

# TIMEPAC

## Academy

### Session 3

How to use the 3D models and the EPC in order to analyse energy savings

Presenter: Alice Gorrino (Edilclima srl)

5 March 2024



REPUBLIC OF SLOVENIA  
MINISTRY OF THE ENVIRONMENT,  
CLIMATE AND ENERGY



EDILCLIMA®  
ENGINEERING & SOFTWARE

laSalle

RAMON LLULL UNIVERSITY

SERA

Institute for  
Sustainable Energy and  
Resources Availability

# Objective of the presentation

To show a procedure for generating the Energy Performance Certificate (EPC) through the use of a BIM approach coupled with an Italian EPC generation tool

- Pointing out some tips and tricks for performing the architectural BIM model to better interconnect BIM with EPC tool
- Focusing on the 3D model of the building envelope
- Listing the information needed for the energy performance and showing how to complete the BIM architectural model for creating the model for EPC generation

# Content of the presentation

- Workflow of the calculation procedure
- Case study
  - Building data from architectural model
  - How to prepare the architectural BIM model
  - Importing the .ifc file into the EPC generation tool
  - Adding information on the EPC generation tool

# Workflow and softwares used

- Geometrical information
- Opaque and transparent dimension and orientation
- Thermal characterization of the opaque envelope
- Spaces

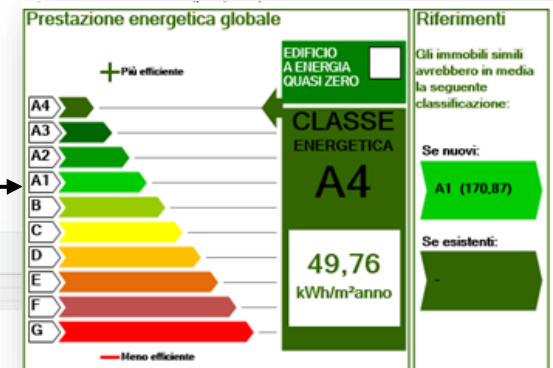
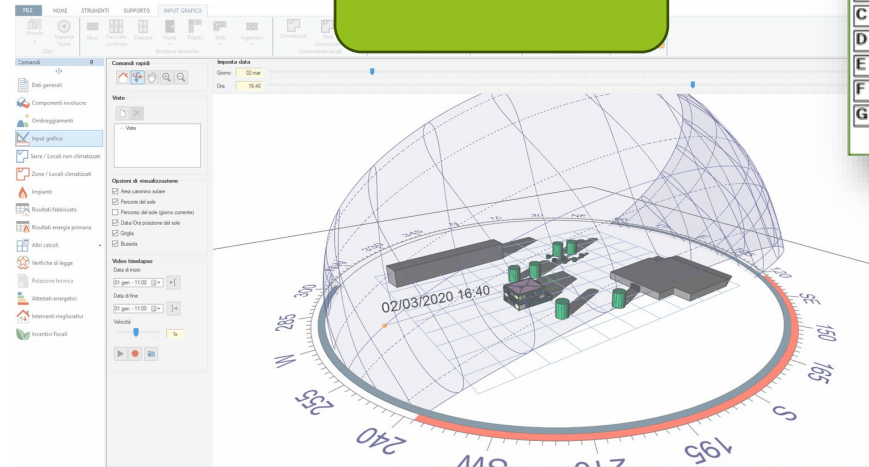
- Climatic data
- Thermal and solar characterization of the envelope (opaque, transparent, thermal bridges)
- Shading objects
- Input data for internal heat gains and ventilation flow rate
- HVAC technical systems
- Legislative framework

Archicad



.ifc

EC700



# Case study - description

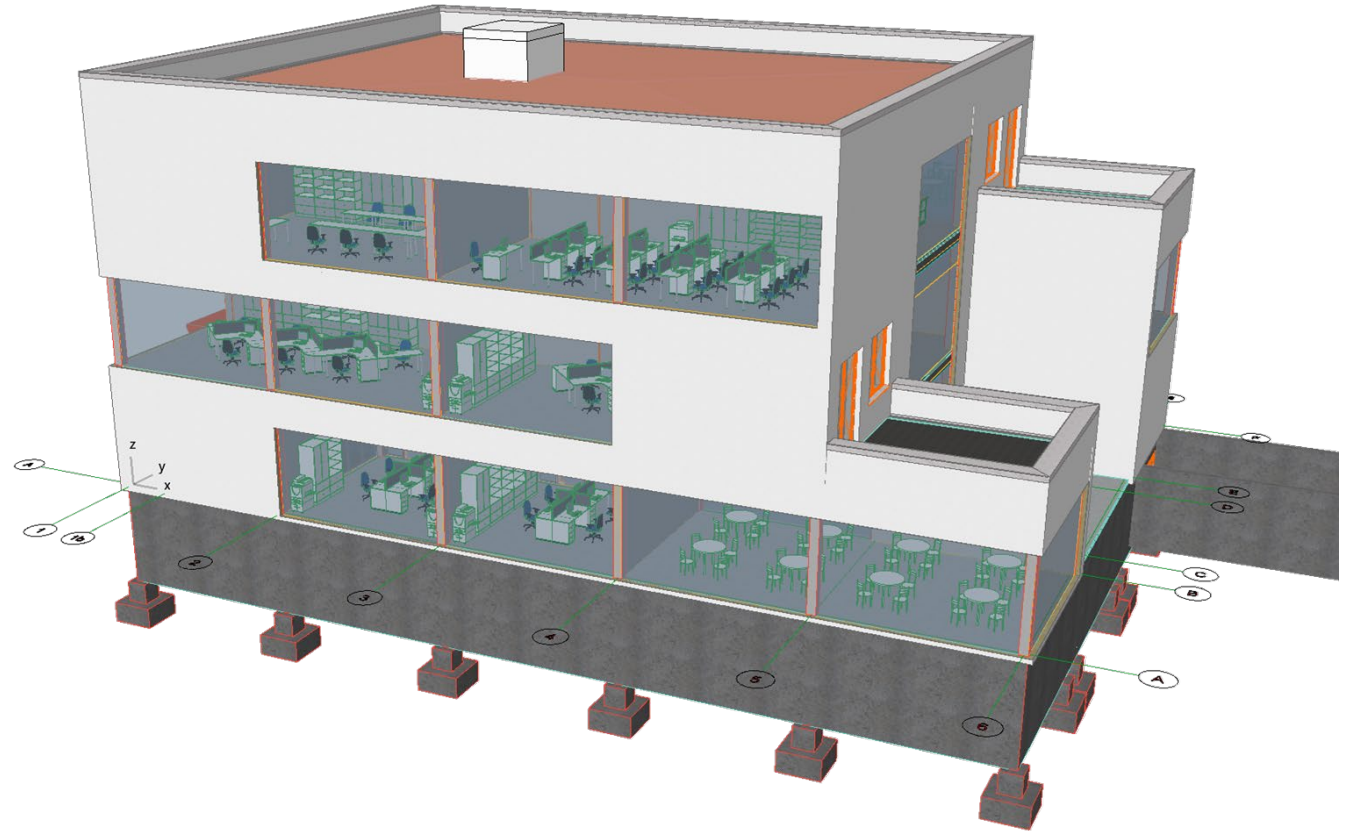
Building type: office building

Location: Rome

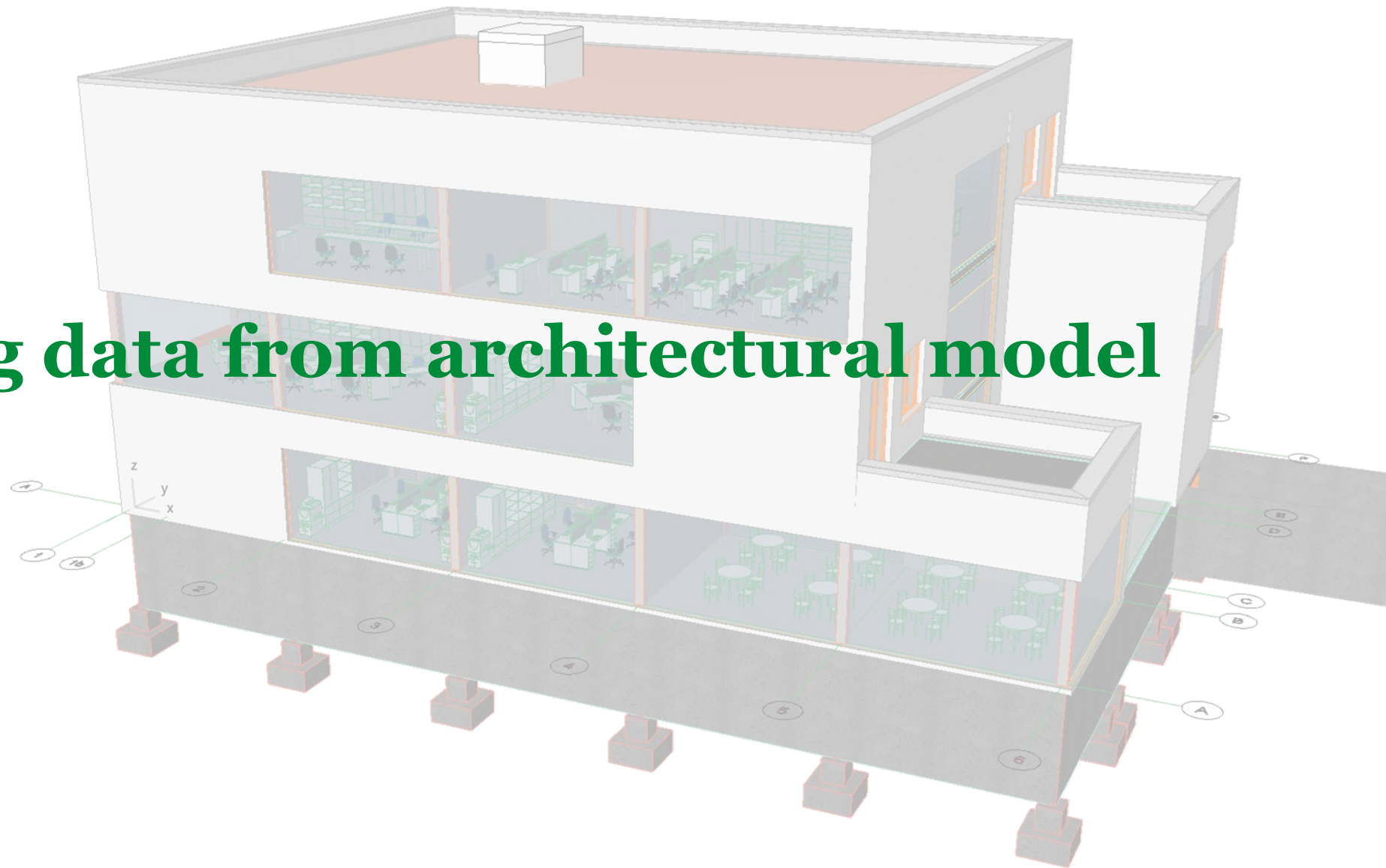
Conditioned net floor area:  
1400 m<sup>2</sup>

Software for  
architectural modeling:  
Archicad, Graphisoft

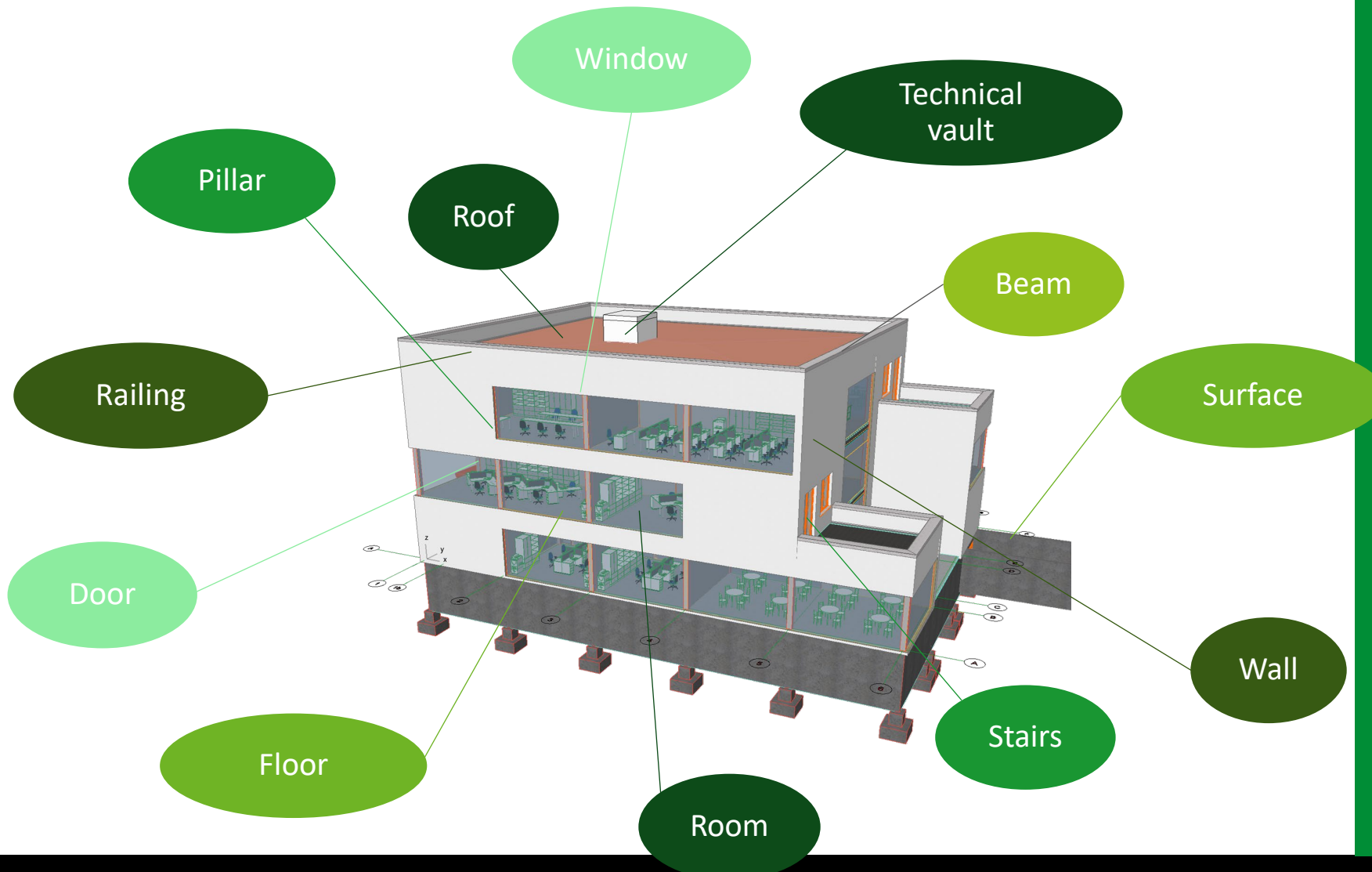
Software used for the  
EPC generation: EC700,  
Edilclima srl



# Building data from architectural model



# Architectural BIM model for energy performance calculation



The architectural model contains a vast amount of data, including elements that are not necessary for energy evaluation.

The product receiving the IFC file should be able to choose which objects are of interest for the specific evaluation and which ones should not be considered.

# Architectural BIM model for energy performance calculation

The image displays a central 3D architectural BIM model of a building, showing a cutaway view of the interior. The model is surrounded by several software interface windows, likely from a BIM software like Revit, used for configuring window and door properties for energy performance calculation.

**Impostazioni Selezione Solaio** (Left):

- GEOMETRIA E POSIZIONAMENTO**: Shows dimensions for the slab (0.400, 0.000) and options for the host plane (1. PIANO PRIMO) and reference plane (a Zero di Progetto, 3.250).
- PIANTA E SEZIONE**: Includes visualization options (Solo Piano Ospite), sectioned surfaces, and model settings.
- PARAMETRI ANALITICI STRUTTURALI**: Shows classification and properties for the slab (SOLAIO 001).

**Impostazioni Selezione Finestra** (Top Right):

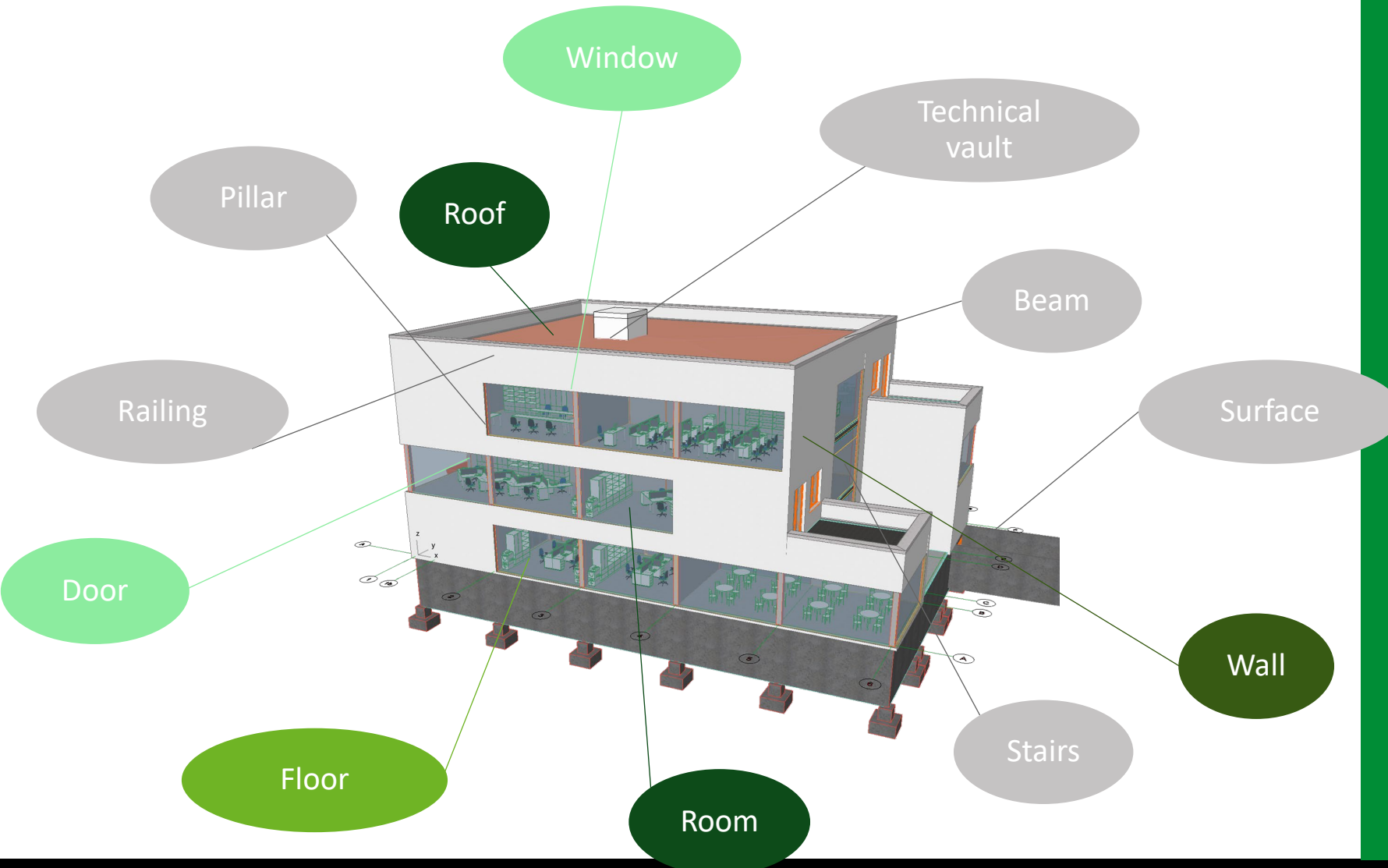
- ANTEPREMI E POSIZIONAMENTO**: Shows dimensions for the window (2.600, 1.200) and options for the host plane (1.100) and wall face (0.350).
- SETTAGGI FINESTRA**: Includes window type (Impostazioni Finestra e Apertura...) and opening type (Cerniera lat.).

**Impostazioni Selezione Porta** (Bottom Right):

- ANTEPREMI E POSIZIONAMENTO**: Shows dimensions for the door (2.600, 2.100) and options for the host plane (0.000) and wall face (0.000).
- SETTAGGI PORTA GARAGE**: Includes door type (1. Foro architettonico) and dimensions (Larghezza: 2.600, Altezza: 2.100).
- PIANTA E SEZIONE**: Includes visualization options and sectioned surfaces.



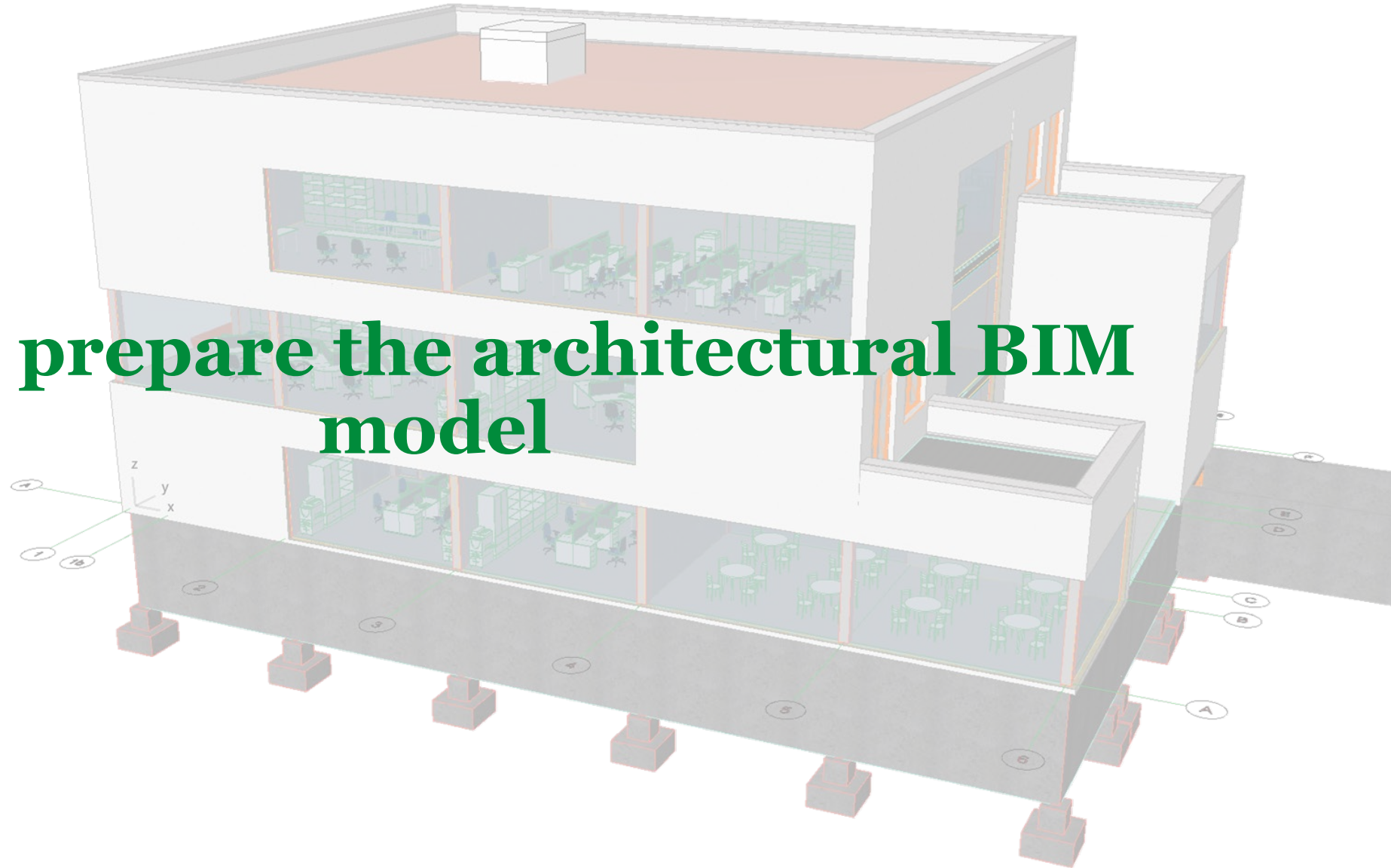
# Architectural BIM model for energy performance calculation



During the import process of an IFC into energy evaluation software, it is necessary to exclude certain elements that, despite being present in the architectural model, should not be the subject of analysis.

For the imported elements, only the information necessary for specific evaluations should be acquired.

# How to prepare the architectural BIM model



# How to prepare the architectural BIM model – Opaque envelope characterization

## Opaque envelope characterization (Archicad)

Strutture Composte

solaio in cemento - isolamento - piastrelle 2cm

Nuovo... Rinomina... Cancella...

EDITA STRATO E LINEA STRUTTURA

Strato e Separatore	Penna Linea	Tipo	Spessore [m]
Esterno/Sopra: Linea Continua	152		
✓ Piastrelle - Pavimento	144		0,020
✓ Linea Continua	144		
Calcestruzzo	✓ 149		0,070
Linea Continua	141		
Isolamento - Minerale duro	✓ 154		0,100
Linea Continua	150		
Spessore totale: [m]			0,400

Inserisci Strato Rimuovi Strato

Usa con:

Annulla OK

*Modification/characterization of the EC700 stratigraphy for opaque elements that were not correctly handled in the architectural modeling software*

Trova e sostituisci dati componenti

Tipo di dati: Stratigrafia

Componente da cui copiare: M1 - Parete esterna

Num	Descrizione	Spessore [mm]
1	Intonaco di gesso e sabbia	15,00
2	Muratura in laterizio pareti interne (um. 0.5%)	80,00
3	Blocco semipieno	200,00
4	Polistirene espanso sinterizzato (alla grafite)	120,00
5	Intonaco plastico per cappotto	5,00

Stratigrafia componente selezionato

Num	Descrizione	Spessore [mm]
1	Intonaco di gesso e sabbia	15,00
2	Muratura in laterizio pareti interne (um. 0.5%)	80,00
3	Blocco semipieno	200,00
4	Polistirene espanso sinterizzato (alla grafite)	120,00
5	Intonaco plastico per cappotto	5,00

Sostituisci stratigrafie

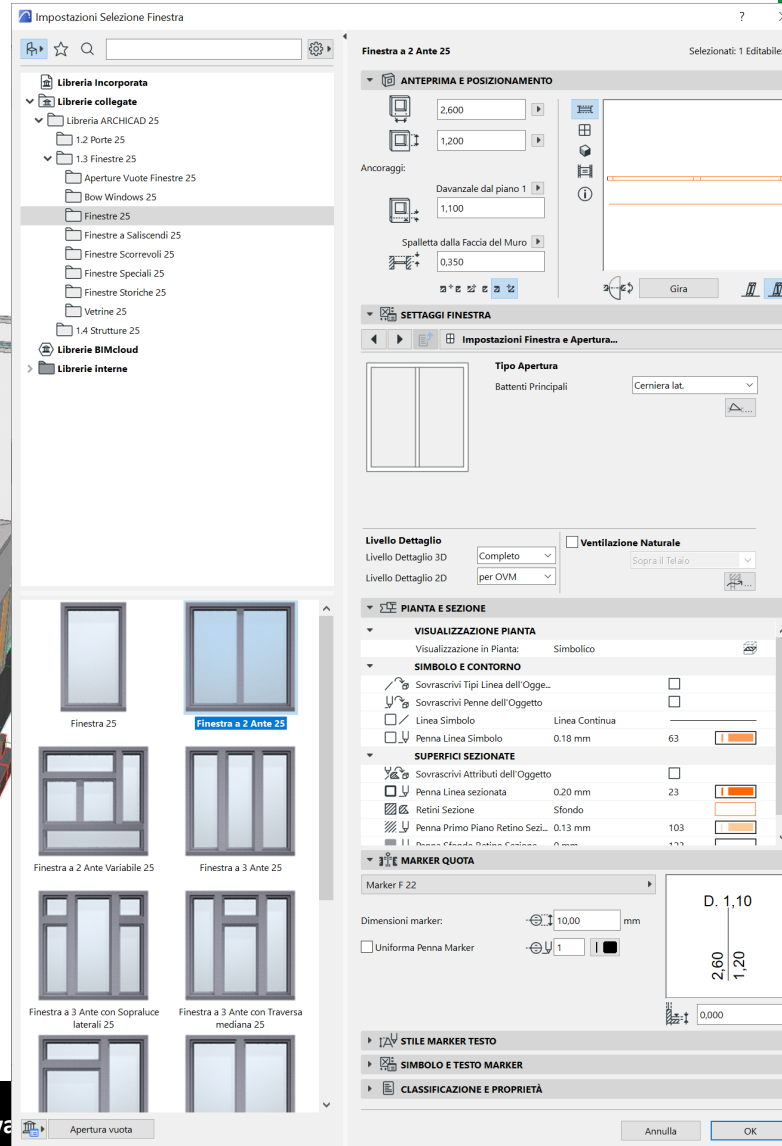
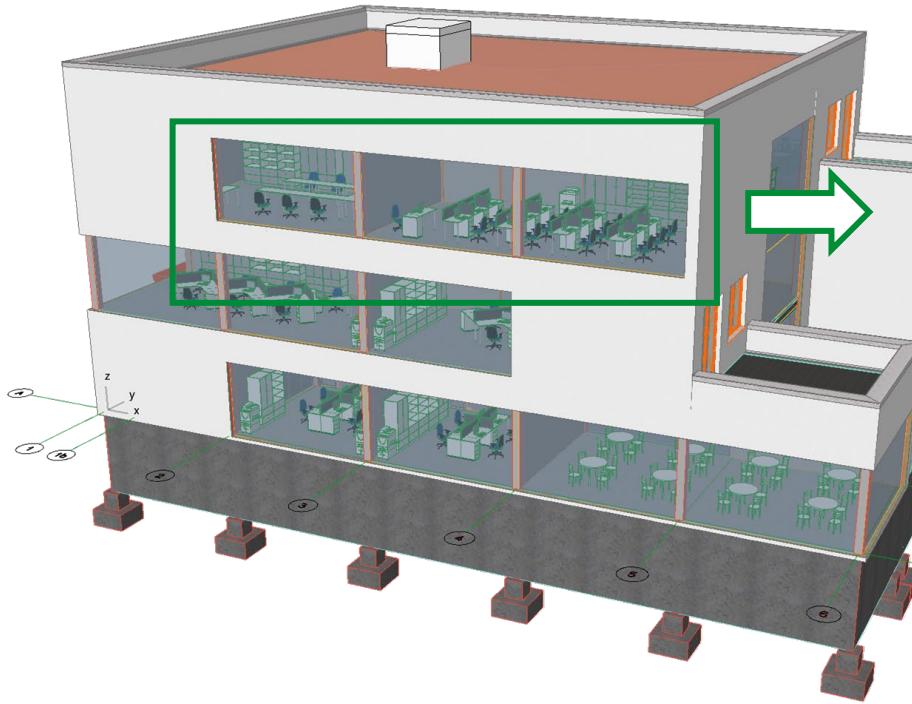
Chiudi

The creation of the opaque and transparent envelope is the first operation to be performed in architectural model creation software.

If possible, the layers of the envelope components should be characterized in the architectural model.

Otherwise, this characterization can be done with specific EPC generation tools.

# How to prepare the architectural BIM model – transparent envelope characterization



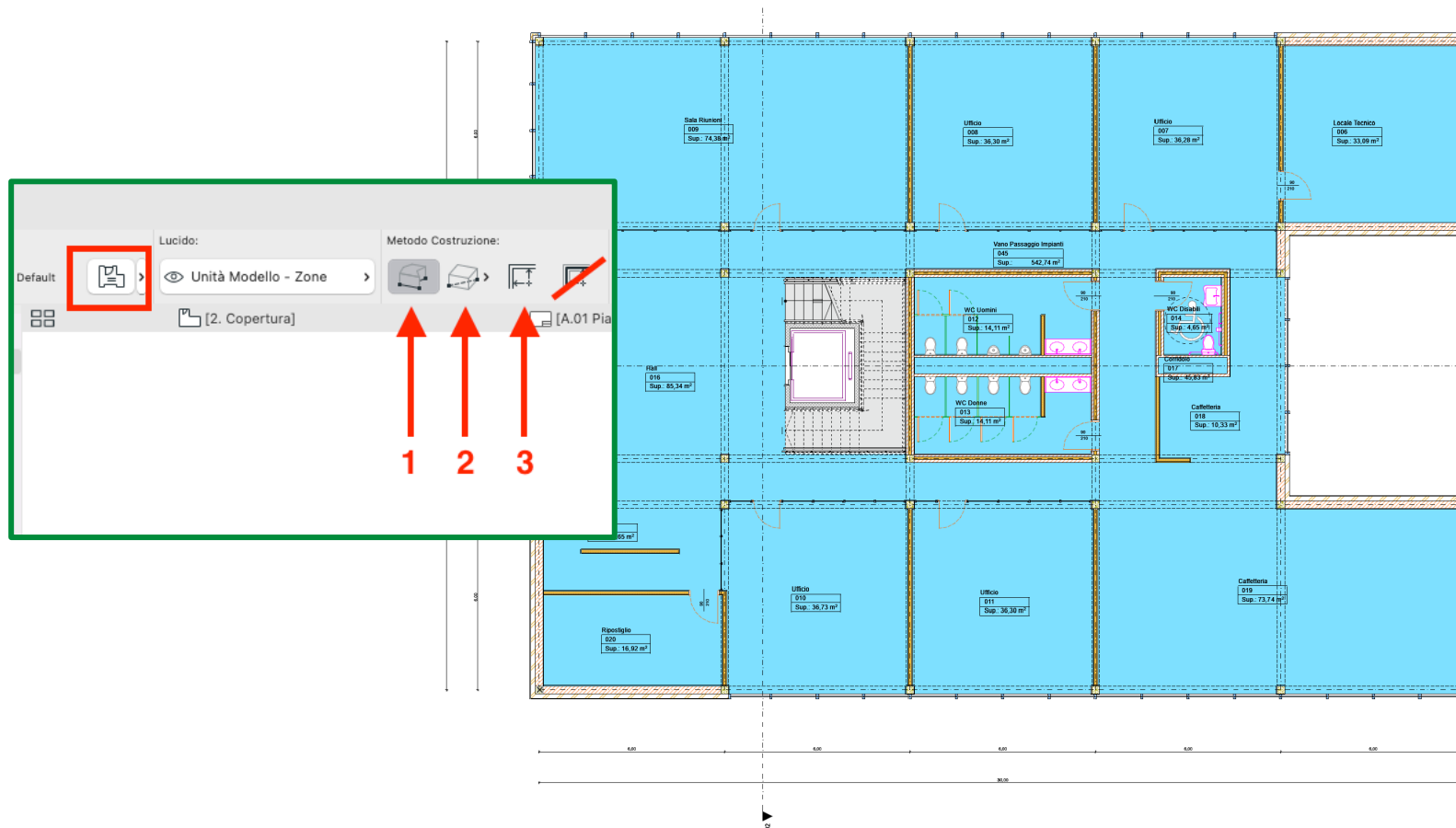
It is necessary to model the windows on the opaque envelope created before. Otherwise, double surfaces may be counted, as both the opaque and transparent parts will be included at the same position.

Additionally, elements like roller shutter boxes should not be included in the window modelling.

Despite being part of the window component, these elements need to be distinguished for energy evaluation purposes and should be modeled as separate elements.

# How to prepare the architectural BIM model – creation of the spaces

*Include in the model the IfcSpace  
Avoid totaly or partial overlapsof spaces!*



IfcSpace need to be included. These elements are used to identify each individual environment and define certain characteristics that will later be used for subsequent evaluations.

The information extracted from these elements via IFC will pertain to surfaces and volumes.

All other discipline-specific details, will be added to these entities downstream of the import (e.g. occupant profile, ventilation air flow etc.). It is crucial that spaces do not intersect with each other either horizontally or vertically, as overlaps will result in additional and inaccurate quantities of surfaces and volumes.

# How to prepare the architectural BIM model – creation of the spaces

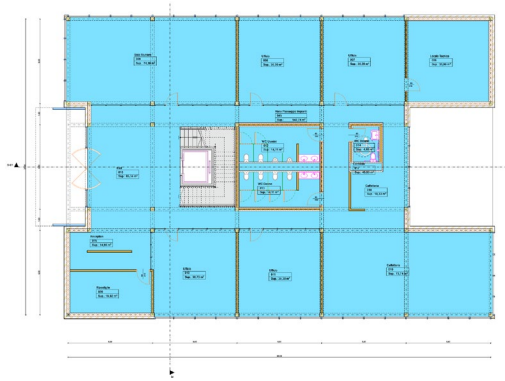
*Perform an accurate offset!*



It is important to check that the boundaries of the spaces touch all the enclosing surfaces both laterally and superiorly.

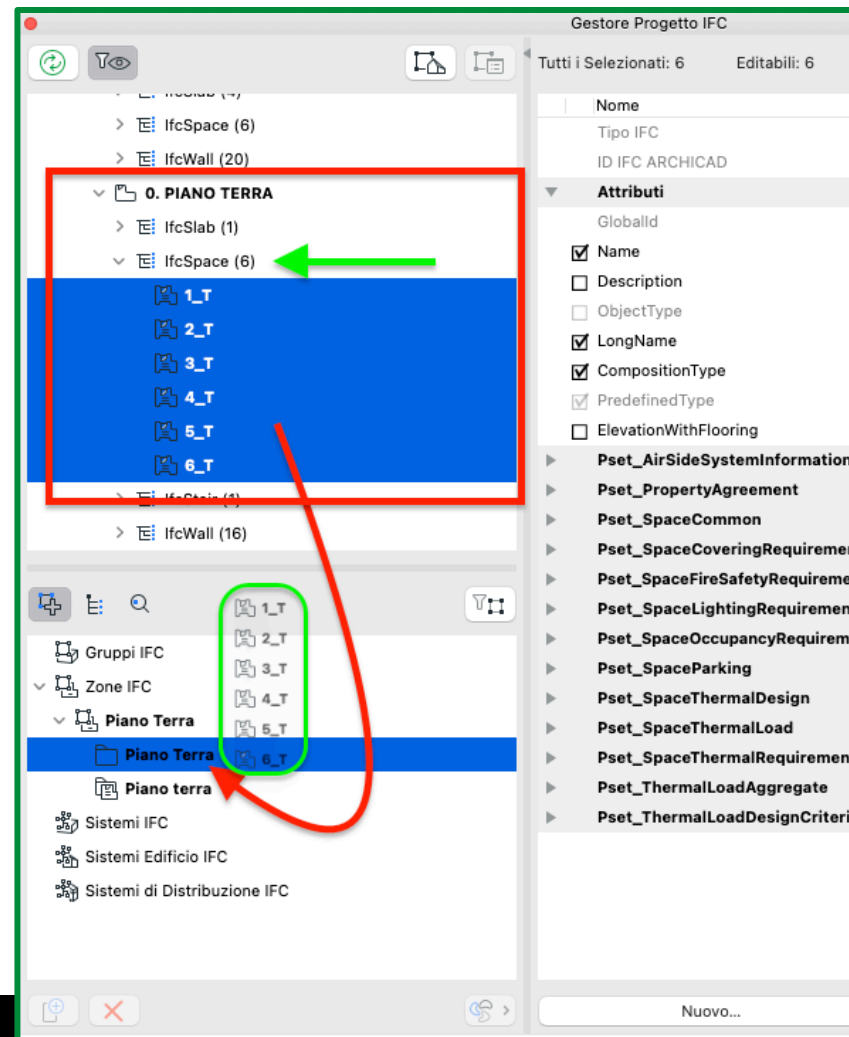
It often happens that the upper offset of the rooms is not properly checked, and if the room does not extend to the element that encloses it from above, this will result in the loss of that thermal surface.

# How to prepare the architectural BIM model – creation of the thermal zones



*Grouping the spaces for the creation of thermal zones, for energy calculation purposes*

## Exporting the IFC file



The spaces, (blue in figure), must be associated with a reference thermal zone.

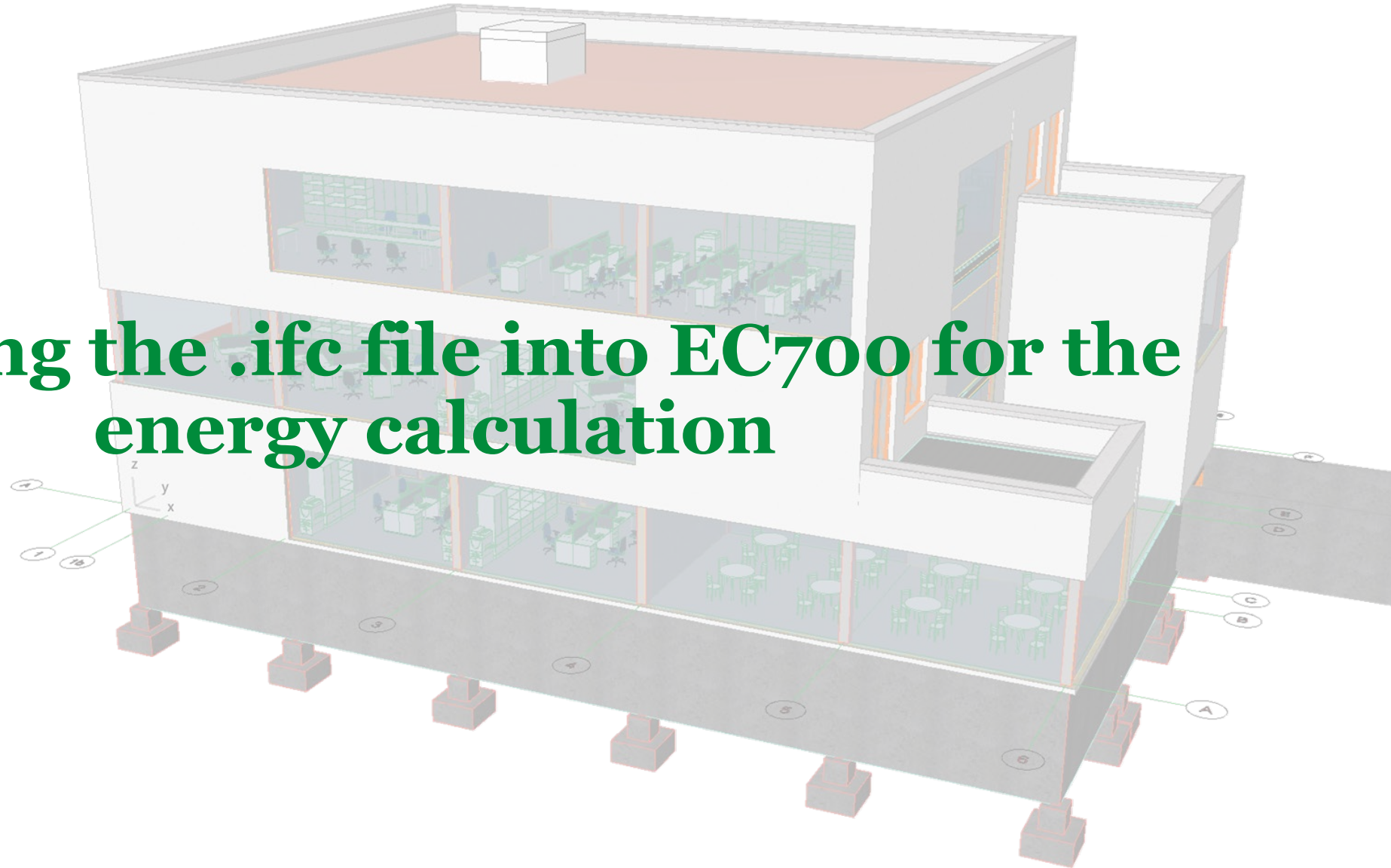
Each architectural modeling software performs this operation in its own way.

For example, Archicad allows these groupings to be done after the modeling phase, when exporting the IFC file.

These steps may also not be executed in the architectural modeling software.

In this case, they should be performed during the IFC import phase in EC700, as this information is necessary for the subsequent energy assessment.

# Importing the .ifc file into EC700 for the energy calculation





# Importing the .ifc file into EC700 for the energy calculation

**1** Destinazione d'uso: Categoria DPR 412/93: E.2

**2** Importa

**3** Associazione materiali

IFC			Edilclima		
Materiale	Spessore [mm]	Codice	Materiale	Spessore [mm]	
Aluminio	150,00	e1504	Aluminio	0,00	
Blocco Muratura - Riempitivo	250,00	e1601	Muratura in laterizio pareti interne (um. ...	0,00	
Blocco Muratura - Riempitivo	100,00	e1601	Muratura in laterizio pareti interne (um. ...	0,00	
Blocco Muratura - Riempitivo	80,00	e1601	Muratura in laterizio pareti interne (um. ...	0,00	
Calcestruzzo	70,00	e403	C.I.s. di sabbia e ghiaia (pareti interne)	0,00	
Cartongesso	12,50			0,00	
Cemento Armato - Strutturale	350,00			0,00	
Cemento Armato - Strutturale	265,00			0,00	
Cemento Armato - Strutturale	250,00			0,00	
Intonaco - Calce Sabbia	15,00			0,00	

Edilclima		Intonaci		Isolanti		Latenzi		Solette		Vari		Pannelli		Intercapedini	
Tipologia materiale	Codice	Descrizione	Sp [mm]	M.V. [kg/m³]	Cond. [W/mK]	R.V. [h]	C.T. [kJ/kgK]	Nome							
Blocchi forati e semipieni calcestru...															
Blocchi pieni calcestruzzo	e403	C.I.s. di sabbia e ghiaia (pareti inter...	0	2000	1.1600	96	1	UNI 10351 - ...							
Calcestruzzi cellulari da autoclave	e404	C.I.s. di sabbia e ghiaia (pareti inter...	0	2200	1.4800	96	1	UNI 10351 - ...							
Calcestruzzi di argilla espansa	e405	C.I.s. di sabbia e ghiaia (pareti inter...	0	2400	1.9100	96	1	UNI 10351 - ...							
Calcestruzzi di perlite e vermiculite	e408	C.I.s. di sabbia e ghiaia (pareti este...	0	2000	1.2600	96	1	UNI 10351 - ...							
Calcestruzzi normali	e409	C.I.s. di sabbia e ghiaia (pareti este...	0	2200	1.6100	96	1	UNI 10351 - ...							
Sottofondi e massetti	e410	C.I.s. di sabbia e ghiaia (pareti este...	0	2400	2.1500	96	1	UNI 10351 - ...							
	e414	C.I.s. in genere	0	400	0.1900	96	1	UNI 10351 - ...							

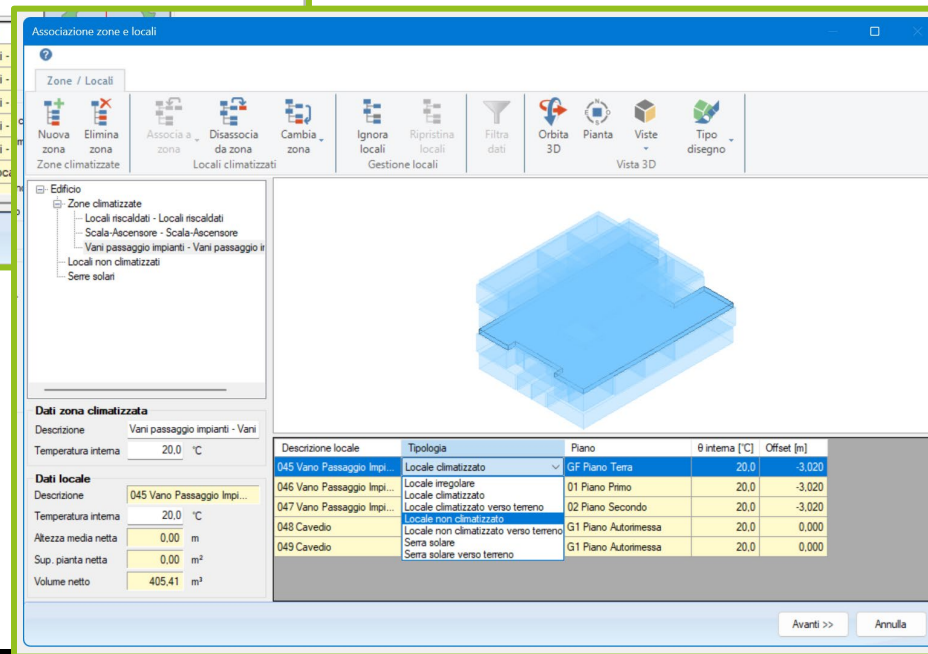
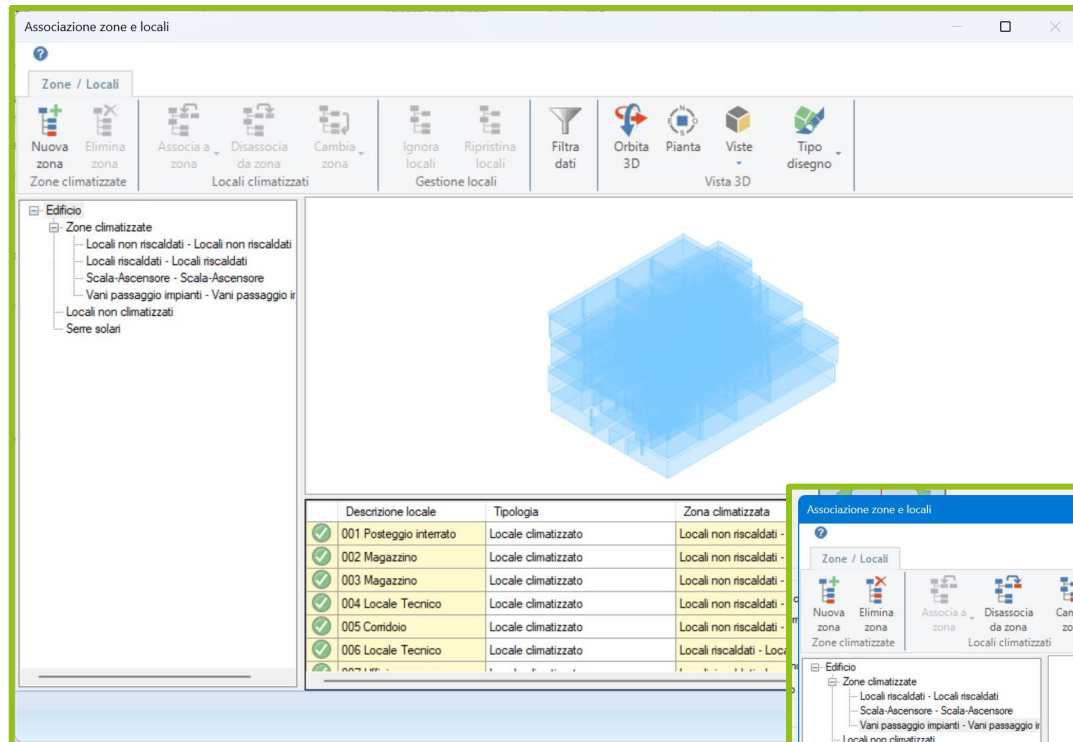
The import phase is activated after entering the building typology and the climatic data.

During the importation phase, it is requested to add the information that are not yet contained in the .ifc.

In the first dialogue window, you are prompted to associate each material found in the architectural BIM model with a material present in the archives provided by the EC700 tool.

In the next release of EC700 this will be done semi-automatically!

# Importing the .ifc file into EC700 for the energy calculation



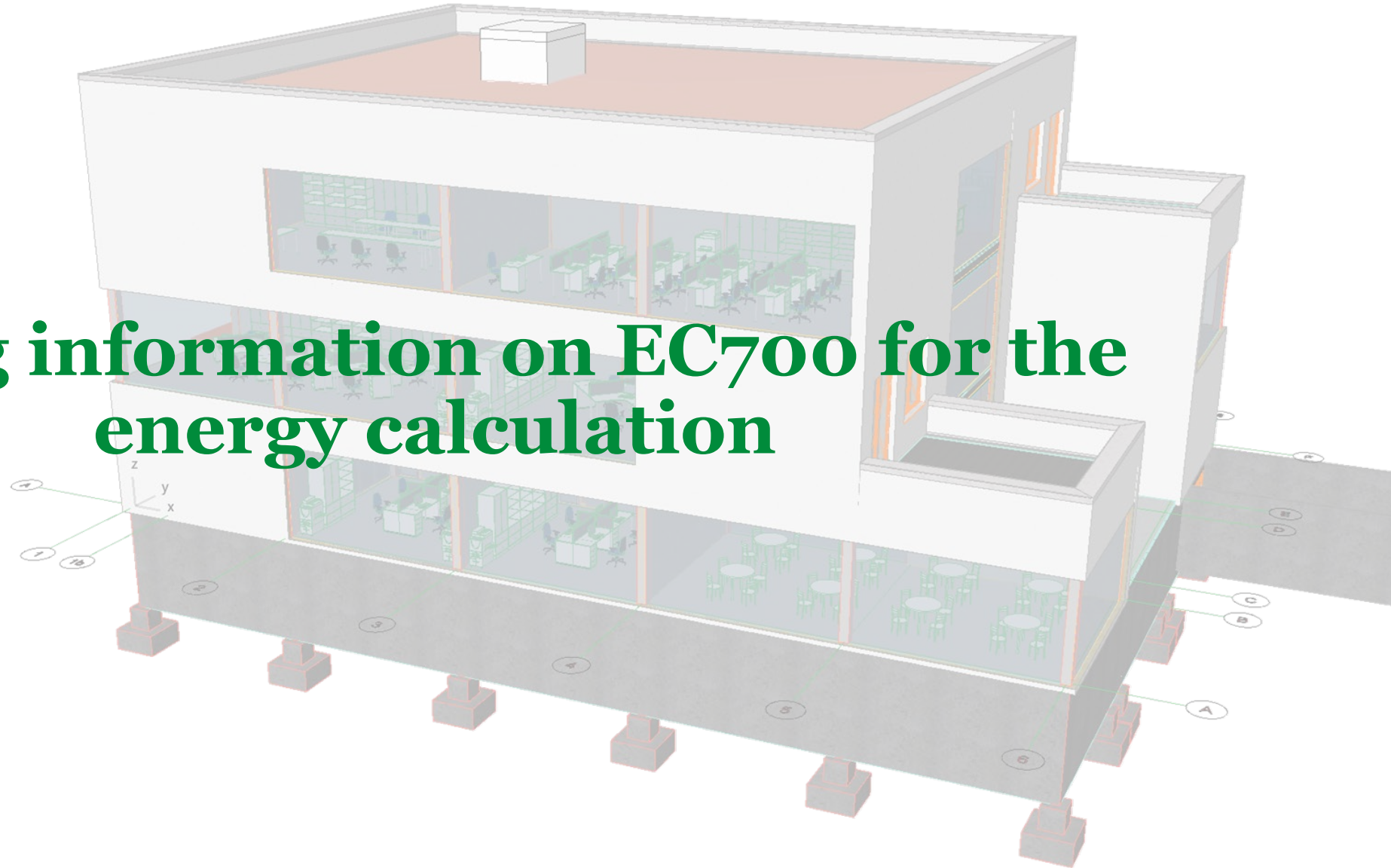
After the material association, you should perform the thermal zone association.

In this example, zoning associations had already been done, so it was not necessary to perform them again.

However, there is still the option to modify the existing associations or move rooms from one category to another.

In .ifc file there is no information about the unheated zones. Therefore, these rooms are manually identified.

# Adding information on EC700 for the energy calculation



# Adding information on EC700 for the energy calculation

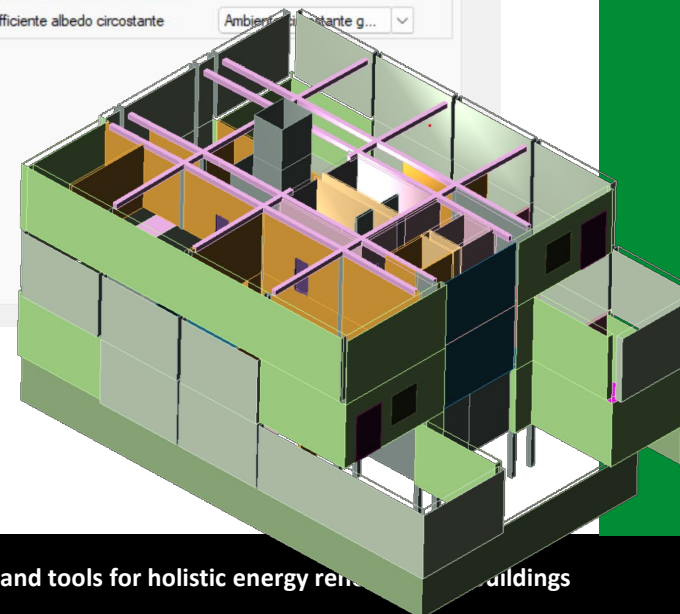
The screenshot shows a software interface for building energy calculation. On the left, a tree view lists components under categories like Muri, Pavimenti, Soffitti, Ponti Termici, and Componenti finestrati. The main window displays details for 'Muri: M1 - 9,5 Muro Interno'. It includes a 'Dati struttura' table, a 'Potenza & Energia' section with input fields for temperature, emissivity, and absorption, and a 'Dati noti' section with calculated values.

Num	Descrizione	Spessore [mm]	Cond. [W/mK]
1	Muratura in laterizio pareti interne (um. 0.5%)	80,00	0,250
2	C.I.s. di sabbia e ghiaia (pareti interne)	15,00	1,160

Origine dati	Valori noti	
Trasmittanza potenza	Up	1,988 W/m²K
Trasmittanza energia	Ue	1,813 W/m²K
Spessore totale		95,0 mm
Massa superficiale	Ms	78,0 kg/m²
Trasmittanza periodica	Yie	1,679 W/m²K
Capacità termica areica		26,032 kJ/m²K

The first phase of the building modeling after the .ifc import phase consists of the opaque envelope modeling.

All materials that have not been yet associated, may be inserted, together with all properties affecting the energy calculation.



# Adding information on EC700 for the energy calculation

The screenshot displays a software interface for energy calculation, showing a list of components, a table of wall components, and a detailed view of a specific wall component.

**Componenti**

- Muri
  - M1 - 9,5 Muro Interno
  - M2 - 26 Muro Box Perimetrale
  - M3 - Porta Garage Basculante 26
  - M4 - 15 Muro Interno - Cartongesso
  - M5 - MUR-EST-430-00
  - M6 - 9,5 Muro Interno
  - M7 - 15 Muro Interno - Cartongesso
  - M8 - 43 Muro Tamponamento Perimetrale
  - M9 - Porta 26
  - M10 - Porta 26
  - M11 - Muro fittizio Tipo Curtain Wall
  - M12 - 28 Muro Interno
  - M13 - 28 Muro Interno
  - M14 - 9,5 Muro Interno
  - M15 - 28 Muro Interno
  - M16 - MUR-EST-430-00
  - M17 - 43 Muro Tamponamento Perimetrale
  - M18 - 28 Muro Interno
- Pavimenti
  - P1 - 50 Solaio Piano Terra
  - P2 - 50 Solaio Piano Terra
  - P3 - 50 Solaio Piano Terra
  - P4 - 50 Solaio Piano Terra
  - P5 - 50 Solaio Piano Terra
  - P6 - 50 Solaio Piano Terra
  - P7 - 40 Solaio Interno
  - P8 - 40 Solaio Interno
  - P9 - 40 Solaio Interno
- Soffitti
  - S1 - 50 Solaio Piano Terra
  - S2 - 40 Solaio Interno
  - S3 - SOL-STR-500-04
  - S4 - SOL - 009
- Ponti Termici
  - W1 - Tipo Curtain Wall
  - W2 - Finestra a 2 Ante 26
  - W3 - Finestra a 2 Ante 26
- Componenti finestrati
  - W1 - Tipo Curtain Wall
  - W2 - Finestra a 2 Ante 26
  - W3 - Finestra a 2 Ante 26

**Muri - riepilogo**

Codice	Tipo	Descrizione	Sp [mm]	Ue [W/m²K]	θe [°C]	Vti	Esistente
M1	E	9,5 Muro Interno	95,00	1,812	0,0	✗	<input type="checkbox"/>
M2	E	26 Muro Box Perimetrale	265,00	2,235	0,0	✗	<input type="checkbox"/>
M3	E	Porta Garage Basculante 26	0,00	0,000	0,0	●	<input type="checkbox"/>
M4	D	15 Muro Interno - Cartongesso	150,00	0,373	-	●	<input type="checkbox"/>
M5	T	MUR-EST-430-00	430,00	0,000	0,0	●	<input type="checkbox"/>
M6	U	9,5 Muro Interno	95,00	1,619	20,0	✗	<input type="checkbox"/>
M7	T	15 Muro Interno - Cartongesso	150,00	0,382	0,0	✗	<input type="checkbox"/>
M8	T	43 Muro Tamponamento Perimetrale	430,00	0,151	0,0	✓	<input type="checkbox"/>
M9	T	Porta 26	0,00	0,000	0,0	●	<input type="checkbox"/>
M10	D	Porta 26	0,00	0,000	-	●	<input type="checkbox"/>
M11	T	Muro fittizio Tipo Curtain Wall					
M12	D	28 Muro Interno					
M13	U	28 Muro Interno					
M14	U	9,5 Muro Interno					
M15	U	28 Muro Interno					
M16	E	MUR-EST-430-00					
M17	E	43 Muro Tamponamento Perimetrale					
M18	T	28 Muro Interno					

**Muri: M8 - 43 Muro Tamponamento Perimetrale**

Codice M 8 Descrizione 43 Muro Tamponamento Perimetrale

**Dati generali** Stratigrafia Verifica Termoigrometrica Grafici Risultati

**Dati struttura**

Num	Descrizione	Spessore [mm]	Cond. [W/mK]
1	Intonaco di gesso	15,00	0,400
2	Muratura in laterizio pareti interne (lm. 0.5%)	250,00	0,250
3	Poliuretano espanso rigido pem. ai gas (sp <= 80 mm)	150,00	0,028
4	Intonaco di calce e sabbia	15,00	0,800

**Potenza & Energia Verifica termoigrometrica**

**Dati UNI TS 11300-1**

Temperatura esterna  $t_{e}$  0,0 °C

Emissività  $\epsilon$  0,900

Fattore di assorbimento  $\alpha$  0,600

Maggiorazione per ponti termici 0,00 %

Inclinazione sull'orizzonte  $\Sigma$  90 deg

**Altri dati**

Struttura esistente

Struttura disomogenea

Contributo Invernale/Estivo I+E

Porta opaca

Cassonetto

Importa cassonetto da EC709

**Dati noti**

Origine dati Valori noti

Trasmittanza potenza  $U_p$  0,152 W/m²K

Trasmittanza energia  $U_e$  0,151 W/m²K

Spessore totale 430,0 mm

Massa superficiale  $M_s$  194,3 kg/m²

Trasmittanza periodica  $Y_e$  0,021 W/m²K

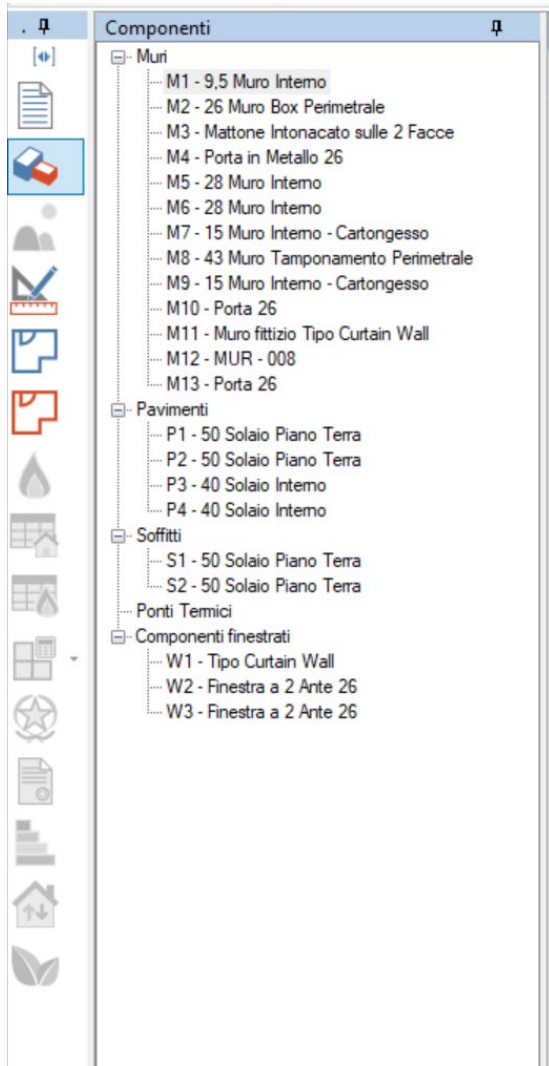
Capacità termica areica 38,327 kJ/m²K

Here is the overview of the envelope components that have been imported into EC700 with a focus on the opaque envelope.

Not all the layers of the components have been recognised (and the corresponding thermal properties e.g. U-values are not yet calculated).

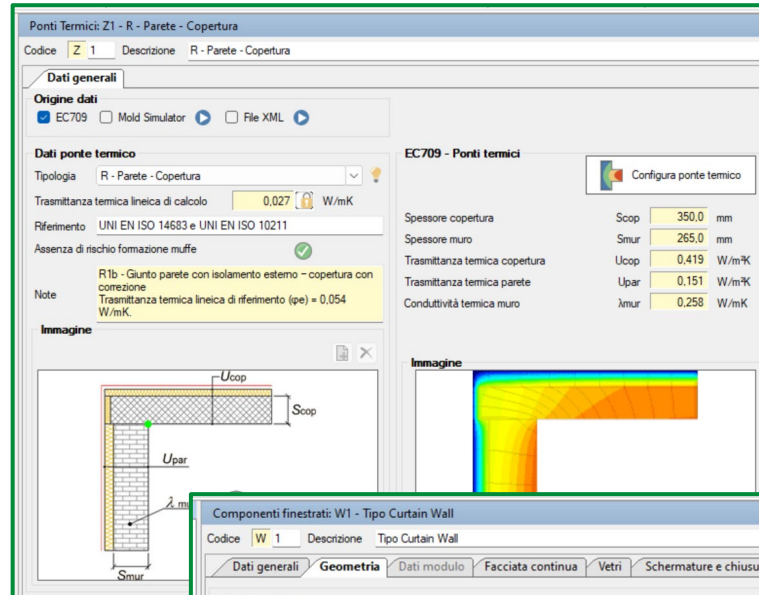
Therefore, it is necessary to model each envelope element together with its specific stratigraphy.

# Adding information on EC700 for the energy calculation



Componenti

- Muri
  - M1 - 9,5 Muro Interno
  - M2 - 26 Muro Box Perimetrale
  - M3 - Mattone Intonacato sulle 2 Facce
  - M4 - Porta in Metallo 26
  - M5 - 28 Muro Interno
  - M6 - 28 Muro Interno
  - M7 - 15 Muro Interno - Cartongesso
  - M8 - 43 Muro Tamponamento Perimetrale
  - M9 - 15 Muro Interno - Cartongesso
  - M10 - Porta 26
  - M11 - Muro fittizio Tipo Curtain Wall
  - M12 - MUR - 008
  - M13 - Porta 26
- Pavimenti
  - P1 - 50 Solaio Piano Terra
  - P2 - 50 Solaio Piano Terra
  - P3 - 40 Solaio Interno
  - P4 - 40 Solaio Interno
- Soffitti
  - S1 - 50 Solaio Piano Terra
  - S2 - 50 Solaio Piano Terra
- Ponti Termici
- Componenti finestrati
  - W1 - Tipo Curtain Wall
  - W2 - Finestra a 2 Ante 26
  - W3 - Finestra a 2 Ante 26



Ponti Termici: Z1 - R - Parete - Copertura

Codice: Z 1 Descrizione: R - Parete - Copertura

Dati generali

Origine dati

EC709  Mold Simulator  File XML

Dati ponte termico

Tipologia: R - Parete - Copertura

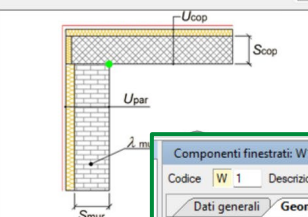
Trasmittanza termica lineica di calcolo: 0.027 W/mK

Riferimento: UNI EN ISO 14683 e UNI EN ISO 10211

Assenza di rischio formazione muffe:

Note: R1b - Giunto parete con isolamento esterno - copertura con coazione  
Trasmittanza termica lineica di riferimento (pe) = 0.054 W/mK

Immagine



EC709 - Ponti termici

Configura ponte termico

Spessore copertura: Scop 350.0 mm

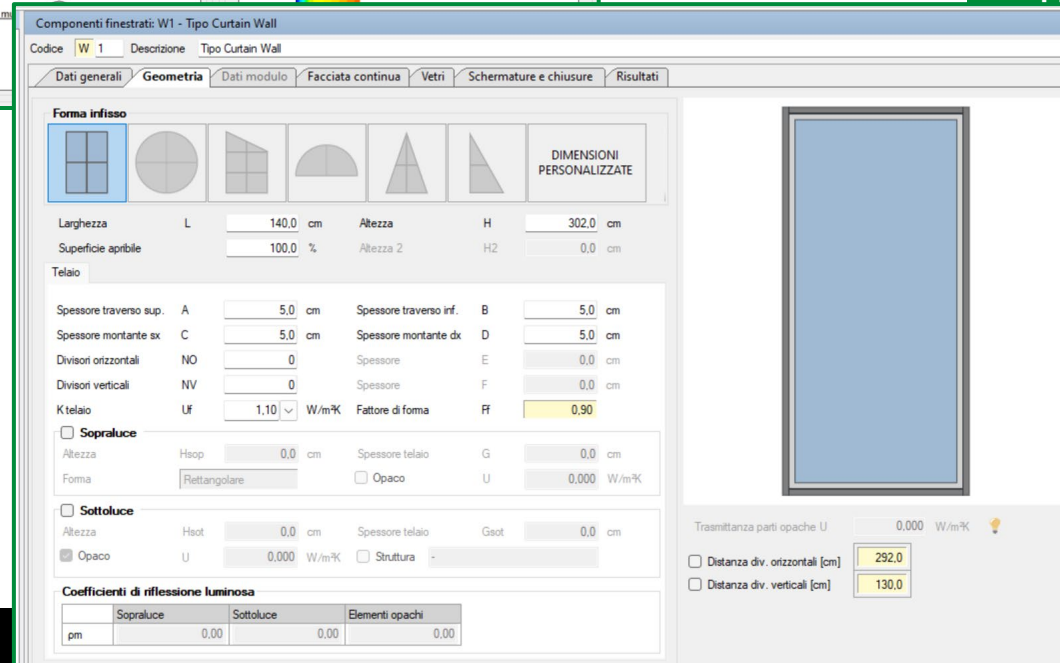
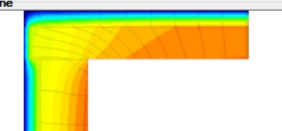
Spessore muro: Smur 265.0 mm

Trasmittanza termica copertura: Ucop 0.419 W/m<sup>2</sup>K

Trasmittanza termica parete: Upar 0.151 W/m<sup>2</sup>K

Conducibilità termica muro: λmur 0.258 W/mK

Immagine



Componenti finestrati: W1 - Tipo Curtain Wall

Codice: W 1 Descrizione: Tipo Curtain Wall

Dati generali Geometria Dati modulo Facciata continua Vetri Schermature e chiusure Risultati

Forma infisso

Larghezza L: 140.0 cm Altezza H: 302.0 cm

Superficie apribile: 100.0 % Altezza 2 H2: 0.0 cm

Telaio

Spessore traverso sup. A: 5.0 cm Spessore traverso inf. B: 5.0 cm

Spessore montante sx C: 5.0 cm Spessore montante dx D: 5.0 cm

Divisori orizzontali NO: 0 Spessore E: 0.0 cm

Divisori verticali NV: 0 Spessore F: 0.0 cm

K telaio UF: 1.10 W/m<sup>2</sup>K Fattore di forma FF: 0.90

Sopraluce

Altezza Hsop: 0.0 cm Spessore telaio G: 0.0 cm

Forma Rettangolare  Opaco U: 0.000 W/m<sup>2</sup>K

Sottoluce

Altezza Hsot: 0.0 cm Spessore telaio Gsot: 0.0 cm

Opaco U: 0.000 W/m<sup>2</sup>K  Struttura

Trasmittanza parti opache U: 0.000 W/m<sup>2</sup>K

Distanza div. orizzontali [cm]: 292.0

Distanza div. verticali [cm]: 130.0

Coefficienti di riflessione luminosa

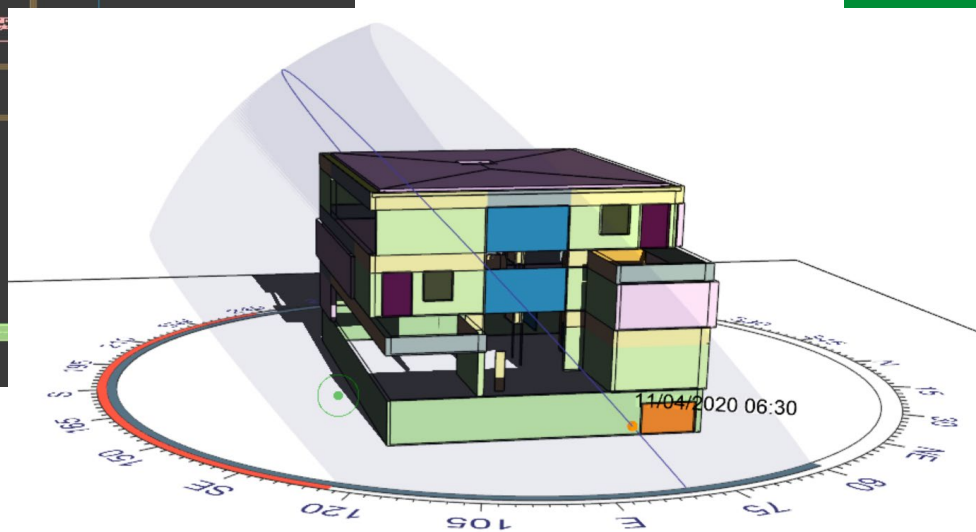
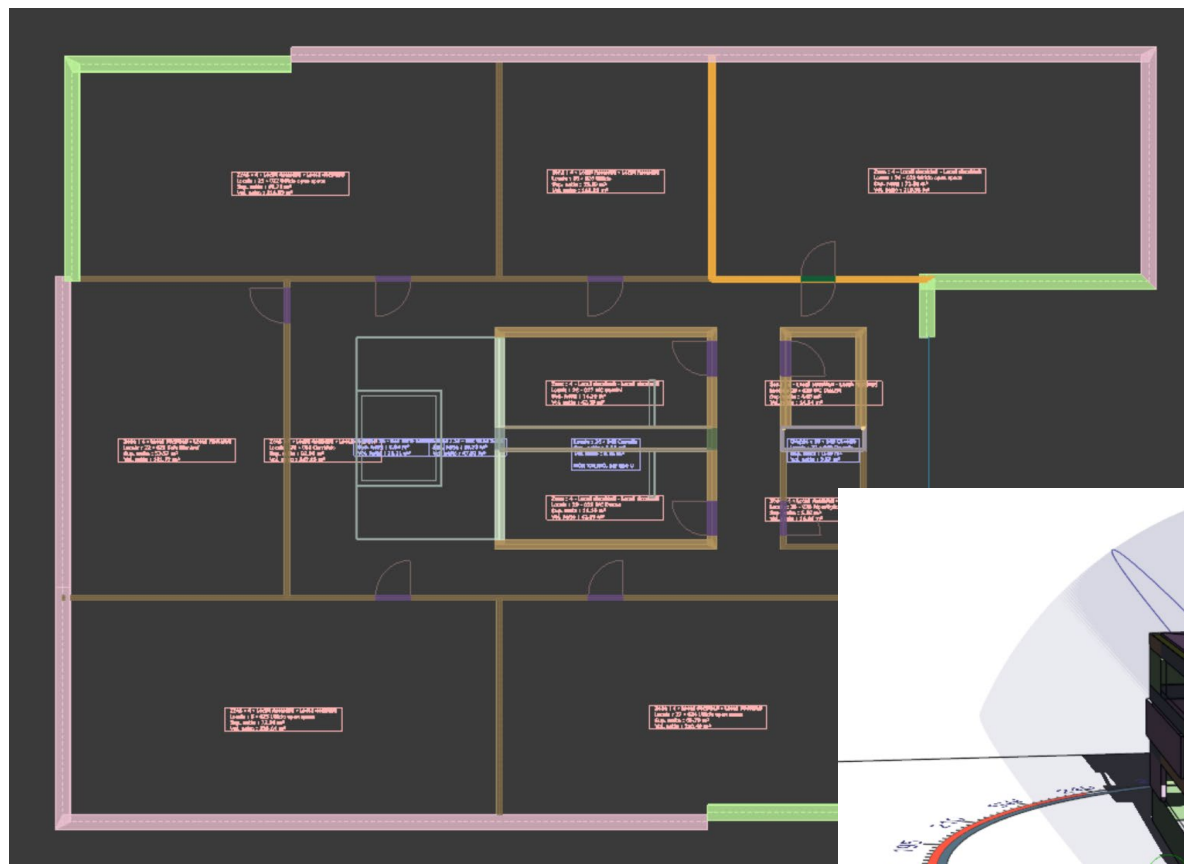
	Sopraluce	Sottoluce	Elementi opachi
pm	0.00	0.00	0.00

Thermal bridges must be created and associated to the specific part of the thermal building envelope.

As regards windows, they are partially pre-compiled with their geometrical characterization.

However, the geometrical and thermal properties of the same as well as the thermal and solar properties of the glass part of the window must be manually compiled.

# Adding information on EC700 for the energy calculation



The drawing of the building is automatically performed.

However, it is important to check if the zones are correctly modelled, as well as the opaque and transparent envelopes.

# Adding information on EC700 for the energy calculation

The drawing should be also implemented with the following elements:

- Thermal bridges both horizontal and vertical, created manually in the building components' section.

Locali riscaldati - Locali riscaldati - Locali riscaldati

Zona 4 Descrizione Locali riscaldati - Locali riscaldati

Dati zona Illuminazione Profilo orario

Descrizione profilo orario Ufficio

Categoria DPR 412/93 E.2 - Edifici adibiti a uffici e assimilabili.

Riferimento normativo prEN 16798-1

**Set-point di temperatura**

Riscaldamento (RH.int) Raffrescamento (RC.int)

Accesso 20.0 °C Accesso 25.0 °C

Ridotto 1 16.0 °C Ridotto 2 32.0 °C

Antigelo 0.0 °C

**Set-point di umidità**

Umidificazione (UR,HU.int) Deumidificazione (UR,DHU.int)

Accesso 25.0 % Accesso 60.0 %

Ridotto 1 0.0 % Ridotto 2 0.0 %

**Apporti interni**

Sensibili Latenti

Persone 4.70 W/m² 3.53 (g/h)/m²

Apparecchiature 12.00 W/m² 0.00 (g/h)/m²

Illuminazione 0.00 W/m²

Profilo orario Grafici

Copia su tutti i feriali Copia su un periodo specifico Nuovo periodo speciale Duplica su periodo speciale Elimina periodo speciale

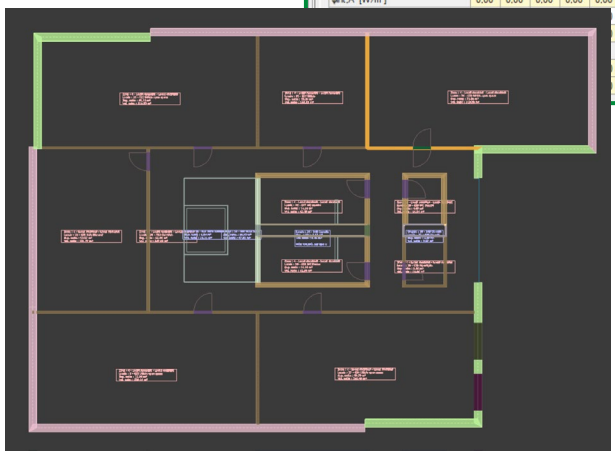
Lunedì Descrizione periodo Lunedì Periodo da 01/01/2023 a 31/12/2023

Ore del giorno	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Media	
OCCUPAZIONE																										
facc [h]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.60	0.60	0.70	0.70	0.40	0.60	0.70	0.70	0.60	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.25	
TEMPERATURA																										
θH.int [°C]	16.0	16.0	16.0	16.0	16.0	16.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0	16.0	16.0	-	
θC.int [°C]	32.0	32.0	32.0	32.0	32.0	32.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	-	
UMIDITÀ																										
UR,HU.int [%]	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	-	
UR,DHU.int [%]	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	-
APPORTI INTERNI SENSIBILI																										
int_P [W/m²]	0.00	0.00	0.00	0.00	0.00	0.00	0.94	2.82	2.82	3.29	3.29	1.88	2.82	3.29	3.29	2.82	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	
int_A [h]	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.60	0.60	0.70	0.70	0.40	0.60	0.70	0.70	0.60	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	
int_A [W/m²]	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.60	0.60	0.70	0.70	0.40	0.60	0.70	0.70	0.60	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	



Shading objects (balconies, nearby buildings, trees) In the new EC700 release, we will learn to import some shading object automatically!

Data associated to each thermal zone (e.g. user profiles, air flow rate, set point temperature etc.)





# Adding information on EC700 for the energy calculation

**Sistema impiantistico**

- Impianti
  - Centralizzato
  - Centralizzato
  - FV Centralizzato

**Configurazione generale degli impianti**

**Servizi energetici**

- Riscaldamento
  - Impianto Centralizzato
  - Impianto Autonomo
- Ventilazione
  - Produzione Combinata con riscaldamento
  - Produzione Separata con
  - Impianto a tutt'aria
- Acqua calda sanitaria
  - Produzione Combinata con riscaldamento
  - Produzione Separata con
- Raffrescamento
  - Impianto Centralizzato
  - Impianto Autonomo

**Fonti rinnovabili**

- Solare termico  Contributi noti
  - Acqua calda sanitaria
  - Riscaldamento
- Solare fotovoltaico  Contributi noti
  - Impianto Centralizzato
  - Impianto Autonomo

**Impianto Centralizzato - Solare Fotovoltaico**

**Servizi coperti dall'impianto**

- Climatizzazione invernale
- Climatizzazione estiva
- Ventilazione meccanica
- Prod. acqua calda sanitaria
- Illuminazione
- Trasporto di persone o cose

**Dati sottocampo**

Descrizione sottocampo: Nuovo sottocampo

Dati posizionamento pannelli

- Selezione falda (da input grafico) (nessuno)

Orientamento rispetto al Sud:  °

Inclinazione rispetto al piano orizzontale:  °

Ombreggiamento:  Crea

Coefficiente di riflettanza (albedo):

Valori mensili:

**Dati moduli**

Modulo utilizzato (*)	ADVENT SOLAR/Moduli ADVENT/ADVENT 160 (*) = Dati da archivio		
Numero di moduli	80	Superficie utile singolo modulo (*)	Apv 1.13 m <sup>2</sup>
Potenza di picco singolo modulo (*) Wpv	160 Wp	Efficienza nominale singolo modulo	0.14
Potenza di picco complessiva	12800 Wp	Fattore di efficienza	f <sub>pv</sub> 0.75

**Fabbisogni elettrici**

- Potenza assorbita dagli ausiliari:  W
- Ore di funzionamento annue:  h

Finally, HVAC systems must be added, together with the renewable energy sources plants.

**DATI GENERALI**

**Destinazione d'uso**  
 Residenziale  
 Non residenziale

**Oggetto dell'attestato**  
 Intero edificio  
 Unità immobiliare  
 Gruppo di unità immobiliari  
 Numero di unità immobiliari: 1  
 di cui è composto l'edificio: 1

Nuova costruzione  
 Passaggio di proprietà  
 Locazione  
 Ristrutturazione importante  
 Riqualificazione energetica  
 Altro: \_\_\_\_\_

**Dati identificativi**

Regione: **LAZIO**      Zona climatica: **D**  
 Comune: **Roma**      Anno di costruzione: **2023**

Indirizzo: \_\_\_\_\_  
 Piano: \_\_\_\_\_  
 Interno: \_\_\_\_\_  
 Coordinate GIS: **0,000000 N - 0,000000 E**

Superficie utile riscaldata (m<sup>2</sup>): **1405,95**  
 Superficie utile raffrescata (m<sup>2</sup>): **1405,95**  
 Volume lordo riscaldato (m<sup>3</sup>): **5487,73**  
 Volume lordo raffrescato (m<sup>3</sup>): **5487,73**

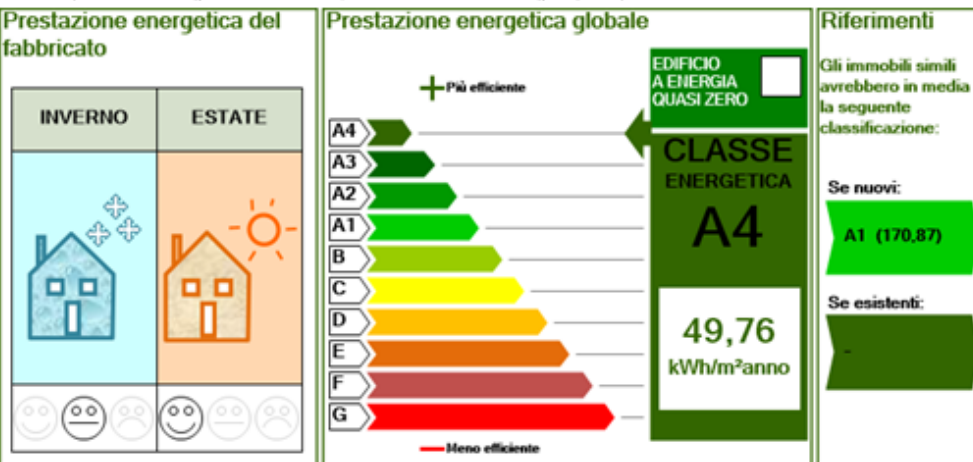
Comune catastale	<b>H501</b>	Sezione		Foglio		Particella	
Subalterni	da	a	da	a	da	a	
Altri subalterni							

**Servizi energetici presenti**

Climatizzazione invernale     Ventilazione meccanica     Illuminazione  
 Climatizzazione estiva       Prod. acqua calda sanitaria     Trasporto di persone o cose

**PRESTAZIONE ENERGETICA GLOBALE E DEL FABBRICATO**

La sezione riporta l'indice di prestazione energetica globale non rinnovabile in funzione del fabbricato e dei servizi energetici presenti, nonché la prestazione energetica del fabbricato, al netto del rendimento degli impianti presenti.



**CONSUMI STIMATI**

... e non rinnovabile, nonché una stima dell'energia consumata...

**Consumi di energia**

Quantità annua consumata in uso standard (specificare unità di misura)	Indici di prestazione energetica globali ed emissioni
<b>35877 kWh</b>	Indice della prestazione energetica non rinnovabile EP <sub>g,non</sub> kWh/m <sup>2</sup> anno <b>49,76</b>
	Indice della prestazione energetica rinnovabile EP <sub>g,ren</sub> kWh/m <sup>2</sup> anno <b>46,06</b>
<b>14658 kWh</b>	Emissioni di CO <sub>2</sub> kg/m <sup>2</sup> anno <b>12</b>

...ati conseguibili, con il singolo intervento o con la realizzazione del potenziale di miglioramento dell'edificio o immobile oggetto...

**RISTRUTTURAZIONE IMPORTANTE E RISULTATI CONSEGUIBILI**

Tempo di ritorno dell'investimento (anni)	Classe Energetica raggiungibile con l'intervento (EP <sub>g,non</sub> kWh/m <sup>2</sup> anno)	CLASSE ENERGETICA raggiungibile se si realizzano tutti gli interventi raccomandati
<b>0,00</b>	<b>A4 0,00</b>	<b>A4 0,00 kWh/m<sup>2</sup> anno</b>

**Energia elettrica**

<b>5487,73</b>	<b>m<sup>3</sup></b>
<b>2964,27</b>	<b>m<sup>2</sup></b>
<b>0,54</b>	
<b>43,55</b>	<b>kWh/m<sup>2</sup> anno</b>
<b>0,0162</b>	<b>-</b>
<b>0,0358</b>	<b>W/m<sup>2</sup>K</b>

Efficienza media stagionale	EP <sub>ren</sub>	EP <sub>non</sub>
<b>74,4</b>	<b>η<sub>H</sub></b>	<b>26,63</b>
<b>129,5</b>	<b>η<sub>C</sub></b>	<b>17,47</b>
<b>75,9</b>	<b>η<sub>W</sub></b>	<b>1,96</b>
<b>0,0</b>		<b>0,00</b>
		<b>0,00</b>

EPC generation through EC700

## Take aways

BIM authoring tools play a significant role in facilitating the creation of accurate and detailed geometric models of buildings.

The geometrical information within these models is essential for various analyses and assessments, including energy performance assessment.

It is important to properly create the BIM architectural model, otherwise some mistakes may occur in the energy performance assessment

**If you would like more information,  
please visit [www.timepac.eu](http://www.timepac.eu) or contact us at  
[a.gorrino@edilclima.it](mailto:a.gorrino@edilclima.it)**

Thanks for your attention!