

ECO *nirman*

Prescriptive

USER MANUAL



USAID | **INDIA**
FROM THE AMERICAN PEOPLE



ECONirman

Prescriptive

USER MANUAL

September 2011

ECONirman Prescriptive USER MANUAL

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How to use this manual

The following symbols and icons are used in this user manual:

Symbol/Icon	Description
§	Section of the user manual
*	Mandatory field
	External web link
	Useful tip
	Caution or warning

The text underlined in blue colour is a cross-reference within the user manual itself. In the soft copy, click it to open the section that is cross-referenced.

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1. Introduction

The Ministry of Power, Government of India, under the provision of the Energy Conservation Act, 2001 launched the **Energy Conservation Building Code (ECBC)** in May 2007. Since then, the Bureau of Energy Efficiency (BEE) has been promoting the implementation of the ECBC through several capacity building programs. United States Agency for International Development (USAID) supported Energy Conservation and Commercialization - Phase-III (ECO-III) Project has been working closely with BEE on these initiatives, and has developed ECBC User Guide and [ECBC Tip Sheets](#) (§ 2.1.1) for raising awareness on the ECBC among the stakeholders.

During these capacity building efforts, a strong need was felt to assist architects and engineers at the design stage so that they are able to assess and demonstrate conformance of their proposed buildings with respect to the ECBC. It is with this objective that the development of **EONirman Prescriptive Tool**, an online conformance check tool, was undertaken by ECO-III Project in partnership with BEE. The tool uses the **Prescriptive Method** to assess conformance with the ECBC. It is developed by Zaloni Technologies India Limited under the guidance of ECO-III Project.

This manual will familiarize a user with the interface of EONirman Prescriptive Tool and walk through the step-by-step process of assessing conformance.

2. Key Concepts

Before using ECONirman Prescriptive Tool for assessing conformance of different building components, it will be beneficial to understand certain energy and conformance related concepts. These are explained in the following sub-sections.



See [Appendix A: Definitions and Acronyms](#) (§ 13) for a list of definitions.

2.1. Energy Conservation Building Code (ECBC)

The Energy Conservation Building Code (ECBC) is the result of extensive work by BEE and its Committee of Experts. Its purpose is to provide minimum requirements for energy efficient design and construction of commercial buildings and their systems. It is the first step towards promoting energy efficiency in the building sector.



Refer to ECBC User Guide (International Standard Book Number 978-81-909025-3-3, BEE, New Delhi, India) to understand the ECBC better. It is available online at http://eco3.org/?file_id=1

2.1.1. ECBC Tip Sheets

The ECBC tip sheets created by ECO-III Project help in understanding the implications of the ECBC on different building components. The following three tip sheets are available for reference:

- **Building Envelope:** http://eco3.org/?file_id=19
- **Building Lighting Design:** http://eco3.org/?file_id=20
- **HVAC System:** http://eco3.org/?file_id=25

2.2. ECBC Conformance

The Bureau of Energy Efficiency's intention is to facilitate the design and construction of the buildings conforming with the ECBC in India. The conformance process has been made flexible enough to help designers and architects in meeting the ECBC requirements.

Conformance with the ECBC can be achieved by meeting the mandatory requirements in the ECBC, in addition to either meeting the prescriptive requirements

using the [Prescriptive Method](#) (§ 2.2.2) or meeting the requirements in the [Whole Building Performance Method](#) (§ 2.2.3).

2.2.1. Mandatory Requirements

The conformance procedure requires the building to fulfil a set of mandatory provisions related to energy use, as well as demonstrate conformance with the specified requirements stipulated for the different building components and systems.


2.2.2. Prescriptive Method

The Prescriptive Method of conformance specifies prescribed minimum energy efficiency parameters for various components and systems of the building. Conformance with the ECBC can be achieved by meeting or exceeding the specific levels described for each individual element of the building systems.

2.2.3. Whole Building Performance Method

The Whole Building Performance (WBP) Method offers considerable design flexibility and allows for conformance with the ECBC to be achieved by optimizing the energy used by various components and systems in order to find the most effective solution. The WBP Method requires the use of an energy simulation software approved by the *Authority Having Jurisdiction* to simulate and compare energy use of the *Proposed Design* and the *Standard Design* of the building.



Refer to Appendix B of the ECBC to learn more about the WBP Method for conformance. Also, refer to **ECONirman Whole Building Performance Tool User Manual** (available online at http://eetools.in/ECONirman_WBP_UserManual.pdf ) to assess conformance using the WBP Method.


3. EConirman Prescriptive Tool

EConirman Prescriptive Tool is an online tool provided by BEE to assist architects and engineers in assessing the conformance of their buildings with the ECBC using the Prescriptive Method. It is a web-based tool that is made available to the users over the Internet with minimal software requirements. It can be used with minimal learning or building science expertise involved.

A total of 1,294 city locations in India are represented in the tool.

The tool requires inputs about the building from the user to arrive at conformance results for different building components. The tool also generates a report that may be submitted to the *Authority Having Jurisdiction* to demonstrate conformance with the ECBC.

3.1. Salient Features

- EConirman Prescriptive Tool indicates if the systems and sub-systems of the building are **conforming** or **not conforming** with the ECBC and also generates conformance reports that compile the data provided by the user.
- It automatically checks conformance of the building envelope using the Trade-Off Option (as defined in Appendix D of the ECBC).
- It facilitates the users in assessing if a building meets the ECBC requirements vis-à-vis the five climatic zones in India.
- It can store multiple building projects under a single user profile.
- It stores the information in a central database for future reference, review, edit, and analysis purposes.
- It keeps the information secure and confidential.
- It allows the design teams to collaborate remotely.
- It is available in the public domain (<http://econirmanpres.eetools.in> ) for easy access to the users.

3.2. Prerequisites

The following checklist of items (specific to the building being assessed for conformance) will come in handy while using EConirman Prescriptive Tool:

- Built-up and conditioned area details
- Connected load or contract demand
- Building plans

- Envelope construction assemblies (for walls, roofs, windows, and skylights) and shading
- Mechanical equipment sizes and efficiencies
- Luminaire details
- Lighting Power Density (LPD) values for each zone
- Transformer and motor details

4. Tool Navigation

ECONirman Prescriptive Tool is aesthetically designed, keeping in mind the ease of navigation for the end-user.

The tool features different tabs at the top to navigate effectively through a project. These tabs feature sub-tabs (on the left side) that act as logical sections to enter the details of different building components and generate the conformance reports. This makes it easy to assess conformance for a single component, if required.

The tool is used to assess the overall conformance of a building as well as its major building components that include:

- [Building Envelope](#) (§ 7)
- [Heating, Ventilation and Air Conditioning](#) (§ 8)
- [Service Hot Water and Pumping](#) (§ 9)
- [Lighting](#) (§ 10)
- [Electrical Power](#) (§ 11)

For each building project, the user progresses by specifying the details of the building components. When complete, the conformance results can be viewed for different components.

The tool allows the user to provide inputs that do not need to be sequential. The information can be provided in the sequence preferred by the user. This makes it more intuitive and interactive. However, to get correct results, the user needs to go through all the left side sub-tabs under each top tab and provide the information relevant to the building components.



Across the tool:

- The fields marked with an asterisk (*) are mandatory.
- Responses to certain requirements may trigger other related input fields to appear.
- The greyed out cells in the tables are non-editable. Double click on the ones that are not greyed out to edit/enter the corresponding values.

4.1. How to Access

Enter the link <http://econirmanpres.eetools.in>  in the web browser's address bar to access ECONirman Prescriptive Tool.



See [Appendix B: Computer Settings](#) (§ 14) to learn about the settings required on a user's computer before using the tool.

4.2. Home Page



This web tool is made possible by the support of the American People through the United States Agency for International Development (USAID), under the terms of Award No. 386C-00-06-00153-00. The contents of this web tool are the sole responsibility of International Resources Group (IRG) and do not necessarily reflect the views of USAID or the United States Government.

- Enter the user credentials and click **Login** to use the tool to assess conformance with the ECBC (see [§ 4.3.3](#))
- Click **Guest User** to use the tool without logging in (see [§ 4.3.1](#))
- Click **Sign Up** to register as a new user (see [§ 4.3.2](#))
- Click **Forgot Password?** to retrieve a forgotten password (see [§ 4.3.4](#))

4.3. User Account

This section explains how to use the tool as a guest user, create a new user account, log into the tool, retrieve a forgotten password, change a password, and update user profile.

4.3.1. Guest User

The **Guest User** feature of the tool allows a user to assess building conformance with the ECBC without creating the user credentials and logging into ECONirman Prescriptive Tool.

Limitations

A guest user can use all the features of the tool, except for saving the project(s) for future reference, review, edit, and analysis purposes. The building details entered into the tool by a guest user are lost upon logging out.

4.3.2. New User

Click **Sign Up** on the **Login** dialog box on the [home page](#) to register as a new user. The **Register User** dialog box appears.

Register User [Close]

Email: *

Password: *

Confirm Password: *



Full name: *

Company Name:

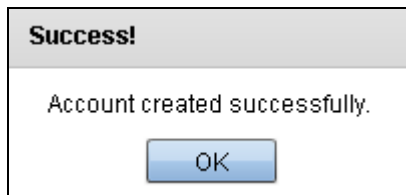
Job Title:

Industry:

* Required Fields

- Enter a valid e-mail address.
- Enter a desired password and confirm it.
-  The password is case sensitive.
- Enter name and other details.
- Click **Create** to create the user account.
-  If the e-mail address is unavailable or invalid, a message appears. Enter another e-mail address to continue signing-up.

However, if the e-mail address is available, a success message is displayed.




Click **OK** to continue.

- The **Login** dialog box appears.

4.3.3. Log In

For an existing user, enter the registered e-mail address and password on the **Login** dialog box.

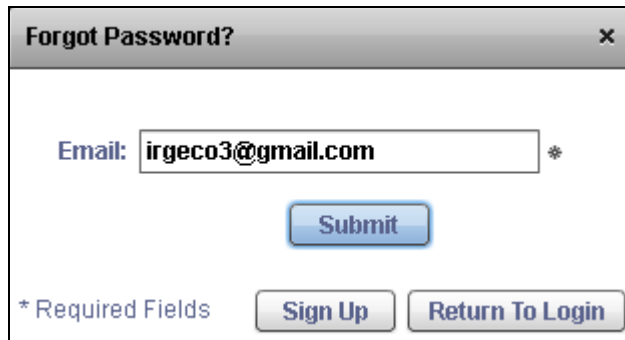
-  The password is case sensitive.


 A dialog box titled "Login" with a close button (x) in the top right corner. It contains two input fields: "Email:" with the value "irgeco3@gmail.com" and "Password:" with the value "*****". Both fields have an asterisk (*) to their right. Below the fields is a blue "Login" button. At the bottom left, there is a text label "* Required Fields". At the bottom right, there are three buttons: "Guest Login", "Sign Up", and "Forgot Password?".

- Click **Log In** to log into ECONirman Prescriptive Tool.
- The **List of Projects** page opens. See [§ 5](#) to learn how to manage projects.

4.3.4. Retrieve Forgotten Password

Click **Forgot Password?** on the **Login** dialog box on the [home page](#) to retrieve a forgotten password of an existing user. The **Forgot Password?** dialog box appears.



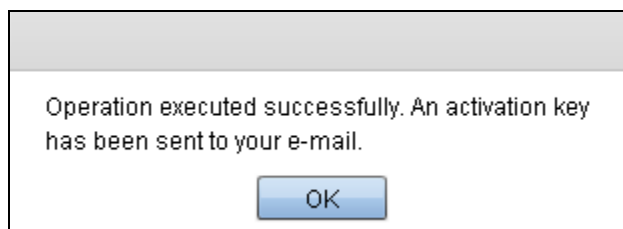
Forgot Password? x

Email: irgeco3@gmail.com *

Submit

* Required Fields Sign Up Return To Login

- Enter the registered e-mail address.
- Click **Submit** to send the request for password retrieval to the registered e-mail address.
- A success message is displayed.



Operation executed successfully. An activation key has been sent to your e-mail.

OK

Click **OK** to continue.

- The **Reset Password** dialog box appears.

Reset Password

Please do not close this window, check your e-mail for the 'reset key'.

Username/Email: *

Reset Key: *

Password: *

Confirm Password: *

* Required Fields

- Open the e-mail (external of ECONirman Prescriptive Tool) and copy the **activation code** available therein.
- Paste the activation code in the **Reset Key** text box.
- Enter the new password and confirm it.
- Click **Submit** to reset the password.
- A success message is displayed.

Success

New password saved successfully.

Click **OK**.

- Log in using the new password.

4.3.5. Update Profile and Change Password

Click on logged in user's e-mail address at the top right corner of the page to update the user's profile or change the password. The **Update Profile** dialog box appears.

Update Profile [X]

Email: **irgeco3@gmail.com**

* Full name:

Company Name:

Job Title:

Industry:


Change Password

Current Password:

New Password:


Confirm New Password:

* Required Fields

- To update the profile, edit the details and click **Save** at the bottom of the dialog box.
- To change the password, select the **Change Password** checkbox. The input fields under it become active.
 - Enter the current password.
 - Enter the new password and confirm it.
 -  The password is case sensitive.
 - Click **Save** at the bottom of the dialog box.

4.3.6. Log Out

After using ECONirman Prescriptive Tool, click **Logout** at the top right corner of the page to log out.

 It is imperative to save the entered details before logging out. Any unsaved details will be otherwise lost.

5. Manage Projects

After logging into EConirman Prescriptive Tool for the **first time**, a blank project list is displayed. However, if the project records were **already created** by an existing user by logging in earlier, then those get listed.

The screenshot shows the EConirman Prescriptive Tool interface. At the top left is the logo "ECO nirman Prescriptive". At the top right, it says "Logged in as irgeco3@gmail.com" with links for "Logout" and "About" (labeled A). Below the logo are buttons for "New Project", "Edit Project", "Delete Project", and "Copy Project" (labeled B). To the right are "Reports" and "Help" buttons (labeled E). Below these is a "List of Projects" section with a "Filter by:" dropdown set to "Last Modified Date", and "Start:" and "End:" date pickers, and an "Apply Filter" button (labeled C). The main part of the interface is a table with the following data:

Building Name	Location (City)	Connected Load (kW) / Contract Demand (kVA)	Built-up Area (m ²)	Building Type	Created On	Last Modified	Results
Centre 1	Delhi	900 kW	7500.00	Office	13 Sep 2011	14 Sep 2011	
Centre 2	Delhi	1000 kW	7500.00	Office	13 Sep 2011	14 Sep 2011	

The table is annotated with a red box and an arrow labeled D pointing to the first two rows.

A	Click on the e-mail address to update user profile and/or change password (see § 4.3.5); click Logout to log out of the tool; click About to view the tool version and credits
B	<p>Actions:</p> <ul style="list-style-type: none"> • Create new project (see § 5.1.1) • Existing project: <ul style="list-style-type: none"> ◦ Edit (see § 5.1.2) ◦ Delete (see § 5.1.3) ◦ Copy (see § 5.1.4)
C	Filter the list of projects (see § 5.2)
D	The list of projects
E	Click Reports to generate the ECBC conformance reports (see § 12); click Help to view this user manual

The project list can be sorted by clicking the column heading. For example, click the column heading **Results** to view the projects sorted as per the availability of the

conformance assessment result. **Yes** indicates that the result is available for the project and **No** indicates that it is not.

5.1. Project Actions

The building projects can be created, edited, deleted, and copied. These actions are explained in the following sub-sections.

5.1.1. Create Project

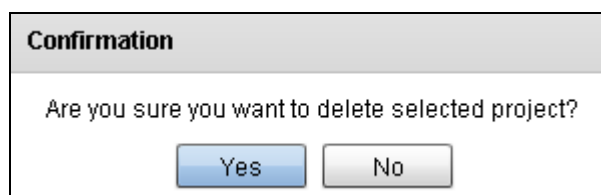
To create a new project for assessing conformance, click **New Project** at the top of the page. The [Project](#) tab opens (see § 6).

5.1.2. Edit Project

To edit an existing project, click on a project in the list and then click **Edit Project** at the top of the page. The [Project](#) tab opens with the underlying project details (see § 6).

5.1.3. Delete Project

To delete an existing project, click on a project in the list and then click **Delete Project** at the top of the page. A confirmation dialog box appears.



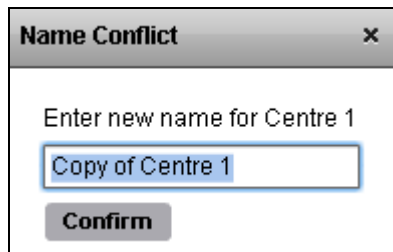
Click **Yes** to delete the project. The project gets deleted.



There is no way to undo this action and retrieve a deleted project.

5.1.4. Copy Project

To make a copy of an existing project, click on a project in the list and then click **Copy Project** at the top of the page. A dialog box appears.



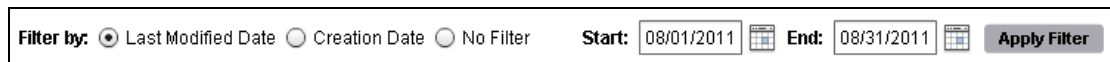
A dialog box titled "Name Conflict" with a close button (x) in the top right corner. The text inside reads "Enter new name for Centre 1". Below this text is a text input field containing "Copy of Centre 1". At the bottom of the dialog is a "Confirm" button.

- Enter a new project name.
- Click **Confirm** to copy the project.

A copy of the project is created with all the information from the original project retained as is.

5.2. Filter Project List


The projects in the list can be filtered to view only the relevant ones. This feature is particularly useful as the number of projects increase and the list gets bigger.




A filter control bar with the following elements: "Filter by:" followed by three radio buttons labeled "Last Modified Date" (selected), "Creation Date", and "No Filter". To the right are "Start:" and "End:" labels, each followed by a date input field containing "08/01/2011" and "08/31/2011" respectively, and a small calendar icon. At the far right is an "Apply Filter" button.


The following two date filters are available:

Last Modified Date	The date on which an existing project was last modified
Creation Date	The date on which a new project was created


- Select the radio button corresponding to the desired date filter.
- Define the date range:
 - To set the start date, click  corresponding to **Start**. Select the date from the calendar that appears.

◀ August 2011 ▶						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

- To set the end date, click  corresponding to **End**. Select the date from the calendar that appears.

 Click ◀ or ▶ to navigate to the previous or the next calendar month respectively.


- Finally, click **Apply Filter** to set the filter. Only the projects within the defined date range get listed.

 Select **No Filter** radio button to remove the set filter.

6. Project

The **Project** tab opens upon clicking [New](#) or [Edit](#) on the [List of Projects](#). The tab comprises of four sub-tabs on the left side that are explained in the following sub-sections.



- Certain input fields may get customized across the tool according to the details entered under the sub-tabs.
- At any point:
 - Click **Save** at the bottom of the page to save the entered details.
 -  It is imperative to save the details before navigating away to create new project or to view the list of existing projects. Any unsaved details will be otherwise lost.
 - Click **New Project** at the top left corner of the page to create a new project.
 - Click **Existing Project** at the top left corner of the page view the list of existing projects (see [§ 5](#)).
 - Click **Reports** at the top right corner of the page to generate the conformance report(s) (see [§ 12](#)).
 - Click **Help** at the top right corner of the page to view this user manual.

6.1. Location

This sub-tab is used to capture the location details of the building.

Logged in as irgeco3@gmail.com [Logout](#) | [About](#) | [Contact](#)

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New Project Existing Projects Reports Help

Project Envelope HVAC SHWP Lighting Electrical Power

Location
Project Details
Site and Approval Details
Contact Details

* State/Union Territory: NCT
* City: Delhi
If you do not find your city in the list, select nearby city in the same climate zone.
Climate Zone: Composite
Latitude/Longitude: 28° 66' / 77° 21'

* Required Fields

Save Check Conformance

6.2. Project Details

This sub-tab is used to capture the name, type, electricity consumption, and area details of the building.

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New Project Existing Projects Reports Help

Project Envelope HVAC SHWP Lighting Electrical Power

Location
Project Details
Site and Approval Details
Contact Details

* Building Name: Centre 2
* Building Type: Office
* Building Usage Hours: 24 Hour Daytime
* Specify Demand / Load: Connected Load Contract Demand
* Connected Load: 1000.00 kW
* Project Type: New Building
* Built-up Area: 7500.00 m²
* Conditioned Area: 7000.00 m²

* Required Fields

Save Check Conformance

6.3. Site and Approval Details

This sub-tab is used to capture site and approval details of the building.

Logged in as irgeco3@gmail.com [Logout](#) | [About](#) | [Contact](#)
Build: 3.0(118)D

ECO nirman
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New Project Existing Projects Reports Help

Project Envelope HVAC SHWP Lighting Electrical Power

Location
Project Details
Site and Approval Details
Contact Details

Site Details

Description Modern office building

* Address Centre 2
Hauz Khas

* City New Delhi

* Pincode 110016

Approval Details

* Approving Authority Authority Having Jurisdiction

Approval Number

* Required Fields

Save Check Conformance

6.4. Building Owner & Architect

This sub-tab is used to capture the building owner and architect details.

Logged in as irgeco3@gmail.com [Logout](#) | [About](#) | [Contact](#)
Build: 3.0(118)D

ECO nirman
Prescriptive

New Project Existing Projects Reports Help

Project Envelope HVAC SHWP Lighting Electrical Power

Location
Project Details
Site and Approval Details
Contact Details

Building Owner

* Name Mr Owner

* Organization IRG ECO-III

* City New Delhi

* State NCT

* Pincode 110016

* Phone +91123

Email

Architect

* Name Mr Architect

* Organization IRG ECO-III

* City New Delhi

* State NCT

* Pincode 110016

* Phone +91321

Email

* Required Fields


Save Check Conformance

7. Envelope

The building envelope refers to the exterior façade and roof, and is comprised of opaque components and fenestration systems. Opaque components include walls and roofs; fenestration systems include windows and skylights.



The envelope protects the building's interior and occupants from the weather conditions and shields them from other external factors such as noise and air pollution. Envelope design strongly affects the visual and thermal comfort of the occupants, as well as the energy consumption of the building.



Refer to **Building Envelope** tip sheet available at http://eco3.org/?file_id=19  to learn more about envelope.

In ECONirman Prescriptive Tool, click the **Envelope** tab to define the windows, walls, roofs, and skylights of a building.



- Certain input fields may get customized across the tool according to the details entered under the sub-tabs.
- At any point:
 - Click **Save** at the bottom of the page to save the entered details.
 It is imperative to save the details before navigating away to create new project or to view the list of existing projects. Any unsaved details will be otherwise lost.
 - Click **Check Conformance** at the bottom of the page to assess conformance of the building component with the ECBC.
 All the inputs related to the building component must be provided to assess conformance.
 - Click **New Project** at the top left corner of the page to create a new project (see [§ 6](#)).
 - Click **Existing Project** at the top left corner of the page view the list of existing projects (see [§ 5](#)).
 - Click **Reports** at the top right corner of the page to generate the conformance report(s) (see [§ 12](#)).
 - Click **Help** at the top right corner of the page to view this user manual.

7.1. Mandatory Requirements

The screenshot displays the ECO nirman Prescriptive software interface. At the top left is the logo "ECO nirman Prescriptive". The top right shows the user is logged in as "irgeco3@gmail.com" with links for "Logout", "About", and "Contact". Below the logo are navigation buttons for "New Project" and "Existing Projects". A secondary navigation bar includes "Reports" and "Help". The main interface has tabs for "Project", "Envelope", "HVAC", "SHWP", "Lighting", and "Electrical Power". On the left, a sidebar lists "MANDATORY" requirements: "Fenestration", "Opaque Construction", and "Building Envelope Sealing", and "PRESCRIPTIVE" requirements: "Roofs", "Walls", "Vertical Fenestration", and "Skylights". The "Fenestration" requirement is highlighted with a red box. The main content area shows the "Fenestration - U-Factor" form with three questions and radio button options for "Yes", "No", and "NA". The first question is about the U-factor for overall fenestration. The second question is about the U-factor for sloped glazing, with a text box for reasons if "NA" is selected. The third question is about the default table in Appendix C §11. Below this is the "Fenestration - SHGC" section with a similar question and options. At the bottom, there are "Save" and "Check Conformance" buttons, and a red asterisk indicating required fields.

The responses to all envelope related mandatory requirements have to be either **Yes** or not applicable (**NA**) for the building to conform with the ECBC. If the response is **NA**, a valid reason must be provided in the text box that appears. The building will be non-conformant if the response to even one mandatory requirement is **No**.



Responses to certain requirements may trigger other related input fields to appear. For example, selecting **Yes** as a response to a particular requirement or selecting a value from a drop-down menu may make other related input fields to appear.

The mandatory requirements are to be fulfilled for the following envelope components:

- Fenestration
- Opaque Construction
- Building Envelope Sealing

7.2. Prescriptive Requirements

The ECBC sets the prescriptive requirements for the following envelope components:

- Roofs
- Walls
- Vertical Fenestration
- Skylights

The screenshot shows the ECO nirman Prescriptive software interface. The 'Envelope' tab is active, displaying a table of envelope components. The table has columns for Component, Description, Area (m²), U-factor of Overall Assembly (W/m²·K), R-value of Insulation Alone (m²·K/W), Initial Solar Reflectance, and Initial Solar Emittance. A red box labeled 'A' highlights the 'PRESCRIPTIVE' sub-tabs on the left. A red box labeled 'B' highlights the 'Add Roof', 'Edit Roof', and 'Delete Roof' buttons. A red box labeled 'C' highlights the 'U-factor of Overall Assembly' and 'R-value of Insulation Alone' cells for 'Roof 1'. A red box labeled 'D' highlights the 'Initial Solar Reflectance' and 'Initial Solar Emittance' cells for 'Roof 1'. The 'Roof 1' row shows a U-factor of 0.62, R-value of 0.00, Initial Solar Reflectance of 5.00, and Initial Solar Emittance of 5.00.

Component	Description	Area (m ²)	U-factor of Overall Assembly (W/m ² ·K)	R-value of Insulation Alone (m ² ·K/W)	Initial Solar Reflectance	Initial Solar Emittance
Roof 1	100mm RCC slab, 50mm EPS underdeck insulation	50.00	0.62	0.00	5.00	5.00

A	Sub-tabs for building envelope related prescriptive requirements
B	Actions: <ul style="list-style-type: none"> • Create new envelope component (see § 7.2.1) • Existing envelope component: <ul style="list-style-type: none"> ◦ Edit (see § 7.2.2) ◦ Delete (see § 7.2.3)
C	Non-editable cells
D	Editable cells

7.2.1. Add Envelope Component

Add an envelope related component such as roof, wall, vertical fenestration, or skylight by clicking **Add Roof**, **Add Wall**, **Add Vertical Fenestration**, or **Add Skylight** respectively under the relevant sub-tab.

A dialog box appears.

The following are the various input fields on different components' dialog boxes:

Roofs	
Roof Assembly	Select a standard assembly from the drop-down menu or define a custom one
Area (m ²)	Enter the area of the roof
Cool Roof	Select if it is a cool roof
Slope	Select the slope of the cool roof
Walls	
Roof Assembly	Select a standard assembly from the drop-down menu or define a custom one
Orientation	Select the orientation of the wall (east, west, north, south)
Area (m ²)	Enter the area of the wall
Vertical Fenestration	
Rated	If rated, selected a standard assembly from the drop-down

	menu or define a custom one
Unrated	If unrated, selected the frame and glass type and tint from the respective drop-down menus
Orientation	Select the orientation of the fenestration (east, west, north, south)
Area (m ²)	Enter the area of the wall
Sill Height (m)	Enter the height of the sill
Interior Light Shelf, Overhang, Side Fins	Select the checkboxes (if applicable) and then enter the respective H-values and V-values
Skylights	
Rated	If rated, enter the description (optional)
Unrated	If unrated, selected the glass type and tint from the respective drop-down menus
Area (m ²)	Enter the area of the skylight
Curb	Select if the skylight has a curb

After providing the details on the dialog box, click **OK**. The component gets listed in the table under the relevant sub-tab.



The greyed out cells in the tables are non-editable. Double click on the ones that are not greyed out to edit/enter the corresponding values.

7.2.2. Edit Envelope Component

Edit an envelope related component such as roof, wall, vertical fenestration, or skylight by clicking **Edit Roof**, **Edit Wall**, **Edit Vertical Fenestration**, or **Edit Skylight** respectively under the relevant sub-tab.

The edit dialog box appears.

- Edit the details of the envelope component.
- After editing the details, click **OK**.

7.2.3. Delete Envelope Component

Delete an envelope related component such as roof, wall, vertical fenestration, or skylight by clicking on the component and then clicking **Delete Roof**, **Delete Wall**, **Delete Vertical Fenestration**, or **Delete Skylight** respectively under the relevant sub-tab.

The component gets deleted from the table.



There is no way to undo this action and retrieve a deleted component.

7.3. Envelope Conformance Report


See [§ 12](#) to learn how to generate the conformance report and interpret the results.

8. Heating, Ventilation, and Air Conditioning (HVAC)

Heating, Ventilation and Air Conditioning (HVAC) refers to the equipment, distribution systems, and terminal units that fulfil, either collectively or individually, the heating, ventilation, or air-conditioning requirement of a building or a portion of it. HVAC systems account for a significant portion of a commercial building's energy use.



HVAC energy use can increase or decrease significantly depending on how efficiently the air side systems and central plant operate. Proven technologies and design concepts can be used to build efficiencies in the systems and generate significant energy and cost savings. An optimal HVAC design considers all the interrelated building systems while addressing indoor air quality, thermal comfort, energy consumption, and environmental benefits.



Refer to **HVAC System** tip sheet available at http://eco3.org/?file_id=25  to learn more about HVAC.

In ECONirman Prescriptive Tool, click the **HVAC** tab to define HVAC systems.



- Certain input fields may get customized across the tool according to the details entered under the sub-tabs.
- At any point:
 - Click **Save** at the bottom of the page to save the entered details.
 -  It is imperative to save the details before navigating away to create new project or to view the list of existing projects. Any unsaved details will be otherwise lost.
 - Click **Check Conformance** at the bottom of the page to assess conformance of the building component with the ECBC.
 -  All the inputs related to the building component must be provided to assess conformance.
 - Click **New Project** at the top left corner of the page to create a new project (see [§ 6](#)).
 - Click **Existing Project** at the top left corner of the page view the list of existing projects (see [§ 5](#)).
 - Click **Reports** at the top right corner of the page to generate the conformance report(s) (see [§ 12](#)).
 - Click **Help** at the top right corner of the page to view this user manual.

8.1. Mandatory Requirements

The screenshot shows the ECO nirman Prescriptive software interface. The user is logged in as irgeco3@gmail.com. The interface includes a navigation menu with options like 'New Project', 'Existing Projects', 'Reports', and 'Help'. The main content area is titled 'HVAC' and contains a table of system data. A sidebar on the left lists requirements under 'MANDATORY' and 'PRESCRIPTIVE' categories. The 'MANDATORY' requirements are highlighted in blue and include: Natural Ventilation, HVAC System Type, Controls, Piping & Duct work, System Balancing, and Condensers. The 'PRESCRIPTIVE' requirements are listed in green and include: Economizer, Simultaneous Heating & Cooling Limitation, Air System Design and Control, Hydronic System Design and Control, Heat Rejection Equipment, and Energy Recovery. The table below shows the data for a system named 'Split AC West'.

System Name	System Type	Cooling Equipment	Cooling Capacity	COP	IPLV	Power Consumption	Heating Capacity	Thermal Efficiency
Split AC West	Split Air Conditioner		23.00	2.00	2.00	2.00	23.00	123.00

The responses to all HVAC related mandatory requirements have to be either **Yes** or not applicable (**NA**) for the building to conform with the ECBC. If the response is **NA**, a valid reason must be provided in the text box that appears. The building will be non-conformant if the response to even one mandatory requirement is **No**.



Responses to certain requirements may trigger other related input fields to appear. For example, selecting **Yes** as a response to a particular requirement or selecting a value from a drop-down menu may make other related input fields to appear.

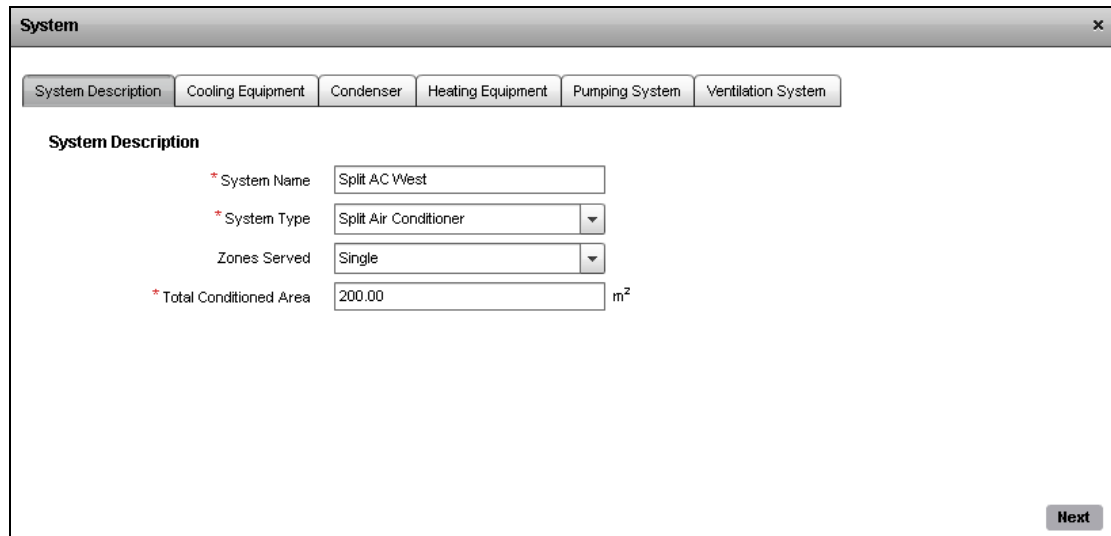
The mandatory requirements are to be fulfilled for the following HVAC components:

- Natural Ventilation
- HVAC System Type
- Controls
- Piping & Duct Work
- System Balancing
- Condensers

8.1.1. Add HVAC System

Under the **HVAC System Type** sub-tab, click **Add system** at the top of the table to create a new HVAC system.

The **System** dialog box appears.



The screenshot shows a dialog box titled "System" with a close button (X) in the top right corner. Below the title bar is a tabbed interface with six tabs: "System Description", "Cooling Equipment", "Condenser", "Heating Equipment", "Pumping System", and "Ventilation System". The "System Description" tab is currently selected. Under this tab, there are four input fields, each with a red asterisk indicating a required field:

- * System Name: A text box containing "Split AC West".
- * System Type: A dropdown menu with "Split Air Conditioner" selected.
- Zones Served: A dropdown menu with "Single" selected.
- * Total Conditioned Area: A text box containing "200.00" followed by "m²".

A "Next" button is located in the bottom right corner of the dialog box.

- Enter the HVAC system related details under each tab on the dialog box.
- On the last tab (**Ventilation System**), click **Add** at the bottom right corner to create the HVAC system.
- The system gets listed in the table.



- Piping and ducts can be added in a similar fashion under the **Piping & Duct Work** sub-tab.
- Controls can be added to the available HVAC systems under the **Controls** sub-tab.

8.1.2. Edit HVAC System

To edit an existing HVAC system:

- Under the **HVAC System Type** sub-tab, click on a system in the table and then click **Edit system** at the top of the table.
- Make the desired changes in the **System** dialog box.
- On the last tab (**Ventilation System**), click **Add** at the bottom right corner to save the changes.



Piping and ducts can be edited in a similar fashion under the **Piping & Duct Work** sub-tab.

8.1.3. Delete HVAC System

To delete an existing HVAC system:

- Under the **HVAC System Type** sub-tab, click on a system in the table and then click the **Delete system** at the top of the table.
- The system gets deleted.



There is no way to undo this action and retrieve a deleted system.



Piping and ducts can be deleted in a similar fashion under **Piping & Duct Work** sub-tab.

8.2. Prescriptive Requirements

As per the ECBC, the prescriptive requirements apply only if the following criteria are met:

- The system serves a single zone
- Cooling (if any) is provided by a unitary packaged or split-system air conditioner or heat pump
- Heating (if any) is provided by a unitary packaged or split-system heat pump, fuel-fired furnace, electric resistance heater, or baseboards connected to a boiler
- Outside air quantity is less than 1,400 l/s (3,000 cfm) and less than 70% of supply air at design conditions

The ECBC sets the prescriptive requirements for the following HVAC components:

- Economizer
- Simultaneous Heating and Cooling
- Air System Design and Control
- Hydronic System Design & Control
- Heat Rejection Equipment
- Energy Recovery
- Exhaust Hoods

- Radiant Heating Systems
- Hot Gas Bypass Limitation

8.3. HVAC Conformance Report



See [§ 12](#) to learn how to generate the conformance report and interpret the results.

9. Service Hot Water and Pumping (SHWP)

For some building types such as large hotels and hospitals, service water heating can be a major energy consumer. The inefficiency in water heating is caused primarily due to the inefficiency in the heating equipment, and by the heat loss from hot water storage tanks and distribution piping network.

In ECONirman Prescriptive Tool, click the **SHWP** tab to define service hot water and pumping for the building.



- Certain input fields may get customized across the tool according to the details entered under the sub-tabs.
- At any point:
 - Click **Save** at the bottom of the page to save the entered details.
 It is imperative to save the details before navigating away to create new project or to view the list of existing projects. Any unsaved details will be otherwise lost.
 - Click **Check Conformance** at the bottom of the page to assess conformance of the building component with the ECBC.
 All the inputs related to the building component must be provided to assess conformance.
 - Click **New Project** at the top left corner of the page to create a new project (see [§ 6](#)).
 - Click **Existing Project** at the top left corner of the page view the list of existing projects (see [§ 5](#)).
 - Click **Reports** at the top right corner of the page to generate the conformance report(s) (see [§ 12](#)).
 - Click **Help** at the top right corner of the page to view this user manual.

9.1. Mandatory Requirements

The ECBC, through mandatory requirements, seeks to minimize energy usage in the water heating systems by:

- Utilizing solar water heating
- Specifying heating equipment efficiency
- Maximizing heat recovery and minimizing electric heating
- Insulating hot water storage tanks and pipelines
- Reducing standby losses
- Reducing heat and evaporation losses in heated swimming pools

The screenshot shows the ECO nirman Prescriptive software interface. At the top, it says "Logged in as irgeco3@gmail.com" with links for "Logout", "About", and "Contact". Below that, it says "Build: 3.0(115)D". The main navigation bar includes "New Project", "Existing Projects", "Reports", and "Help". The "SHWP" tab is selected, showing a form with the following questions and inputs:

- Is the building a hotel or a hospital with a centralized water heating system? Yes No
- Specify the design heating capacity of the centralized water heating system: kL/day
- Does the heating system have a heat recovery system that provides water heating? Yes No
- What is the water heating capacity of the heat recovery system? kL/day

Below the inputs, there is a note: "As the water heating capacity of the heat recovery system is at least one-fifth of the design heating capacity of the centralized water heating system, this building is exempt from the mandatory requirement for Solar Water Heating." At the bottom, there is a red asterisk indicating "* Required Fields" and buttons for "Save" and "Check Conformance".

The responses to all SHWP related mandatory requirements have to be either **Yes** or not applicable (**NA**) for the building to conform with the ECBC. If the response is **NA**, a valid reason must be provided in the text box that appears. The building will be non-conformant if the response to even one mandatory requirement is **No**.



Responses to certain requirements may trigger other related input fields to appear. For example, selecting **Yes** as a response to a particular requirement or selecting a value from a drop-down menu may make other related input fields to appear.

The mandatory requirements are to be fulfilled for the following SHWP components:

- Solar Water Heating

- Equipment Efficiency
- Supplementary Water Heating System
- Piping Insulation
- Heat Traps
- Swimming Pool
- Compliance Documentation

9.2. SHWP Conformance Report

See [§ 12](#) to learn how to generate the conformance report and interpret the results.



10. Lighting

Lighting accounts for approximately 15% of the total energy consumed in India. It is an area that offers many energy efficiency opportunities in almost any building facility (existing or new).

In practice, the right quality and quantity of light can be provided efficiently by using the right technology and its effective integration with daylight. An energy-efficient lighting design involves sensitive integration of many requirements and considerations such as building orientation, interior building layout, task illumination, daylight strategies, glazing specification, choice of lighting systems, and controls.

In EConirman Prescriptive Tool, click the **Lighting** tab to define the interior and exterior lighting for the building.



- Certain input fields may get customized across the tool according to the details entered under the sub-tabs.
- At any point:
 - Click **Save** at the bottom of the page to save the entered details.
 It is imperative to save the details before navigating away to create new project or to view the list of existing projects. Any unsaved details will be otherwise lost.
 - Click **Check Conformance** at the bottom of the page to assess conformance of the building component with the ECBC.
 All the inputs related to the building component must be provided to assess conformance.
 - Click **New Project** at the top left corner of the page to create a new project (see [§ 6](#)).
 - Click **Existing Project** at the top left corner of the page view the list of existing projects (see [§ 5](#)).
 - Click **Reports** at the top right corner of the page to generate the conformance report(s) (see [§ 12](#)).
 - Click **Help** at the top right corner of the page to view this user manual.

10.1. Mandatory Requirements

The mandatory requirements for lighting mainly relate to interior and exterior lighting controls.

ECO nirman Prescriptive

Logged in as Guest Logout About Contact
Build: 3.0(115)D

New Project Existing Projects Reports Help

Project Envelope HVAC SHWP Lighting Electrical Power

MANDATORY

- Lighting Control
- Exit Signs
- Exterior Building Grounds Lighting

PRESCRIPTIVE

- Interior Lighting Power
- Exterior Lighting Power

Automatic Lighting Shut off

For a building that is not a 24-hour use building, are interior lighting systems equipped with an automatic control device for buildings larger than 500m²? Yes No NA

For a building that is not a 24-hour use building, are all office areas less than 30 m² and enclosed by walls or ceiling-height partitions, all meeting and conference rooms, all school classrooms, and all storage spaces, equipped with occupancy sensors? Yes No NA

For all spaces other than office areas less than 30 m² and enclosed by walls or ceiling-height partitions, meeting and conference rooms, school classrooms, and storage spaces, in a building that is not a 24-hour use building, does the automatic control device function on either of the following bases?

(a) scheduled for specified programmed times, wherein an independent program schedule is provided for areas up to 2500m², and for a single floor Yes No NA

* Required Fields

Save Check Conformance

The responses to all Lighting related mandatory requirements have to be either **Yes** or not applicable (**NA**) for the building to conform with the ECBC. If the response is **NA**, a valid reason must be provided in the text box that appears. The building will be non-conformant if the response to even one mandatory requirement is **No**.



Responses to certain requirements may trigger other related input fields to appear. For example, selecting **Yes** as a response to a particular requirement or selecting a value from a drop-down menu may make other related input fields to appear.

The mandatory requirements are to be fulfilled for the following lighting components:

- Lighting Control
- Exit Signs
- Exterior Building Grounds Lighting

10.2. Prescriptive Requirements

The prescriptive requirements of the ECBC regulate both interior and exterior lighting power.

10.2.1. Interior Lighting Power

The prescriptive requirements limit the installed electric wattage for interior building lighting. The installed lighting power used by luminaires is calculated, which is then compared with the maximum permissible interior lighting power, specified for various building types (Building Area Method) or building space functions (Space Function Method).

Building Area Method: As per this method, determination of interior lighting power allowance (watts) shall be in accordance with the following:

- Determine the allowed lighting power density as per the ECBC for each appropriate building area type.
- Calculate the gross lighted floor area for each building area type.
- The interior lighting power allowance is the sum of the products of the gross lighted floor area of each building area times the allowed lighting power density for that building area types.

Space Function Method: As per this method, determination of interior lighting power allowance (watts) shall be in accordance with the following:

- Determine the appropriate building type as per the ECBC and the allowed lighting power density.
- For each space enclosed by partitions 80% or greater than ceiling height, determine the gross interior floor area by measuring to the center of the partition wall. Include the floor area of balconies or other projections. Retail spaces do not have to comply with the 80% partition height requirements.
- The interior lighting power allowance is the sum of the lighting power allowances for all spaces. The lighting power allowance for a space is the product of the gross lighted floor area of the space times the allowed lighting power density for that space.

Add Zone

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New Project Existing Projects Reports Help

Project Envelope HVAC SHWP Lighting Electrical Power

Select a method for determination of Interior Lighting Power Allowance Building Area Method Space Function Method


Zones **Add Edit Delete**

Name	Building Area Type	Lighted Floor Area (m ²)	Installed Interior Lighting Power (W)	Installed Interior Lighting Power Density (W/m ²)
Cafeteria	Dining: Cafeteria/Fast Food	200.00	15000.00	75.00

Add Luminaires to Cafeteria **Add Edit Delete**

Luminaire ID	Description	Lamp Type	Luminaire Wattage (W)	Number of luminaires
1		Compact Fluorescent	1000	15

Save Check Conformance

- Under the **Interior Lighting Power** sub-tab, select a radio button corresponding to either **Building Area Method** or **Space Function Method**.
 Any details entered/saved under a method will be lost upon switching to the other method.
- Click **Add** at the top of the table to create a new zone.

A dialog box appears.

Add Building Area ×

* Name

* Type

* Lighted Floor Area m²

* Required Fields **OK Cancel**

- Enter the zone name, type, and the lighted floor area.
- Click **OK** to create the zone. It gets listed in the table.



Luminaires can be added to a zone. Click on a zone and then click **Add** at the top of the **Luminaires** table.

Edit Zone

To edit an existing zone:

- Click on a zone in the table and then click **Edit** at the top of the table.
- Make the desired changes in the dialog box that appears.
- Click **OK** to save the changes.



Luminaires can be edited in a similar fashion under the **Luminaires** table.

Delete Zone

To delete an existing zone:

- Click on a zone in the table and then click **Delete** at the top of the table.
- The zone gets deleted.



There is no way to undo this action and retrieve a deleted zone.



Luminaires can be deleted in a similar fashion under the **Luminaires** table.

10.2.2. Exterior Lighting Power

Lighting power limits are specified for the following building exterior lighting applications in the ECBC:

Exterior Lighting Application	Power Limits
Building entrance (with canopy)	13 W/m ² (1.3 W/ft ²) of canopied area
Building entrance (without canopy)	90 W/lin m (30 W/lin f) of door width
Building exit	60 W/lin m (20 W/lin f) of door width
Building facades	2 W/m ² (0.2 W/ft ²) of vertical facade area

The connected lighting power for these applications must not exceed the above-mentioned allowed limits. In addition, trade-offs between applications are not permitted.

Exemptions are allowed for certain lighting applications, only if they are equipped by an independent control device.



Exterior lighting applications can be added, edited, and deleted in a similar fashion in which the interior lighting zones are added, edited, and deleted. Besides, luminaires can be added to exterior lighting applications just like they are added to the interior lighting zones. The luminaires added to the applications can then be edited or deleted.

10.3. Lighting Conformance Report



See [§ 12](#) to learn how to generate the conformance report and interpret the results.

11. Electrical Power

The ECBC provisions for the electrical power systems installed in the building relate to distribution transformers, electric motors, power factor, and distribution losses.

In ECONirman Prescriptive Tool, click the **Electrical Power** tab to define the electrical power systems for the building.



- Certain input fields may get customized across the tool according to the details entered under the sub-tabs.
- At any point:
 - Click **Save** at the bottom of the page to save the entered details.
 It is imperative to save the details before navigating away to create new project or to view the list of existing projects. Any unsaved details will be otherwise lost.
 - Click **Check Conformance** at the bottom of the page to assess conformance of the building component with the ECBC.
 All the inputs related to the building component must be provided to assess conformance.
 - Click **New Project** at the top left corner of the page to create a new project (see [§ 6](#)).
 - Click **Existing Project** at the top left corner of the page view the list of existing projects (see [§ 5](#)).
 - Click **Reports** at the top right corner of the page to generate the conformance report(s) (see [§ 12](#)).
 - Click **Help** at the top right corner of the page to view this user manual.

11.1. Mandatory Requirements

The screenshot shows the 'ECO nirman Prescriptive' software interface. The user is logged in as 'iroeco3@gmail.com'. The 'Electrical Power' tab is active, displaying a table for transformer losses and a form for measurement reporting.

Component	Transformer Type	Rating of the transformer	Class of the transformer	Maximum Allowable Power Transformer Losses		
				Transformer losses at 50% loading (total loss value)	Transformer losses at 100% loading (total loss value)	Is this transformer selected to minimize the total of its initial cost in addition to the present value of its total lost energy while serving its estimated loads during its respective life span?
Transformer 1	Dry Type	100	Upto 22kV	12	8	Yes

Measurement and Reporting of Transformer Losses

Is the measurement of losses carried out using calibrated digital meters of class 0.5 or better accuracy and certified by the manufacturer? Yes No NA

Buttons: Save, Check Conformance

The responses to all Electrical Power related mandatory requirements have to be either **Yes** or not applicable (**NA**) for the building to conform with the ECBC. If the response is **NA**, a valid reason must be provided in the text box that appears. The building will be non-conformant if the response to even one mandatory requirement is **No**.



Responses to certain requirements may trigger other related input fields to appear. For example, selecting **Yes** as a response to a particular requirement or selecting a value from a drop-down menu may make other related input fields to appear.

The mandatory requirements are to be fulfilled for the following electrical power components:

- Transformers
- Energy Efficient Motors
- Power Factor
- Metering and Monitoring
- Power Distribution System

The following sub-sections explain how to add, edit, and delete transformers under the **Transformers** sub-tab.

11.1.1. Add Transformer

Under the **Transformers** sub-tab, click **Add Transformer** at the top of the table to add a new transformer.

The **Add Transformer** dialog box appears.

Add Transformer

Details for Transformer 2

* Transformer Type: Dry Type

* Rating of the transformer: 160 kVA

* Class of the transformer: Upto 22kV

Maximum Allowable Power Transformer Losses

* Transformer losses at 50% loading (total loss value): 20.00 kW

* Transformer losses at 100% loading (total loss value): 15.00 kW

* Is this transformer selected to minimize the total of its initial cost in addition to the present value of the cost of its total lost energy while serving its estimated loads during its respective life span?
 Yes No NA

* Required Fields

OK Cancel

- Enter the details of the transformer and its maximum allowable power losses.
- Click **OK** at the bottom right corner to add the transformer.
- The system gets listed in the table.

11.1.2. Edit Transformer

To edit an existing transformer:

- Under the **Transformers** sub-tab, click on a transformer in the table and then click **Edit Transformer** at the top of the table.
- Make the desired changes in the **Edit Transformer** dialog box.
- Click **OK** at the bottom right corner to save the changes.

11.1.3. Delete Transformer

To delete an existing transformer:

- Under the **Transformers** sub-tab, click on a transformer in the table and then click the **Delete Transformer** at the top of the table.
- The transformer gets deleted.



There is no way to undo this action and retrieve a deleted transformer.

11.2. Electrical Power Conformance Report

See [§ 12](#) to learn how to generate the conformance report and interpret the results.

12. Conformance Reports

ECONirman Prescriptive Tool provides the conformance assessment results with detailed reports. The information in the reports can be used for analysis and subsequent improvement of the building and its components. These reports can also be submitted to the *Authority Having Jurisdiction*.




See § 14.2 to understand the settings required on the computer to access the conformance reports.

12.1. Generating Reports

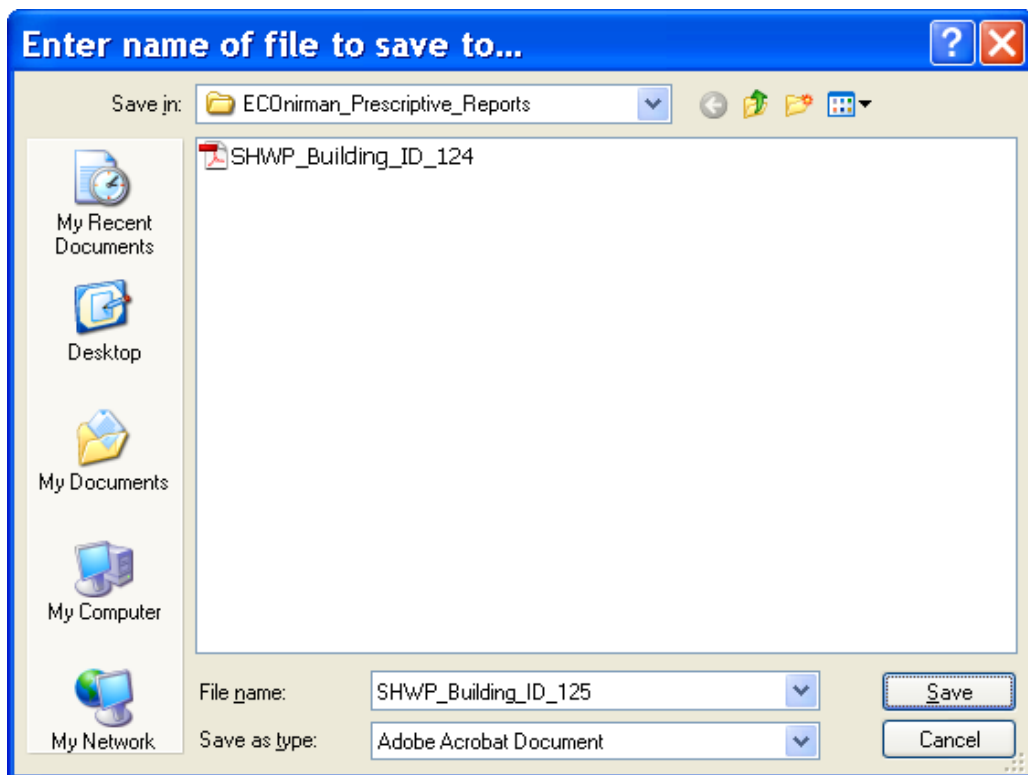
The screenshot shows the ECO nirman Prescriptive tool interface. At the top left is the logo 'ECO nirman Prescriptive'. The top right shows the user is logged in as 'lrgco3@gmail.com' with links for 'Logout', 'About', and 'Contact'. Below the logo are buttons for 'New Project' and 'Existing Projects'. A 'Reports' button is highlighted with a red box. The main content area is divided into tabs: 'Project', 'Envelope', 'HVAC', 'SHWP', 'Lighting', and 'Electrical Power'. The 'SHWP' tab is active. On the left, a 'MANDATORY' sidebar lists: 'Solar Water Heating', 'Equipment Efficiency', 'Supplementary Water Heating', 'Piping Insulation', 'Heat Traps', 'Swimming Pools', and 'Compliance Documentation'. The main content area contains three questions with radio button options for 'Yes', 'No', and 'NA':
1. Does the application for approval furnish detailed calculations showing the design to ensure at least 20% of the heating requirement is met from solar heat recovery?
2. Does the application for approval furnish detailed calculations showing the design to ensure not more than 80% of the heating requirement is met from electrical heating?
3. Does the application for approval furnish detailed calculations showing the design to ensure not more than 20% of the heating requirement is met from electrical heating wherever gas is available?
At the bottom right, a 'Check Conformance' button is highlighted with a red box, next to a 'Save' button.

The conformance reports can be generated using either of the following two options:

- **Option 1:** Click **Check Conformance** at the bottom of the page. This is used to assess conformance only for the corresponding building component (for example, SHWP).

 All the inputs related to the building component must be provided to assess conformance and generate a report. For example, all the inputs under all the **SHWP** sub-tabs must be provided in order to assess conformance of SHWP with the ECBC.

A dialog box to select the location for saving the conformance report appears.



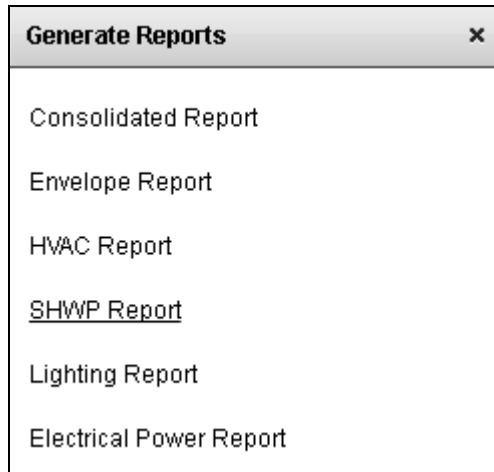
Select the location and click **Save**. The conformance report gets saved at the selected location.

- **Option 2:** Click **Reports** at the top right corner of the page to generate the report(s) for building component(s).



All the inputs related to the building component(s) must be provided to assess conformance and generate report(s).

The **Generate Reports** dialog box appears:



Click a hyperlink to view the corresponding conformance report.

A dialog box to select the location for saving the conformance report appears. Select the location and click **Save**. The conformance report gets saved at the selected location.



- It is only when all the inputs related to a building component are provided that its corresponding report becomes available (as a hyperlink) on this dialog box. For example, **SHWP Report** in the above illustration is a hyperlink; it indicates that all the inputs related to SHWP are provided in the tool.
- When all the inputs under all the building components' sub-tabs are provided, **Consolidated Report** becomes a hyperlink. This report contains the conformance details of the entire building, including all its components. Therefore, it replaces the need to generate individual reports for different building components.

12.2. Composition of the Reports

The following is the composition of a conformance report:

Report Section	Details Captured
Component Summary	
General	Building ID and name
Location	Building location and climate details
Project Details	Building type, use, loads, and area details
Component Conformance Summary	Conformance summary of the building component and its systems
Component Checklist	
General	Building ID and name
Location	Building location and climate details
Project Details	Building type, use, loads, and area details
Mandatory Requirements	List of building component related mandatory requirements with responses
Prescriptive Requirements	List of building component related prescriptive requirements with responses/inputs

13. Appendix A: Definitions and Acronyms

13.1. Definitions

The following are certain relevant definitions from the ECBC 2007.

Addition: an extension or increase in floor area or height of a building outside of the existing building envelope.

Alteration: any change, rearrangement, replacement, or addition to a building or its systems and equipment; any modification in construction or building equipment.

Boiler: a self-contained low-pressure appliance for supplying steam or hot water.

Boiler, packaged: a boiler that is shipped complete with heating equipment, mechanical draft equipment, and automatic controls; usually shipped in one or more sections. A packaged boiler includes factory-built boilers manufactured as a unit or system, disassembled for shipment, and reassembled at the site.

Building envelope: the exterior plus the semi-exterior portions of a building. For the purposes of determining building envelope requirements, the classifications are defined as follows:

Coefficient Of Performance (COP) – cooling: the ratio of the rate of heat removal to the rate of energy input, in consistent units, for a complete refrigerating system or some specific portion of that system under designated operating conditions.

Coefficient Of Performance (COP) – heating: the ratio of the rate of heat delivered to the rate of energy input, in consistent units, for a complete heat pump system, including the compressor and, if applicable, auxiliary heat, under designated operating conditions.

Control device: a specialized device used to regulate the operation of the equipment.

Daylighted area: the daylight illuminated floor area under horizontal fenestration (skylight) or adjacent to vertical fenestration (window).

Economizer, air: a duct and damper arrangement and automatic control system that together allow a cooling system to supply outdoor air to reduce or eliminate the need for mechanical cooling during mild or cold weather.

Economizer, water: a system by which the supply air of a cooling system is cooled indirectly with water that is itself cooled by heat or mass transfer to the environment without the use of mechanical cooling.

Energy Efficiency Ratio: the ratio of net cooling capacity in Btu/h to total rate of electric input in watts under designated operating conditions.

Energy Factor: a measure of water heater overall efficiency.

Fenestration: all areas (including the frames) in the building envelope that let in light, including windows, plastic panels, clerestories, skylights, glass doors that are more than one-half glass, and glass block walls.

- **Skylight:** a fenestration surface having a slope of less than 60 degrees from the horizontal plane. Other fenestration, even if mounted on the roof of a building, is considered vertical fenestration.
- **Vertical fenestration:** all fenestration other than skylights. Trombe wall assemblies, where glazing is installed within 300 mm (12 in) of a mass wall, are considered walls, not fenestration.

Fenestration area: total area of the fenestration measured using the rough opening and including the glazing, sash, and frame. For doors where the glazed vision area is less than 50% of the door area, the fenestration area is the glazed vision area. For all other doors, the fenestration area is the door area.

Floor area gross: the sum of the floor areas of the spaces within the building including basements, mezzanine and intermediate-floored tiers, and penthouses with headroom height of 2.5 m (7.5 ft) or greater. It is measured from the exterior faces of exterior walls or from the centerline of walls separating buildings, but excluding covered walkways, open roofed-over areas, porches and similar spaces, pipe trenches, exterior terraces or steps, chimneys, roof overhangs, and similar features.

- **Gross building envelope floor area:** the gross floor area of the building envelope, but excluding slab-on-grade floors.
- **Gross conditioned floor area:** the gross floor area of conditioned spaces.
- **Gross lighted floor area:** the gross floor area of lighted spaces.
- **Gross semi heated floor area:** the gross floor area of semi heated spaces.

HVAC system: the equipment, distribution systems, and terminals that provide, either collectively or individually, the processes of heating, ventilation, or air conditioning to a building or portion of it.

Kilovolt-ampere: where the term “kilovolt-ampere” (kVA) is used in this standard, it is the product of the line current (amperes) times the nominal system voltage (kilovolts) times 1.732 for three-phase currents. For single-phase applications, kVA is the product of the line current (amperes) times the nominal system voltage (kilovolts).

Kilowatt: the basic unit of electric power, equal to 1000 W.

Lighted floor area, gross: the gross floor area of lighted spaces.

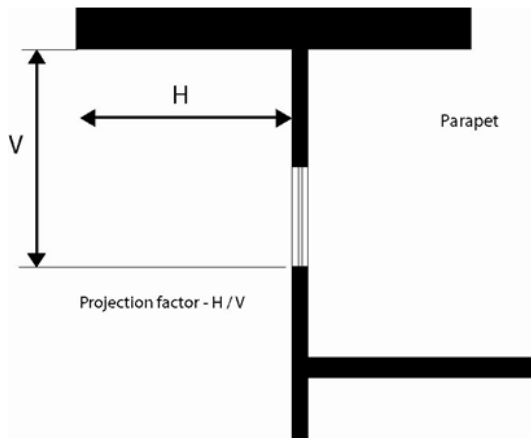
Lighting Power Density: the maximum lighting power per unit of area of a building classification of space function.

Packaged Terminal Air Conditioner: a factory-selected wall sleeve and separate unencased combination of heating and cooling components, assemblies, or sections. It may include heating capability by hot water, steam, or electricity, and is intended for mounting through the wall to service a single room or zone.

Process load: the load on a building resulting from the consumption or release of process energy.

Projection factor, overhang: the ratio of the horizontal depth of the external shading projection divided by the sum of the height of the fenestration and the distance from the top of the fenestration to the bottom of the farthest point of the external shading projection, in consistent units.

Projection factor, side-fin: the ratio of the horizontal depth of the external shading projection divided by the distance from the window jamb to the farthest point of the external shading projection, in consistent units.



R-value (thermal resistance): the reciprocal of the time rate of heat flow through a unit area induced by a unit temperature difference between two defined surfaces of material or construction under steady-state conditions. Units of R are $\text{m}^2\text{-}^\circ\text{C}/\text{W}$ ($\text{h}\text{-ft}^2\text{-}^\circ\text{F}/\text{Btu}$). For the prescriptive building envelope option, R-value is for the insulation alone and does not include building materials or air films.

Roof: the upper portion of the building envelope, including opaque areas and fenestration, which is horizontal or tilted at an angle of less than 60° from horizontal.

Roof area, gross: the area of the roof measured from the exterior faces of walls or from the centerline of party walls.

Single-zone system: HVAC system serving a single HVAC zone.

Skylight roof ratio (SRR): the ratio of the total skylight area of the roof, measured to the outside of the frame, to the gross exterior roof.

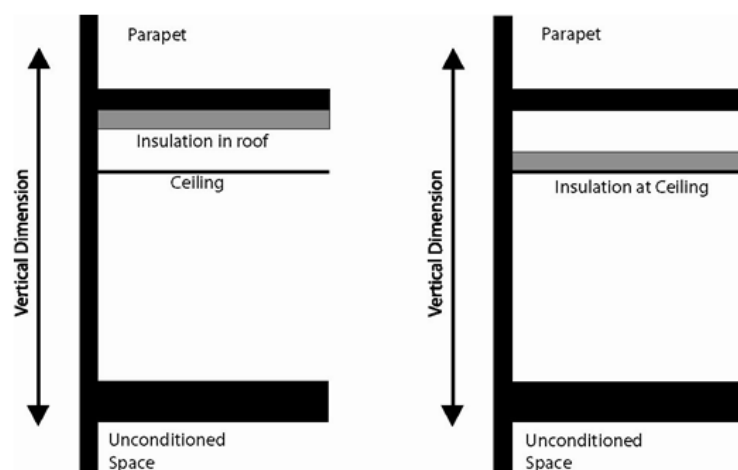
Solar Heat Gain Coefficient: the ratio of the solar heat gain entering the space through the fenestration area to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation, which is then reradiated, conducted, or convected into the space.

U-factor (Thermal Transmittance): heat transmission in unit time through unit area of a material or construction and the boundary air films, induced by unit temperature difference between the environments on each side. Units of U are $\text{W}/\text{m}^2\text{-}^\circ\text{C}$ ($\text{Btu}/\text{h}\text{-ft}^2\text{-}^\circ\text{F}$).

Variable Air Volume system: HVAC system that controls the dry-bulb temperature within a space by varying the volumetric flow of heated or cooled supply air to the space.

Wall: portion of the building envelope, including opaque area and fenestration that is vertical or tilted at an angle of 60° from horizontal or greater. This includes above-grade and below-grade walls, between floor spandrels, peripheral edges of floors, and foundation walls.

Wall area, gross: the overall area off a wall including openings such as windows and doors, measured horizontally from outside surface to outside service and measured vertically from the top of the floor to the top of the roof. If roof insulation is installed at the ceiling level rather than the roof, then the vertical measurement is made to the top of the ceiling. (Note that ECBC Section 4.3.1 does not allow roof insulation to be located on a suspended ceiling with removable ceiling panels.) The gross wall area includes the area between the ceiling and the floor for multi-story buildings.



Window Wall Ratio: the ratio of vertical fenestration area to gross exterior wall area. Gross exterior wall area is measured horizontally from the exterior surface; it is measured vertically from the top of the floor to the bottom of the roof.

Zone, HVAC: a space or group of spaces within a building with heating and cooling requirements those are sufficiently similar so that the desired conditions (for example, temperature) can be maintained throughout using a single sensor such as thermostat or temperature sensor.

13.2. List of Acronyms

The following is the list of relevant acronyms.

AC	Air Conditioner
AFUE	Annual fuel utilization efficiency
AHU	Air Handling Unit
ANSI	American National Standards Institute
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
BEE	Bureau of Energy Efficiency
BIS	Bureau of Indian Standards
Btu	British thermal unit
Btu/ft ² °F	British thermal units per square foot per degree Fahrenheit
Btu/h	British thermal units per hour
Btu/h ft °F	British thermal units per lineal foot per degree Fahrenheit
Btu/h ft ²	British thermal units per hour per square foot
Btu/h ft ² °F	British thermal units per hour per square foot per degree Fahrenheit
C	Celsius
CAV	Constant Air Volume
cfm	Cubic feet per minute
cm	Centimeter
COP	Coefficient of Performance
DG/GG	Diesel Generator/Gas Generator
DX	Direct expansion
EC Act 2001	Energy Conservation Act 2001
ECBC	Energy Conservation Building Code
ECM	Energy Conservation Measure
ECO-III	Energy Conservation and Commercialization - Phase III
EER	Energy Efficiency Ratio
EF	Energy Factor
EPI	Energy Performance Intensity
F	Fahrenheit
ft	Foot
GIS	Geospatial Information System
h	Hour

h·ft ² ·°F/Btu	Hour per square foot per degree Fahrenheit per British thermal unit
h·m ² ·°C/W	Hour per square meter per degree Celsius per Watt
HC	Heat capacity
hp	Horsepower
HSD	High Speed Diesel
HSPF	Heating seasonal performance factor
HVAC	Heating, Ventilation and Air Conditioning
in.	Inch
I-P	Inch-pound
IPLV	Integrated part-load value
IRG	International Resources Group
ISHRAE	Indian Society of Heating, Refrigeration and Air-conditioning Engineers
ISO	International Organization for Standardization
kVA	kilovolt-ampere
kW	kilowatt
kWh	kilowatt-hour
l/s	litre/second
LE	Lighting efficacy
lin	Linear
lin ft	Linear foot
lin m	Linear meter
lm	Lumen
LPD	Lighting Power Density
m	Meter
m ²	Square meter
mm	Millimeter
NAECA	National Appliance Energy Conservation Act
PDF	Portable Document Format
PF	Projection factor
PSZ	Packaged Single Zone
PTAC	Packaged Terminal Air Conditioner
R	R-value (thermal resistance)
RHFS	Reheat Fan System
Rs.	Indian Rupees
SC	Shading Coefficient
SHGC	Solar Heat Gain Coefficient
SHWP	Service Hot Water and Pumping
SL	Standby loss

SRR	Skylight roof ratio
TR	Tons of Refrigeration
ULB	Urban Local Body
USAID	United States Agency for International Development
VAV	Variable Air Volume
VLT	Visible Light Transmission
W	Watt
W/ft ²	Watts per square feet
W/m °C	Watts per lineal meter per degree Celsius
W/m ²	Watts per square meter
W/m ² °C	Watts per square meter per degree Celsius
Wh	Watt-hour
WRR	Window Wall Ratio



14. Appendix B: Computer Settings

ECONirman Prescriptive Tool is a web based rich Internet application (RIA) that has characteristics of a desktop application. It runs on a standard web browser and communicates with a web service, where conformance is assessed in the cloud (Internet). As a result, no special software needs to be installed on the computer. Additionally, the following are updated automatically:


- Tool features
- Default inputs in the tool
- The ECBC revisions

Unlike traditional applications, the tool runs much faster without using much connectivity bandwidth as a result of minimal data exchange with the servers.

The following are the system settings and recommendations to use the tool:

- Adobe® Flash® Player should be installed on the computer.
 Adobe® Flash® Player can be downloaded free of cost from <http://get.adobe.com/flashplayer>  (consult the System Administrator for assistance, if required).
- No other plug-in or software is required to use the tool.
- The tool is best viewed in 1024x768 or higher screen resolution.
- For security reasons, logout of the tool after each session.


14.1. Web Browser

- ECONirman Prescriptive Tool works with all the popular web browsers. It is recommended to use the latest versions of the web browsers for an optimal experience.
- It takes some time for the tool to load in the web browser for the first time. The loading time reduces subsequently.
- JavaScript must be enabled in the web browser.
- The web browser must be set to accept cookies.
- If the web browser has a provision, add <http://econirmanpres.eetools.in>  as a trusted site.

14.2. Conformance Reports

- All conformance reports are generated as Portable Document Format (PDF) files. Therefore, Adobe® Reader® (version 6.0 or higher) must be installed on the computer to view these reports.



Adobe® Reader® can be downloaded free of cost from <http://get.adobe.com/reader>  (consult the System Administrator for assistance, if required).

- A conformance report opens in a different pop-up window.
 - It is imperative to allow the pop-ups to open in the web browser. The report will not open if the pop-ups are blocked. Pop-up settings in the third-party toolbar (if installed) also need to be changed accordingly.
 - Wait for the report to open. Do not immediately close the new window that pops-up.



USAID ECO-III Project

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