The user can delete any compressor by clicking on the bin icon (red) and can edit the entered data by clicking on edit icon (green).

SINo	Compressor Name	Rated Voltage (V)	Rated Current (A)	Rated Power Factor	Rated Motor Efficiency (%)	Rated Motor Power (kW)	Action
1	Air Compressor. 31	4	4341	31	313	213	[Edit] [Delete]
2	Compressor 35	76	6	6	876	86	[Edit] [Delete]
3	Air Compressor.4	2423	4234234	234234	2344	4	[Edit] [Delete]
4	Compressor Motor	415	35	0.80	90	18.50	[Edit] [Delete]
5	Air Compressor3	415	975	0.74	90	300	[Edit] [Delete]
6	Compressor111	415	975	0.74	90	300	[Edit] [Delete]
7	Air Compressor. 90	415	975	0.74	90	300	[Edit] [Delete]

Image 40: Compressor List

Editing a compressor will open previous data in edit mode, user can change the data and submit it again and get the current performance.

Edit Compressor

Compressor Tool

Compressor Name: Rated Voltage (V): Rated Current (A): Rated Power Factor: Rated Efficiency(%):

Rated kW: Compressor Design Delivery Rate(m³/minute): Total Fresh Air Suction Area(m²):

Measured Voltage(V): Measured Current(A): Measured Power Factor: Measured kW:

Average Air Velocity in m/s: Compressed Air Delivery Pressure(kg/cm²):

Image 41: Edit Existing Compressor Data

This tool is useful if there are multiple compressors connected with a single receiver and it is not possible to isolate the compressor and receiver from other compressors. However, if it is possible to run a single compressor connected with

the receiver, please use the Alternative Compressor Tool for more detailed performance analysis.

- In alternative compressor tool, user needs to enter the following data:
- Compressor Name – to be entered by the user
- Rated Capacity – to be entered by the user in cubic meter/minute from nameplate or specification
- Rated Voltage – to be entered by the user in Volt from nameplate or specification
- Rated Current – to be entered by the user in Ampere from nameplate or specification
- Rated Power – to be entered by the user in kW from nameplate or specification
- Rated Power Factor – to be entered by the user (0<value<1) from nameplate or specification
- Rated Motor Efficiency – to be entered by the user (0<value<100) from nameplate or specification
- Measured Voltage – to be entered by the user in Volt from measurement at both Loading Condition and Unloading Condition
- Measured Current – to be entered by the user in Ampere from measurement at both Loading Condition and Unloading Condition
- Measured Power – to be entered by the user in kW from measurement at both Loading Condition and Unloading Condition
- Measured Power Factor – to be entered by the user (0<value<100) from measurement at both Loading Condition and Unloading Condition
- Atmospheric Pressure – to be entered by the user in kg/cm² from measurement
- Initial Pressure after Bleeding – to be entered by the user in kg/cm² from measurement
- Final Pressure after Filling – to be entered by the user in kg/cm² from measurement
- Storage volume which includes Receiver, After Cooler and Delivery Piping – to be entered by the user in cubic meter from nameplate or specification
- Ambient Air Temperature – to be entered by the user in °C from measurement
- Compressed Air Temperature at Discharge - to be entered by the user in °C from measurement
- Time take to build up Final Pressure – to be entered by the user in minute from measurement
- Loading Time – to be entered by the user in second from measurement
- Unloading Time – to be entered by the user in second from measurement

Add Compressor

Compressor Tool
Alternative Compressor Tool

Compressor Name:	Rated Capacity (m ³ /minute):	Rated Voltage (V):	Rated Current (A):
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Rated Power (kW):	Rated Power Factor:	Efficiency(%):	
<input type="text"/>	<input type="text"/>	<input type="text"/>	

Measurements	At Loading Condition	At Unloading Condition
Measured Voltage (V)	<input type="text"/>	<input type="text"/>
Measured Current (A)	<input type="text"/>	<input type="text"/>
Measured Power (kW)	<input type="text"/>	<input type="text"/>
Measured Power Factor	<input type="text"/>	<input type="text"/>

Atmospheric Pressure (kg/cm ²):	Initial Pressure after Bleeding (kg/cm ²):	Final Pressure after Filling (kg/cm ²):	Storage volume which includes Receiver, After Cooler and Delivery Piping (m ³):	Ambient Air Temperature (°C):
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Compressed Air Temperature at Discharge (°C):	Time take to build up Final Pressure (minute):	Loading Time (second):	Unloading Time (second):	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

Submit
Go Back

Image 42: Compressor Data Entry Form for Alternative Compressor Tool

After entering the data, click on the ‘Submit’ button, this will show the actual free air discharge, capacity shortfall, specific energy consumption, isothermal efficiency, % leakage and leakage quantity of the compressor with the data entered.

Other functions (Download PDF, Edit) are working in same way as described in compressor tool.

14.3 Fan Tool:

To start using fan tool, the user first need to click on 'Add New Fan' button.

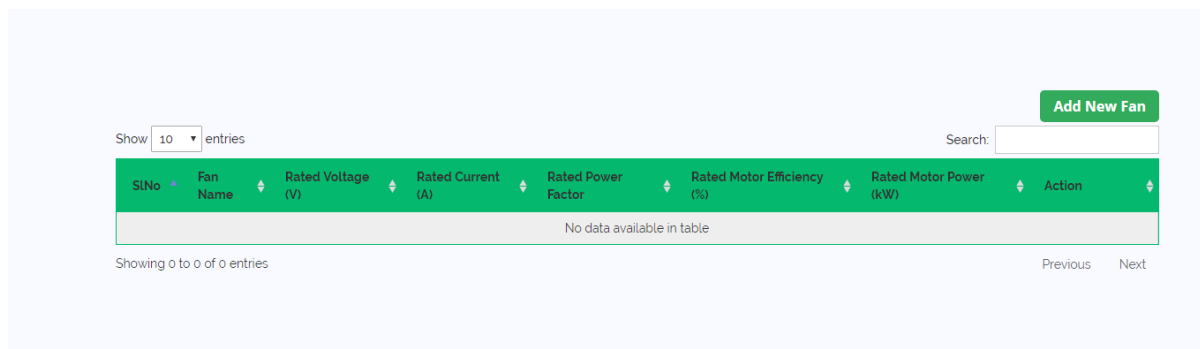


Image 43: Add a Fan

Adding a new fan will open a data entry form. Here the user needs to enter the following data:

- Fan Name – to be entered by the user
- Rated Voltage – to be entered by the user in Volt from nameplate or specification
- Rated Current – to be entered by the user in Ampere from nameplate or specification
- Rated Power Factor – to be entered by the user ($0 < \text{value} < 1$) from nameplate or specification
- Rated Efficiency – to be entered by the user ($0 < \text{value} < 100$) from nameplate or specification
- Rated kW – to be entered by the user in kW from nameplate or specification
- Total Fresh Air Suction Area – to be entered by the user in square meter from nameplate or specification
- Measured Voltage – to be entered by the user in Volt from measurement
- Measured Current – to be entered by the user in Ampere from measurement
- Measured Power Factor – to be entered by the user ($0 < \text{value} < 100$) from measurement
- Measured kW – to be entered by the user in kW from measurement
- Average Air Velocity – to be entered by the user in meter/sec from measurement
- Suction Pressure – to be entered by the user in mmwc cm from measurement
- Discharge Pressure – to be entered by the user in mmwc cm from measurement

Add Fan

Fan Tool

Fan Name:	Rated Voltage (V):	Rated Current (A):	Rated Power Factor:	Rated Efficiency(%):
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Rated kW:	Total Fresh Air Suction Area(m2):			
<input type="text"/>	<input type="text"/>			
Measured Voltage(V):	Measured Current(A):	Measured Power Factor:	Measured Power(kW):	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Average Air Velocity in m/s:	Suction Pressure(mmwc):	Discharge Pressure(mmwc):		
<input type="text"/>	<input type="text"/>	<input type="text"/>		

Image 44: Fan Data Entry Form

After entering the data, click on the ‘Submit’ button, this will show the mechanical efficiency and specific energy consumption of the fan with the data entered.

Fan Tool

Fan Name:	Rated Voltage (V):	Rated Current (A):	Performance Analysis
Fan111	415	14	
Rated Power Factor:	Rated Efficiency(%):	Rated kW:	
0.88	86	7.5	
Total Fresh Air Suction Area(m2):	Measured Voltage(V):	Measured Current(A):	
2	410	11.1	
Measured Power Factor:	Measured kW:	Average Air Velocity in m/s:	
0.80	6.3	2.22	
Suction Pressure(mmwc):	Discharge Pressure(mmwc):		
25	30		

Image 45: Fan Performance Analysis

This can be downloaded in pdf file by clicking on ‘Download PDF’.

All the fans added will be available in the fan tool. The user can delete any fan by clicking on the bin icon (red) and can edit the entered data by clicking on edit icon (green).









SNo	Fan Name	Rated Voltage (V)	Rated Current (A)	Rated Power Factor	Rated Motor Efficiency (%)	Rated Motor Power (kW)	Action
1	Fan 14	420	220	0.98	64	98	 
2	Fan1	420	220	0.87	98	45	 
3	Fan 3	415	14	0.88	86	75	 
4	Fan111	415	14	0.88	86	75	 

Image 46: Fan List

Editing a fan will open previous data in edit mode, user can change the data and submit it again and get the current performance.

Edit Fan

Fan Tool

Fan Name: Rated Voltage (V): Rated Current (A): Rated Power Factor: Rated Efficiency(%):

Rated kW: Total Fresh Air Suction Area(m2):

Measured Voltage(V): Measured Current(A): Measured Power Factor: Measured Power(kW):

Average Air Velocity in m/s: Suction Pressure(mmwc): Discharge Pressure(mmwc):

Image 47: Edit Existing Fan Data

14.4 Motor Tool:

To start using motor tool, the user first need to click on 'Add New Motor' button.

The screenshot shows a web interface for the Motor Tool. At the top right, there is a green 'Add Motor' button. Below it, there is a search bar and a dropdown menu for 'Show 10 entries'. The main part of the interface is a table with the following columns: SNo, Motor Name, Rated current(A), Rated voltage(V), Rated Power(KW), Rated Efficiency(%), Rated PF, and Action. The table contains three entries. Below the table, there is a pagination control showing 'Showing 1 to 3 of 3 entries (filtered from 38 total entries)' and 'Previous 1 Next'.

SNo	Motor Name	Rated current(A)	Rated voltage(V)	Rated Power(KW)	Rated Efficiency(%)	Rated PF	Action
1	testtt	415	85	89	97	0.99	View Generate PDF Edit
2	Test	152	415	90	93.6	0.88	View Generate PDF Edit
3	aaaa	122	415	87	98	0.77	View Generate PDF Edit

Image 48: Add a Motor

Adding a new motor will open a data entry form. Here the user needs to enter the following data:

- **Motor Details**
 - Motor Name – to be entered by the user
 - Motor Description – to be entered by the user
- **Rated Data**
 - Rated Current – to be entered by the user in Ampere from nameplate or specification
 - Rated Voltage – to be entered by the user in Volt from nameplate or specification
 - Rated Power – to be entered by the user in kW from nameplate or specification
 - Total Fresh Air Suction Area – to be entered by the user in square meter from nameplate or specification
 - Rated Efficiency – to be entered by the user(0<value<100) from nameplate or specification
 - Rated PF (Power Factor) – to be entered by the user(0<value<1) from nameplate or specification
 - Number of Poles – to be selected by the user from dropdown menu
 - Electricity Cost – cost of electricity in INR/kWh or INR/Unit, to be entered by the user
- **Measured Data**
 - Date & Time – to be entered by the user in YYYY-MM-DDHH:MM format
 - Current – to be entered by the user in Ampere from measurement
 - Voltage – to be entered by the user in Volt from measurement
 - Actual Power – to be entered by the user in kW from measurement

- Apparent Power – to be entered by the user in kW from measurement
- Power Factor – to be entered by the user (0<value<100) from measurement

Motor Tool Form

MOTOR DETAILS

Motor Name Motor Description

RATED DATA

Rated Current(A) Rated Voltage(V) Rated Power(KW) Rated Efficiency(%) Rated PF Number of Poles

Electricity Cost(₹/kWh)

MEASURED DATA

Date & Time	Current(A)	Voltage(V)	Actual Power(KW)	Apparent Power(KVA)	Power Factor
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Image 49: Motor Data Entry Form

After entering the data, click on the ‘Submit’ button, this will show the performance of the motor, Underloading summary and applicable actions that can be taken for improving motor efficiency.

Performance Report

Motor Rated Parameter

Motor Name	Rated current(A)	Rated voltage(V)	Rated Power(KW)	Rated Efficiency(%)	Rated PF	Number of Poles	Electricity Cost(₹/kWh)
Test	152	415	90	93.6	0.88	6	9

Data Sets

Date & Time	Entered Parameters				Calculated Parameters		
	Current(A)	Voltage(V)	Actual Power(KW)	Apparent Power(KVA)	Power Factor	Loading Index(%)	Efficiency Index(%)
2017-08-24 03:30:00	78	398	78	84	0.88	49.21	93.6
2017-08-24 03:45:00	73	418	92	89	0.81	44.28	93.08↓
2017-08-24 04:00:00	60	400	57	91	0.98	42.37	93.6
2017-08-24 04:15:00	89	401	68	98	0.9	57.87	93.6
2017-08-24 04:30:00	45	409	61	57	0.47	14.22	85.41↓

Performance Snapshot

	Loading Index (%)	Efficiency Index (%)	Deviation (KW)
Lowest	14.22	85.41	1.31
Highest	57.87	93.6	0
Average	42.08	91.86	0.77

Under Loading Summary

Occurrence Percentage (%)	Loading Index (%)	Operational Efficiency index (%)	Deviation (KW)
20	14.22	91.25	1.31

Take Action

Description

Higher Rated Efficiency Motor Available in the Market.
Unexpected deviation of Operational Efficiency of the motor, take maintenance.

[Generate PDF](#)**Image 50: Motor Performance Analysis**

This can be downloaded in pdf file by clicking on 'Generate PDF'.

All the motors added will be available in the motor tool. The user can view the report of a motor by clicking on 'View' button, download report in pdf by clicking on 'Generate PDF' button or edit the entered data by clicking on 'Edit' button.

Show entries Search: [Add Motor](#)

SINo	Motor Name	Rated current(A)	Rated voltage(V)	Rated Power(KW)	Rated Efficiency(%)	Rated PF	Action
1	Test 1	415	85	89	97	0.99	View Generate PDF Edit
2	Pump Motor	122	415	87	98	0.77	View Generate PDF Edit
3	Test	152	415	90	93.6	0.88	View Generate PDF Edit

Showing 1 to 3 of 3 entries (filtered from 38 total entries) Previous Next

Image 51: Motor List

Editing a motor will open previous data in edit mode, user can change the data and submit it again and get the current performance.

Motor Tool Form

MOTOR DETAILS
Motor Name: Motor Description:

RATED DATA
Rated Current(A): Rated Voltage(V): Rated Power(KW): Rated Efficiency(%): Rated PF: Number of Poles:
Electricity Cost(₹/kWh):

MEASURED DATA

Date & Time	Current(A)	Voltage(V)	Actual Power(KW)	Apparent Power(KVA)	Power Factor
2017-12-22 17:00:00	8.57	399.83	2.31	5.94	0.37
2017-12-22 17:15:00	7.91	399	0.86	5.47	0.15
2017-12-22 17:30:00	9.3	400	3.65	6.45	0.56
2017-12-22 17:45:00	9.34	401	3.72	6.49	0.57
2017-12-22 18:00:00	8.75	396	2.68	6.01	0.44

[Submit](#)

Image 52: Edit Existing Motor Data

14.5 Pump Tool:

To start using pump tool, the user first need to click on 'Add New Pump' button.

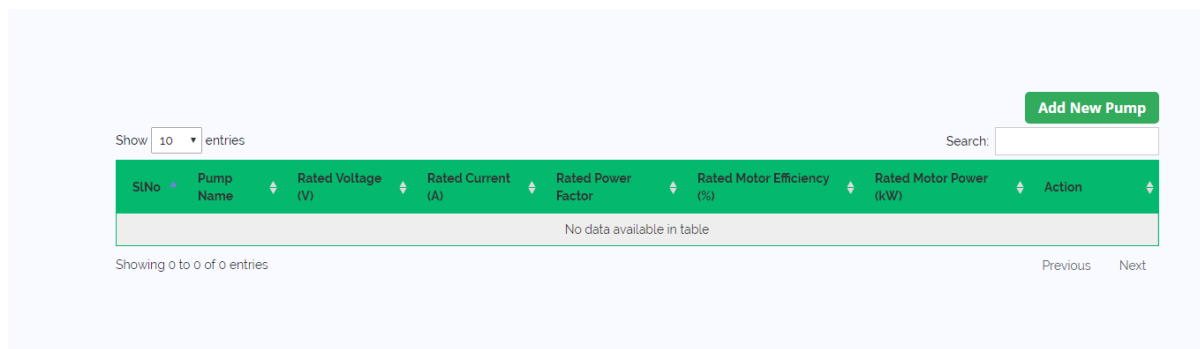


Image 53: Add a Pump

Adding a new pump will open a data entry form. Here the user needs to enter the following data:

- Pump Name – to be entered by the user
- Rated Voltage of Motor– to be entered by the user in Volt from nameplate or specification
- Rated Current of Motor – to be entered by the user in Ampere from nameplate or specification
- Rated Power Factor of Motor – to be entered by the user (0<value<1) from nameplate or specification
- Rated Efficiency of Motor (%) – to be entered by the user (0<value<100) from nameplate or specification
- Rated Power of Motor – to be entered by the user in kW from nameplate or specification
- Measured Voltage of Motor – to be entered by the user in Volt from measurement
- Measured Current of Motor – to be entered by the user in Ampere from measurement
- Measured Power Factor of Motor – to be entered by the user (0<value<100) from measurement
- Measured kW of Motor – to be entered by the user in kW from measurement
- Measured kVA of Motor – to be entered by the user in kVA from measurement
- Operating Suction Head of Pump – to be entered by the user in meter from measurement
- Operating Discharge Head of Pump – to be entered by the user in meter from measurement
- Diameter of Pipe – to be entered by the user in meter from measurement
- Length of Pipe – to be entered by the user in meter from measurement
- Density of Fluid – to be entered by the user in kg/cubic meter (for water, it 1000 kg/m³ at 4°C temperature)
- Measured Flow Rate of Pump – to be entered by the user in cubic meter/hour from measurement

- Friction Factor – auto filled with standard value (0.005); however user can edit the value.

Add Pump

Pump Tool

Pump Name:	Rated Voltage of Motor (V):	Rated Current of Motor (A):	Rated Power Factor of Motor:	Rated Efficiency of Motor (%):	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Rated Power of Motor (kW):	Measured Voltage of Motor:				
<input type="text"/>	<input type="text"/>				
Measured Current of Motor:	Measured Power Factor of Motor:	Measured kW of Motor:	Measured kVA of Motor:	Operating Suction Head of Pump (Meter):	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Operating Discharge Head of Pump (Meter):	Diameter of Pipe (Meter):	Length of Pipe (Meter):	Density of Fluid in kg/m ³ :	Measured Flow Rate of Pump (m ³ /Hr):	Friction Factor:
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Submit **Go Back**

Image 54: Pump Data Entry Form

After entering the data, click on the ‘Submit’ button, this will show the efficiency and specific energy consumption of the pump with the data entered.

Pump Tool

Pump Name:	Rated Voltage of Motor (V):	Rated Current of Motor (A):
Pump	415	33
Rated Power Factor of Motor:	Rated Efficiency of Motor (%):	Rated Power of Motor (kW):
0.80	89	11
Measured Voltage of Motor:	Measured Current of Motor:	Measured Power Factor of Motor:
410	28.3	0.80
Measured kW of Motor:	Measured kVA of Motor:	Operating Suction Head of Pump (Meter):
9.3	11.6	4
Operating Discharge Head of Pump (Meter):	Diameter of Pipe (Meter):	Length of Pipe (Meter):
37	0.2	50
Density of Fluid in kg/m ³ :	Measured Flow Rate of Pump (m ³ /Hr):	Friction Factor:
1000	48	0.005

Performance Analysis

Pump Efficiency - **64.86 %**

Pump Specific Energy Consumption - **0.17 kwh/m³**

Go Back **DOWNLOAD PDF**

Image 55: Pump Performance Analysis

This can be downloaded in pdf file by clicking on ‘Download PDF’.

All the pumps added will be available in the pump tool. The user can delete any pump by clicking on the bin icon (red) and can edit the entered data by clicking on edit icon (green).

SNo	Pump Name	Rated Voltage (V)	Rated Current (A)	Rated Power Factor	Rated Motor Efficiency (%)	Rated Motor Power (kW)	Action
1	Pump 90	4654	64	0.64	64	64	[Edit] [Delete]
2	Pump 33	420	210	0.87	90	90	[Edit] [Delete]
3	Pump 35	415	35	0.80	90	18.50	[Edit] [Delete]
4	Pump 11	415	33	0.80	89	11	[Edit] [Delete]

Showing 1 to 4 of 4 entries

Image 56: Pump List

Editing a pump will open previous data in edit mode, user can change the data and submit it again and get the current performance.

Edit Pump

Pump Tool

Pump Name:

Rated Voltage of Motor (V):

Rated Current of Motor (A):

Rated Power Factor of Motor:

Rated Efficiency of Motor (%):

Rated Power of Motor (kW):

Measured Voltage of Motor:

Measured Current of Motor:

Measured Power Factor of Motor:

Measured kW of Motor:

Measured kVA of Motor:

Operating Suction Head of Pump (Meter):

Operating Discharge Head of Pump (Meter):

Diameter of Pipe (Meter):

Length of Pipe (Meter):

Density of Fluid in kg/m³:

Measured Flow Rate of Pump (m³/Hr):

Friction Factor:

Image 57: Edit Existing Pump Data

14.6 Furnace Tool:

To start using furnace tool, the user first need to click on 'Add New Furnace' button.

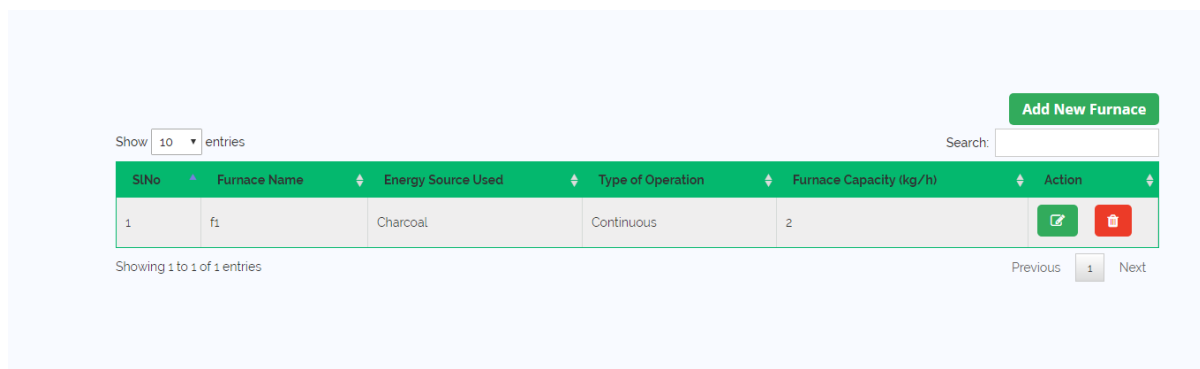


Image 58: Add a Furnace

Adding a new boiler will open a data entry form. Here the user needs to enter the following data:

- Furnace Name – to be entered by the user
- Energy Source Used – to be selected by the user from dropdown menu
- GCV – Gross Calorific Value of the selected fuel, it will auto filled with standard value for the selected fuel; however user can edit the value.
- Type of Operation – to be selected by the user, either Continuous Process or Batch Process
- Furnace Capacity – the rated capacity of the furnace in kg/hour from furnace specification

If Continuous Process has been selected:

- No. of Product Materials -to be entered by the user
- Total Quantity of Energy Source Used – total quantity of energy source used for all product material, to be entered by the user in the specified unit
- For each Product Material, separate data entry table will be populated as per the no. of product materials.
- Product Material Type – material grade of the product (e.g. FG 200, SG 400/7 etc.), to be entered by the user
- Output Material Quantity – quantity of output material in kg for that product material, to be entered by the user from measurement
- Output Material Temperature – temperature of output material in °C or that product material, to be entered by the user from measurement
- Raw Material Used – raw material name (e.g. CI Pig Iron, CI Scrap, Copper etc.) for that product material
- Raw Material Quantity – quantity of each raw material used for that product material in kg, to be entered by the user
- Specific Heat – specific heat of each raw material used for that product material, it will auto filled with a value (0.110); however user can edit the value.

- Raw Material Temperature – the initial temperature of the raw material before charging in °C for that product material, to be entered by the user from measurement
- More raw materials can be added by clicking on ‘+’ (green), or can be deleted by clicking on the bin icon (red) under Action.

If Batch Process has been selected:

- No. of Heat: to be entered by the user
- For each heat, separate data entry table will be populated as per the no. of heats.
- Heat –identification no. of heat to be entered by the user
- Product Material Type – material grade of the product (e.g. FG 200, SG 400/7 etc.), to be entered by the user
- Output Material Quantity – quantity of output material in kg in that heat, to be entered by the user from measurement
- Output Material Temperature – temperature of output material in °C in that heat, to be entered by the user from measurement
- Quantity of Energy Source Used – quantity of energy source used for that heat, to be entered by the user in the specified unit
- Raw Material Used – raw material name (e.g. CI Pig Iron, CI Scrap, Copper etc.) in that heat
- Raw Material Quantity – quantity of each raw material used in that heat in kg, to be entered by the user
- Specific Heat – specific heat of each raw material used in that heat, it will auto filled with a value (0.110); however user can edit the value.
- Raw Material Temperature – the initial temperature of the raw material before charging in °C in that heat, to be entered by the user from measurement
- More raw materials can be added by clicking on ‘+’ (green), or can be deleted by clicking on the bin icon (red) under Action.

Add Furnace

Furnace Tool

Furnace Name: Energy Source Used: GCV: Type of Operation: Continuous Process Batch Process

Furnace Capacity (kg/h) No. of Product Materials Total Quantity of Energy Source Used

Product Material Type	Output Material Quantity (kg)	Output Material Temperature (°C)
<input type="text"/>	<input type="text"/>	<input type="text"/>

Raw Material Used	Raw Material Quantity (kg)	Specific Heat (kCal/kg/°C)	Raw Material Temperature (°C)	Action
<input type="text"/>	<input type="text"/>	110	<input type="text"/>	<input checked="" type="button" value="+"/>

Image 59: Furnace Data Entry Form – Continuous Process

Add Furnace

Furnace Tool

Furnace Name: Energy Source Used: GCV: Type of Operation: Continuous Process Batch Process

Furnace Capacity (kg/h) No. of Heat

Heat	Product Material Type	Output Material Quantity (kg)	Output Material Temperature (°C)	Quantity of Energy Source Used
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Raw Material Used	Raw Material Quantity (kg)	Specific Heat (kCal/kg/°C)	Raw Material Temperature (°C)	Action
<input type="text"/>	<input type="text"/>	110	<input type="text"/>	<input checked="" type="button" value="+"/>

Image 60: Furnace Data Entry Form – Batch Process

After entering the data, click on the ‘Submit’ button, this will show the efficiency and specific energy consumption of the furnace with the data entered.

Furnace Tool

Furnace Name: Energy Source Used: GCV (kCal/kg):

Furnace Capacity (kg/h): No. of Heat:

Heat	Product Material Type	Output Material Quantity (kg)	Output Material Temperature (°C)	Quantity of Energy Source Used (kg)
1	q	485	1460	70

Raw Material Used	Raw Material Quantity (kg)	Specific Heat (kCal/kg/°C)	Raw Material Temperature (°C)
q1	250	.110	30
q2	265	.111	32

Heat	Product Material Type	Output Material Quantity (kg)	Output Material Temperature (°C)	Quantity of Energy Source Used (kg)
2	r	475	1470	65

Raw Material Used	Raw Material Quantity (kg)	Specific Heat (kCal/kg/°C)	Raw Material Temperature (°C)
r1	245	.110	32
r2	255	.111	33

Performance Analysis

Efficiency -
20.53 %

Furnace Specific Energy Consumption -
815.63 kCal/kg

Go Back

 DOWNLOAD PDF

Image 61: Furnace Performance Analysis

This can be downloaded in pdf file by clicking on 'Download PDF'.

All the furnaces added will be available in the furnace tool. The user can delete any furnace by clicking on the bin icon (red) and can edit the entered data by clicking on edit icon (green).

Show 10 entries

Add New Furnace

Search:

SINo	Furnace Name	Energy Source Used	Type of Operation	Furnace Capacity (kg/h)	Action
1	Furnace2	Fuel Oil	Continuous	464	
2	Furnace 5	Electricity	Continuous	500	
3	Furnace22	Coke	Batch	400	
4	Furnace 4	Light Diesel Oil (LDO)	Continuous	2342	
5	Continuous type furnace111	Electricity	Continuous	500	
6	Batch Type Furnace111	Coke	Batch	400	

Showing 1 to 6 of 6 entries

Previous 1 Next

Image 62: Furnace List

Editing a furnace will open previous data in edit mode, user can change the data and submit it again and get the current performance.

Edit Furnace

Furnace Tool

Furnace Name: Energy Source Used: GCV (kCal/kg): Type of Operation: Continuous Process Batch Process

Furnace Capacity (kg/h): No. of Heat:

Heat	Product Material Type	Output Material Quantity(kg)	Output Material Temperature (°C)	Quantity of Energy Source Used (kg)
1	q	485	1460	70

Raw Material Used	Raw Material Quantity (kg)	Specific Heat (kCal/kg/°C)	Raw Material Temperature (°C)	Action
q1	250	110	30	
q2	265	111	32	

Heat	Product Material Type	Output Material Quantity(kg)	Output Material Temperature (°C)	Quantity of Energy Source Used (kg)
2	r	475	1470	65

Raw Material Used	Raw Material Quantity (kg)	Specific Heat (kCal/kg/°C)	Raw Material Temperature (°C)	Action
r1	245	110	32	
r2	255	111	33	

Image 63: Edit Existing Furnace Data

15 Energy Audit Equipment

To view a list of the most commonly used Energy Audit Equipment a visitor can select the appropriate option from the left-hand side menu bar and to the page.

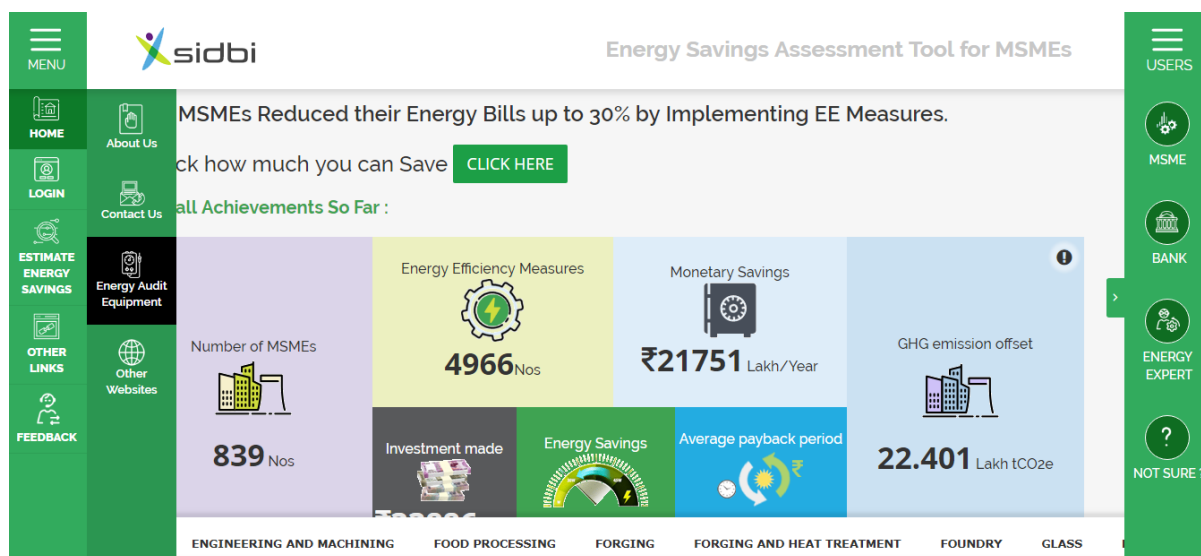


Image 64: Link of Energy Audit Equipment Page

Here the user can view a number of Equipment names along with images and brief description. A list of the equipments included here has been provided on the left hand side, if the user clicks on the name of the equipment, the page automatically scrolled and equipment description appears.

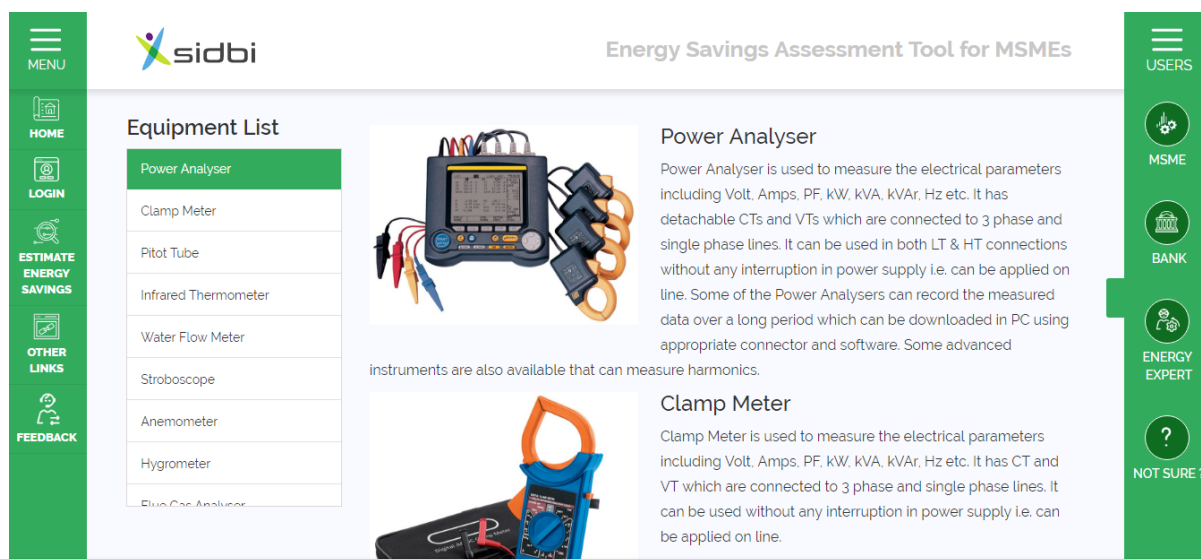


Image 65: Energy Audit Equipment Page

The Equipments listed here are – Power Analyser, Clamp Meter, Pilot Tube, Infrared Thermometer, Water Flow Meter, Stroboscope, Anemometer, Hygrometer, Flue Gas Analyser, Ultrasonic Leak Detector, Tachometer, K Type Thermocouple, Lux Meter, Contact Thermometer, Thermal Imager, Visgauge, Lube Oil Test Kit, Digital Manometer, U-Tube Manometer, pH Meter, Electrical Conductivity Meter, TDS Meter, Steam Trap Monitor, Digital Multimeter.

16 Other Websites

Any visitor to the Energy Savings Assessment Tool might be interested in viewing the websites of other organizations which work in the Energy Efficiency domain. There is a list of such websites which can be found in the menu on the left-hand side.

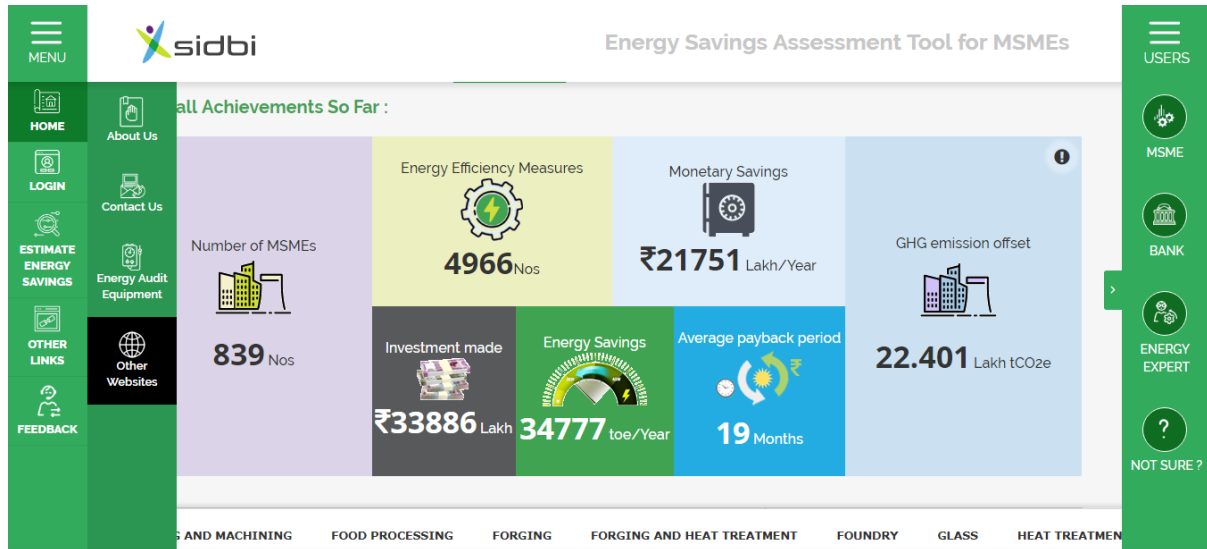


Image 66: Link of Other Websites Page

Here the click on any logo and a new tab will open on the browser taking the visitor to the appropriate website.

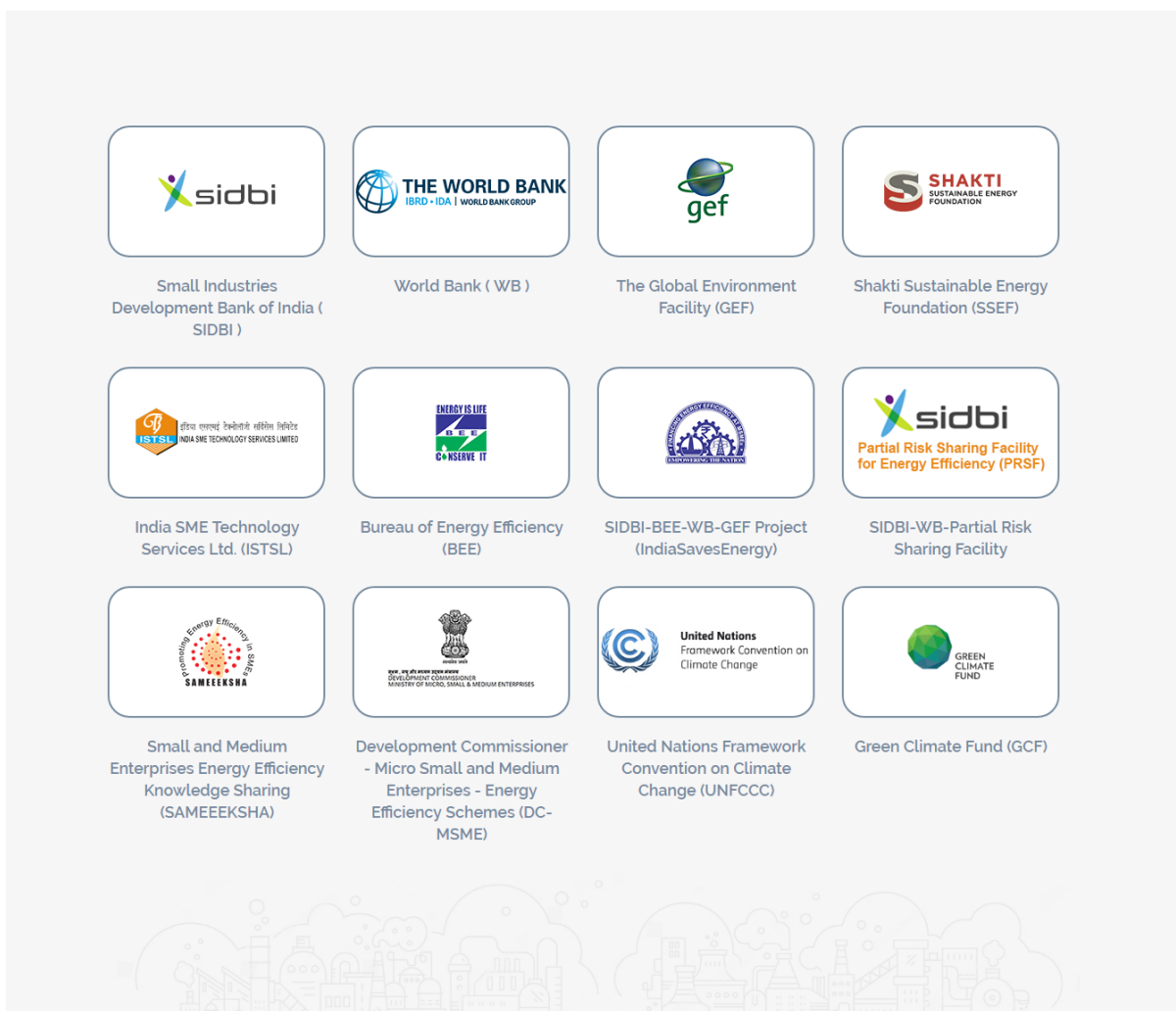


Image 67: Other Websites Page

17 Feedback Page

The feedback page allows the user to provide an overall rating of the Energy Savings Assessment Tool, share their experience and provide their valuable suggestions for improvement of the EE Tool. A user can go to the Feedback page by clicking on the 'Feedback' icon in the left hand side menu bar.

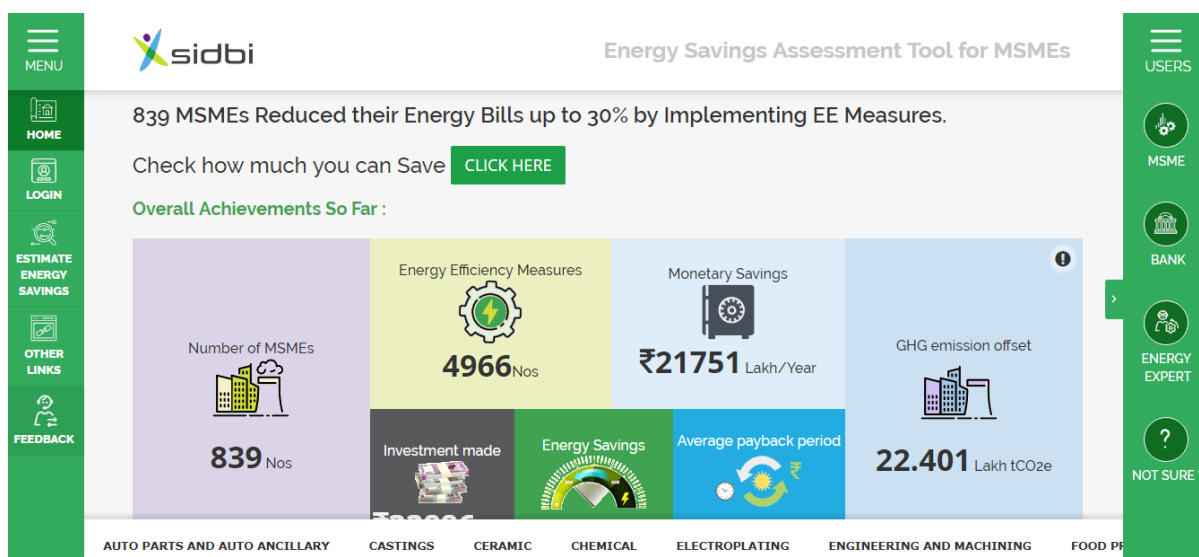


Image 68: Link of Feedback Page

Following is the screenshot of the feedback page for unregistered users; here user needs to provide some details about the organization. In case of registered user, there is no need to provide the organization details for providing feedback.

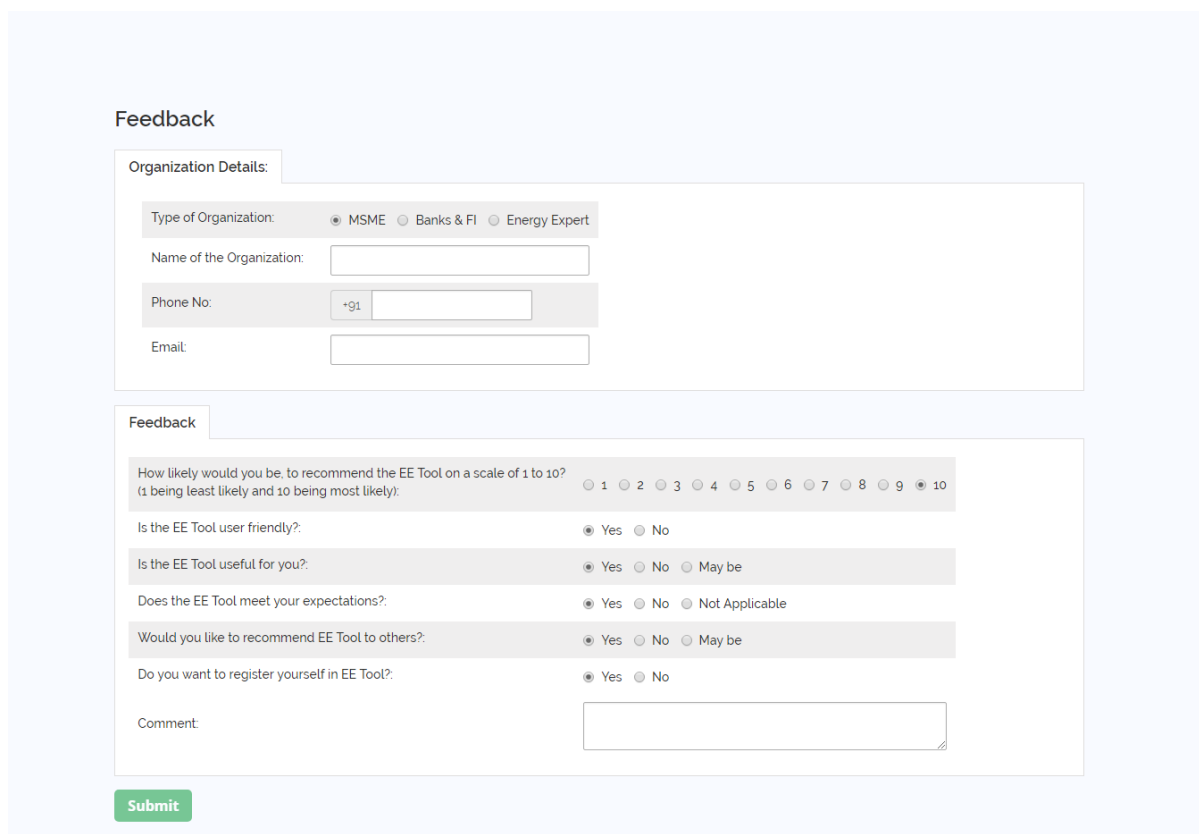


Image 69: Pre-login Feedback Page

Feedback

Feedback

How likely would you be, to recommend the EE Tool on a scale of 1 to 10? (1 being least likely and 10 being most likely). 1 2 3 4 5 6 7 8 9 10

Is the EE Tool user friendly? Yes No

Is the EE Tool useful for you? Yes No May be

Does the EE Tool meet your expectations? Yes No Not Applicable

Would you like to recommend EE Tool to others? Yes No May be

Have you faced any problem in using EE Tool? Yes No

Do you have any suggestion? Yes No

Comment:

Submit

Image 70: Post-login Feedback Page

After completing the feedback form, the user needs to click on the ‘Submit’ button in lower left corner of the page.

18 Contact Us

To communicate with the Administrator of the Energy Savings Assessment Tool, click on the Other Links in the left-hand side menu bar and then Contact Us in the sub menu.

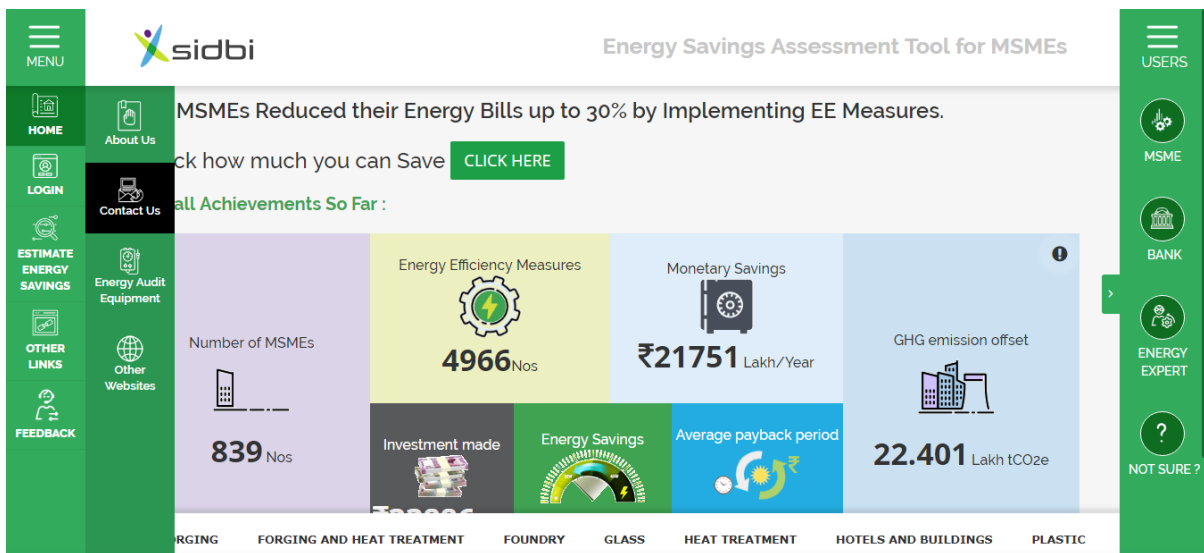


Image 71: Link of Contact Us Page

The Contact Us page consists of the contact details of the system administrator and a query form. In the query form, the user must provide all required information i.e. Name, Email Address, Mobile Number, Subject and the Message.

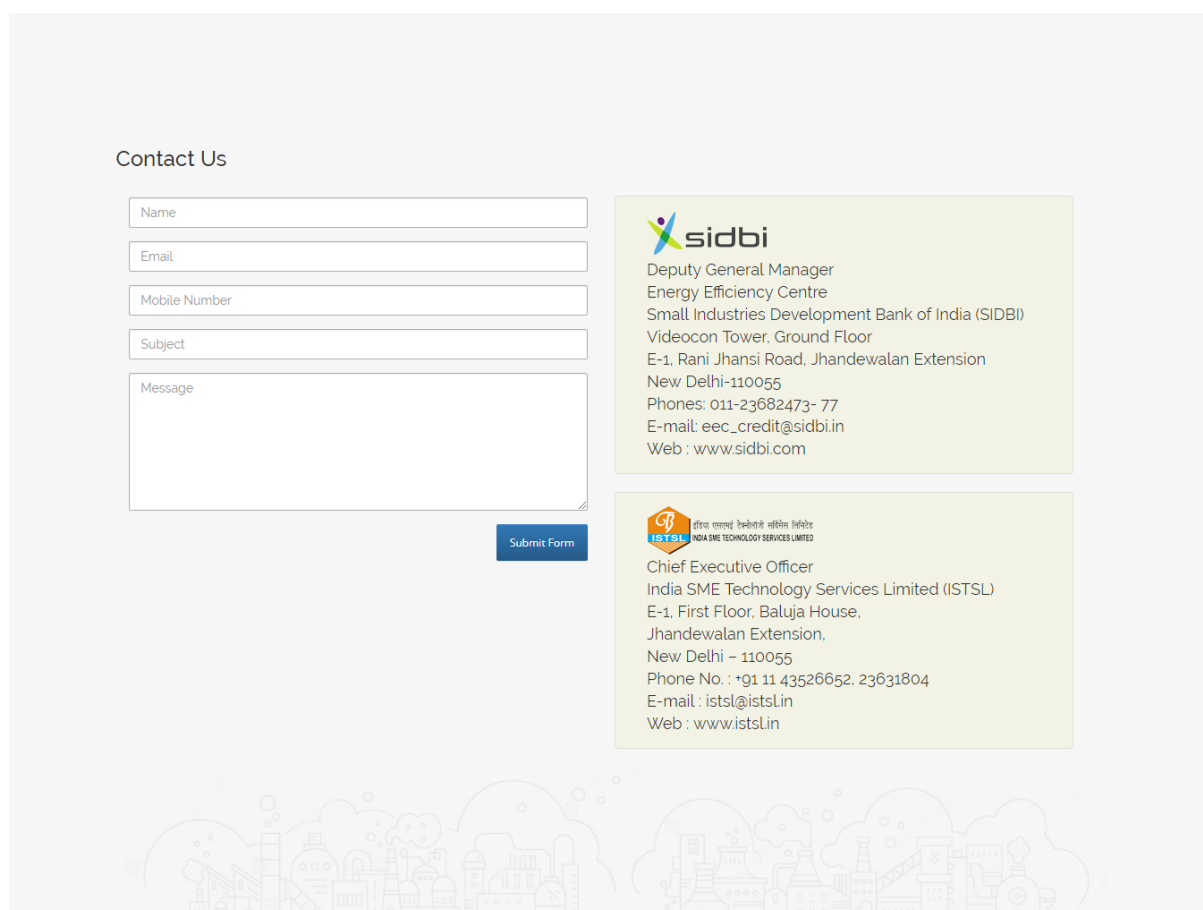


Image 72: Contact Us Page

Table 4: Contact Details of SIDBI and ISTSL

SIDBI	ISTSL
Deputy General Manager Energy Efficiency Centre Small Industries Development Bank of India (SIDBI) Videocon Tower, Ground Floor E-1, Rani Jhansi Road, Jhandewalan Extension New Delhi-110055 Phones: 011-23682473- 77 E-mail: eec_credit@sidbi.in Web : www.sidbi.com	Chief Executive Officer India SME Technology Services Limited (ISTSL) E-1, First Floor, Baluja House, Jhandewalan Extension, New Delhi – 110055 Phone No. : +91 11 43526652, 23631804 E-mail : istsl@istsl.in Web : www.istsl.in