IES iCD – Intelligent Community Design

2024.0.0 Release Notes

IES Ltd

31st January 2024

Contents

Release 2024.0.0 – January 2024

New login Mechanism

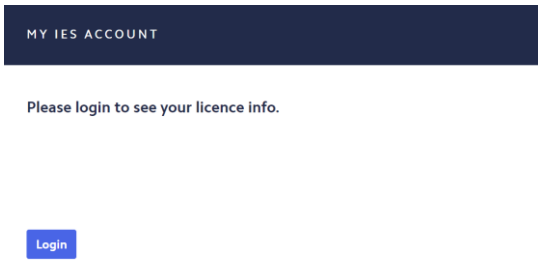
iCD was updated to make use of the Azure B2C authentication system as well as the new IES MyLicensing platform to manage licensing and authentication.

As a result, a new login interface was implemented in iCD to allow the user with a valid license to activate the iCD plugin in SketchUp.

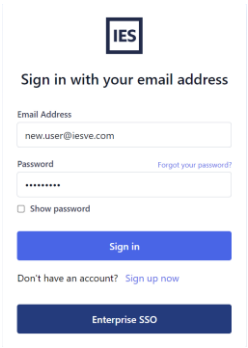
When iCD is launched for the first time, the toolbar will be grey and inactive as long as the user's license has not been validated. The only available icons when the user is not yet logged in are the My IES Account icon and the Help icon.

The My IES Account icon opens the dialog that allows the user to login

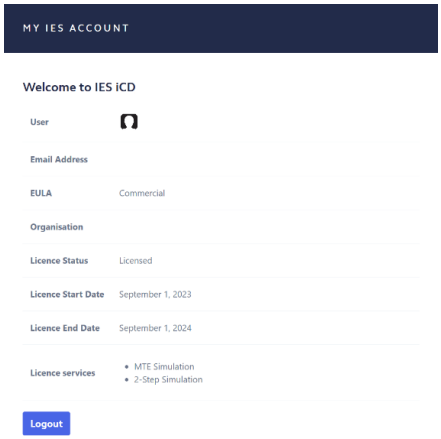
This opens the My IES Account dialog



After having clicked login, the user is navigated to the IES login page in their browser to enter their credential.



Once validated, the user can close the browser. The My IES Account dialog is updated with user license information.



Simulation improvement: Roof-space

In iCD, when a building's Roof type attribute is set to either Gable or Hipped, the building is modelled with a roof space on top of the last floor.

As part of this release, an improvement has been made to how the roof spaces are modelled to better take into account theses spaces within iCD simulation.

Important notes:

- These roof spaces cannot be edited (using attributes) and are always assumed unoccupied and un-conditioned.
- This update introduces a change in the simulation behaviour and user can expect different simulation results with this release if compared to simulation using an older version of iCD.

For more information please refer to our FAQ
https://www.iesve.com/support/icd/knowledgebase_faq

Release 2023.1.0 – September 2023

Synchronisation of iCD models to IES iRoadmap

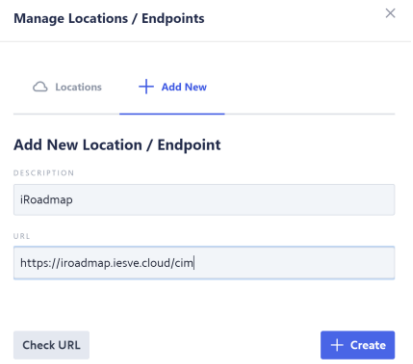
iCD was updated to use the new authentication mechanism which allows iCD users to create project in iRoadmap from their iCD model using the synchronisation functionality.

Similar to how user can currently create projects in iCIM from iCD and keep their models synchronised between the two applications, iCD users can add their iRoadmap endpoints, synchronise their iCD model to iRoadmap and use them as baseline models for their decarbonisation road mapping project.

To set your iRoadmap endpoint in iCD, the process is identical to adding an iCIM endpoint:

Open the synchronisation dialog via the button in the toolbar.

In the “manage” menu add the URL to the iRoadMap deployment



Once the endpoint saved, you can create a new iRoadmap project or synchronise your iCD model to an existing iRoadMap project using the synchronisation dialog

Bug fixing and upgrade

Fix on data painter

Fix on data painter was incorporated to prevent from potential accidental object duplication in the model.

Integrated engine

The iCD integrated engine was updated to use the latest version of the Model Translation Engine (MTE 0.27.2)

Release 2023.0.1 – April 2023

Bug fixing

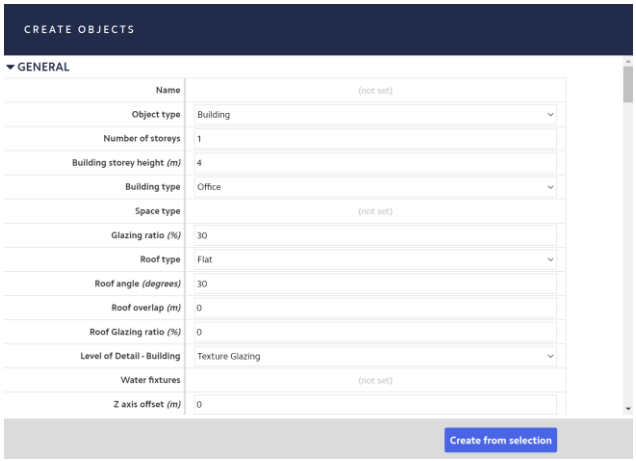
Bug introduced in the latest release resulted in some models ending up in a corrupt state (related to roof surface).

This bug has been fixed as part of this release

Release 2023.0 – March 2023

Create tool

The create tool was re-designed and improved to retain previous user settings



Computer and lighting max power consumption fixes

Recently introduced attributes Computer Max Power Consumption, Lighting Max Power Consumption and Process Load Max Power Consumption were fixed and now trigger the right Apache input and have the expected behaviour for simulation.

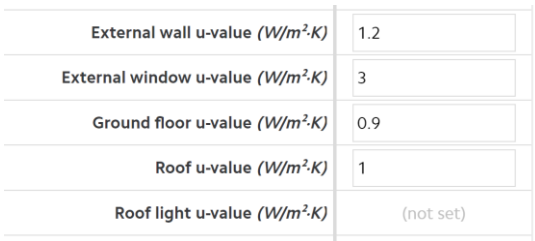
iCD plugin supported by SketchUp 2023

iCD is now compatible with SketchUp2023.

ICD integrated engine update

iCD integrated simulation engine has been updated.

The use of the new version of the integrated engine removes the error previously seen when editing a U-value.



U-values can now be set within these ranges:

	min (W/m2.K)	Max (W/m2.K)
Ext wall	0	4
Roof	0	5
Ground floor	0	1
Window	0.5	5.5
Roof light	0.5	5.5

Release 2022.3.0 – October 2023

New Object selection filter (Locate entity Dialog)

The locate entity functionality was re-worked in order to allow the user to easily find and select objects in iCD based on their attributes' values.

To use the new object selection tool, click on the Locate Entity icon in the toolbar

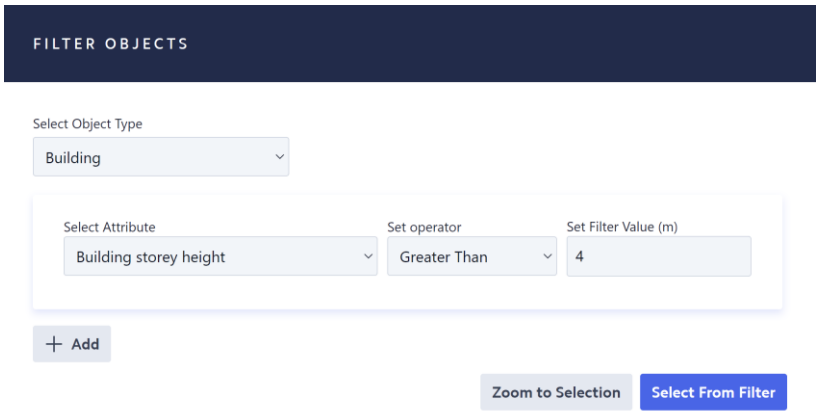
It opens the Filter object dialog

In this dialog, you can select the object type you want to research

Then:

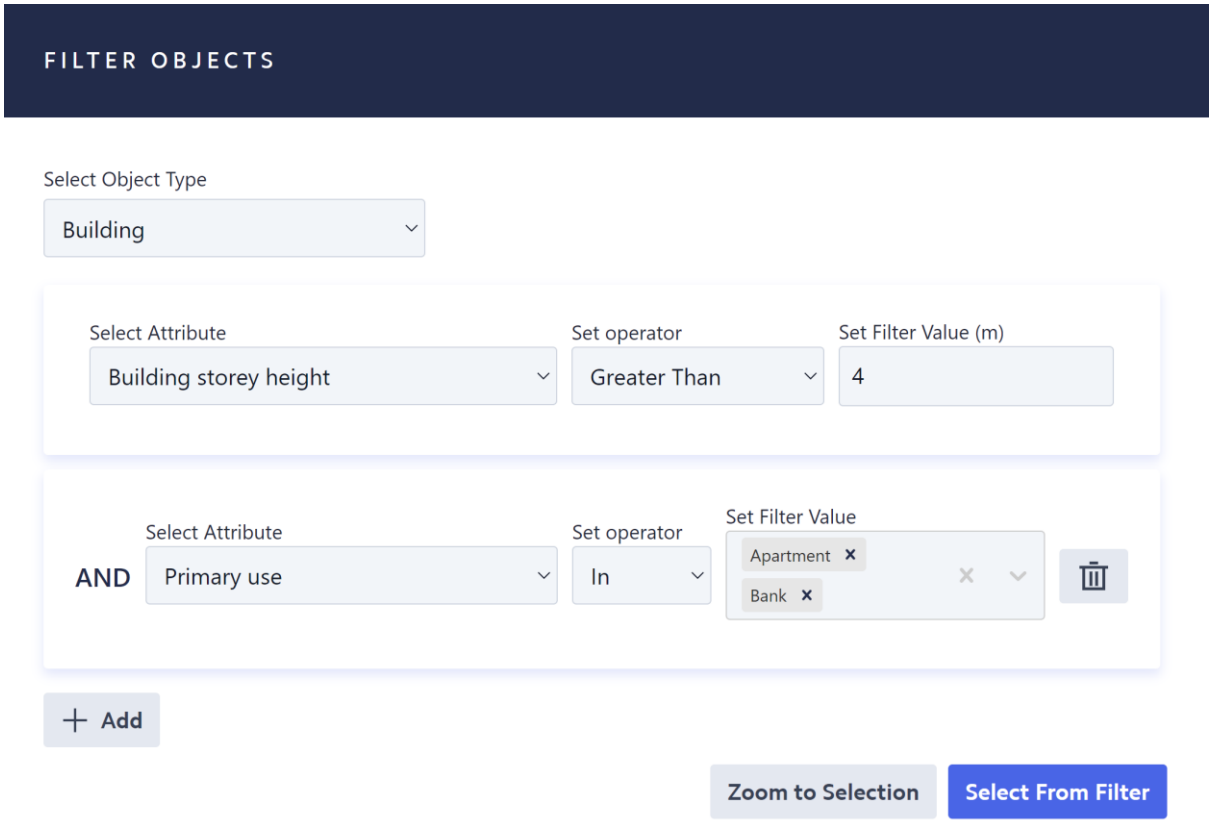
- select the attribute to filter your selection
- The operator or the condition
- And finally, the value targeted for the filter

Ex: below the filter will selects all buildings which have the attribute Building Storey height greater than 4m.



By clicking the +Add button, it is possible to narrow down the selection by adding more conditions or operators with an "And" predicate

Ex: below the filter will select all buildings that have a Building storey height greater than 4m and that have a primary use set to Apartment.

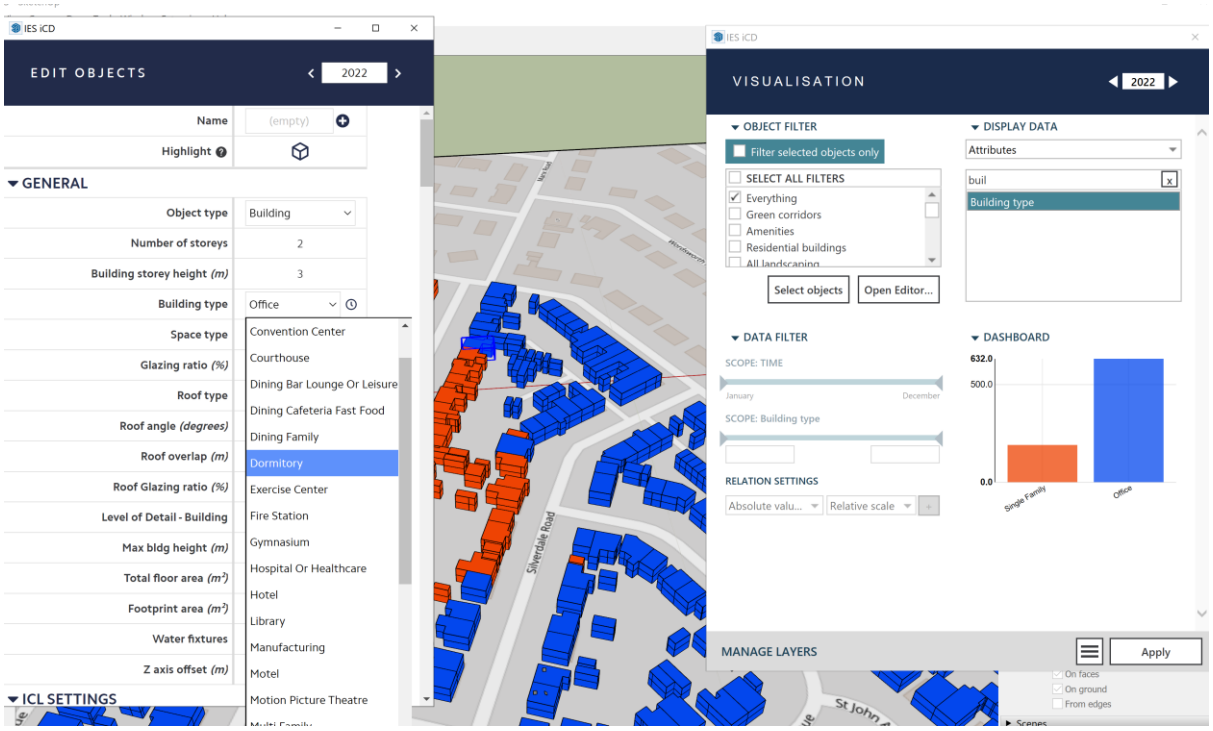


Once the filter is set, clicking “Select from Filter” will select all the objects in the model that match the filter conditions.

“Zoom to selection” sets the zoom to view all the selected objects.

Query Tool and Visualisation tool update

iCD allows now users to open the Query tool (Edit object dialog) when the Visualisation tool is on. This allows the user to edit objects attributes while visualising the data visualisation overlay and facilitate which building to edit when modifying your model manually


IES iCD
EDIT OBJECTS
2022
Name
(empty)
Highlight
GENERAL
Object type
Building
Number of storeys
2
Building storey height (m)
3
Building type
Office
Space type
Glazing ratio (%)
Roof type
Roof angle (degrees)
Roof overlap (m)
Roof Glazing ratio (%)
Level of Detail - Building
Max bldg height (m)
Total floor area (m²)
Footprint area (m²)
Water fixtures
Z axis offset (m)
ICL SETTINGS
Convention Center
Courthouse
Dining Bar Lounge Or Leisure
Dining Cafeteria Fast Food
Dining Family
Dormitory
Exercise Center
Fire Station
Gymnasium
Hospital Or Healthcare
Hotel
Library
Manufacturing
Motel
Motion Picture Theatre
Silverdale Road
IES iCD
VISUALISATION
2022
OBJECT FILTER
Filter selected objects only
SELECT ALL FILTERS
Everything
Green corridors
Amenities
Residential buildings
Select objects
Open Editor...
DISPLAY DATA
Attributes
buil
Building type
DATA FILTER
SCOPE: TIME
January
December
SCOPE: Building type
RELATION SETTINGS
Absolute valu...
Relative scale
DASHBOARD
632.0
500.0
0.0
Single Family
Office
MANAGE LAYERS
Apply
On faces
On ground
From edges
Scenes

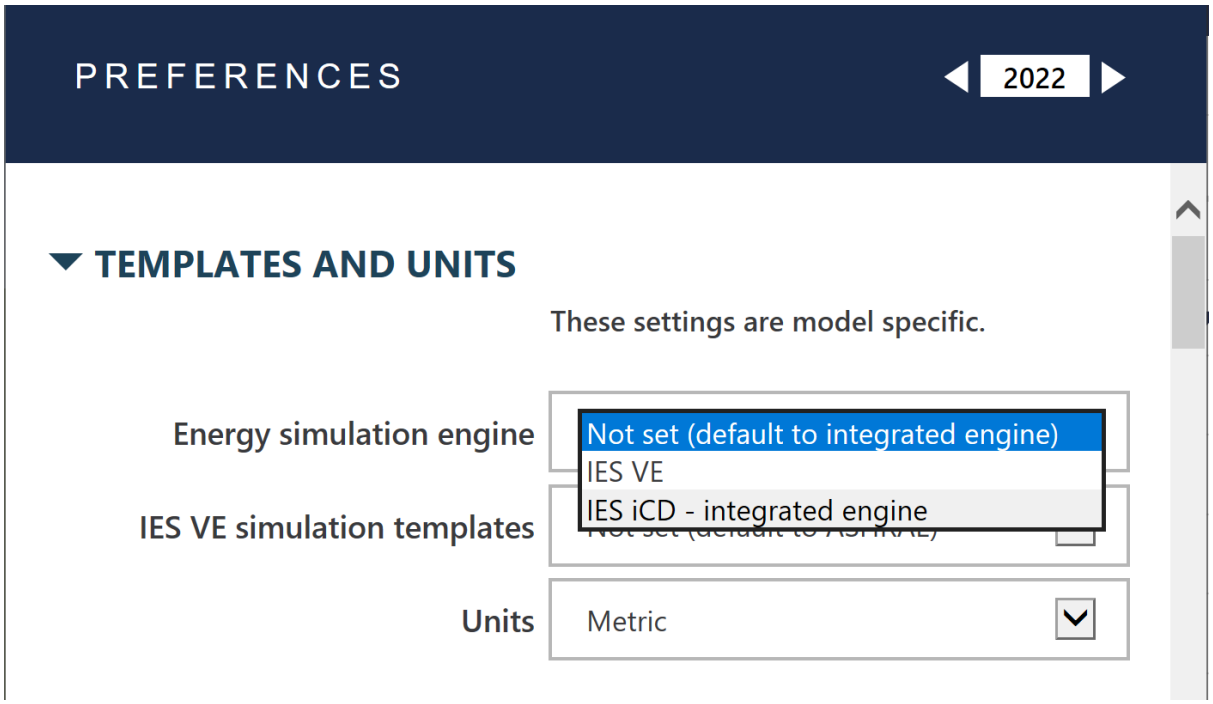
Release 2022.2.0 – July 2022

Incorporation of the iCD integrated engine (MTE)

The iCD integrated engine is a simulation engine embedded in the in the ICD. It gives the users the option to use IES simulation engine Apache if a user does not have the VE installed on his machine.

The iCD integrated engine is now the default simulation engine in iCD. To change the simulation engine back to the VE can go back to:

Extension > IES iCD > Preferences > Templates and Units Energy simulation engine, and select the simulation engine from the drop-down menu



Using the iCD integrated engine gives the user access to additional attributes that allow him to enter inputs with more details.

These additional attributes can be found in the query tool under the category Advanced – MISC

These attributes have dynamic default values that automatically update when changing template values which also gives the user more visibility on the used inputs in the simulation.

These values are editable by the user.

EDIT OBJECTS ‹ 2022 ›

Name	(empty)
Highlight	

ADVANCED - MISC

Heating profile	ASHRAE - Office - S…
Heating setpoint *(°C)*	21.11
Heating SCoP	0.84
Heating seasonal efficiency	0.89
DHW profile	BLDG: Office - DHW
DHW delivery efficiency	0.51
Cooling profile	ASHRAE - Office - S…
Cooling setpoint *(°C)*	23.89
Cooling SSEER	2
Cooling seasonal EER	3.13
Computers max power consumption *(W/m²)*	8.07
Computers profile	BLDG: Office - Equip
Lighting max power consumption *(W/m²)*	8.83
Lighting profile	BLDG: Office - Light
Occupancy profile	BLDG: Office - People
External wall u-value *(W/m²·K)*	0.55
External window u-value *(W/m²·K)*	3.17
Ground floor u-value *(W/m²·K)*	0.71

EDIT OBJECTS ‹ 2022 ›

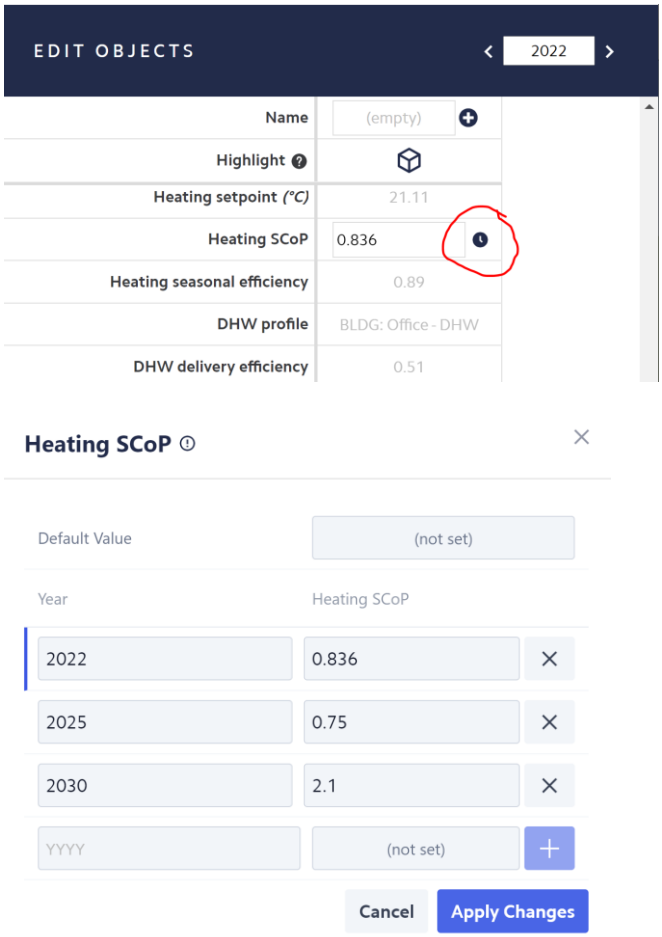
Name	(empty)
Highlight	
Roof u-value *(W/m²·K)*	0.79
Roof light u-value *(W/m²·K)*	(not set)
Auxiliary energy profile	ASHRAE - Office - S…
Auxiliary max flow *(ac/h)*	(not set)
Auxiliary variation profile	(not set)
DHW consumption *(l/h·person)*	0.25
DHW cold water temperature *(°C)*	10
DHW storage insulation thickness *(mm)*	0
DHW storage insulation type	Uninsulated
DHW storage system	Yes
DHW storage volume *(l)*	1,000
DHW supply temperature *(°C)*	60
Max humidity value *(%)*	70
Min humidity value *(%)*	0
Solar DHW panel area *(m²)*	0
Solar DHW panel azimuth *(degrees)*	180
Solar DHW conversion efficiency	0.76
Solar DHW heat exchange efficiency	0.4
Solar DHW inclination *(degrees)*	35

Solar DHW inclination *(degrees)*	35
Solar DHW shading factor	1
Auxiliary energy value *(kW / m²)*	0.95
Off-schedule auxiliary energy value *(kW / m²)*	0
Cooling system heat rejection *(%)*	10
Cooling/ventillation mechanism	Mechanical Ventila…
Ventillation heat recovery effectiveness	0
Ventillation heat recovery return air temp *(°C)*	21
Computers diversity factor	1
Infiltration max flow *(ac/h)*	0.17
Infiltration profile	On continuously
Lighting dimming profile	On continuously
Lighting diversity factor	1
Natural ventilation max flow *(ac/h)*	(not set)
Natural ventilation profile	(not set)
People max latent gain *(W/person)*	58.61
People max sensible gain *(W/person)*	73.27
Occupancy diversity factor	1
Process load max power consumption *(W/m²)*	(not set)
Process load profile	(not set)

Time dimension input in the query tool

The way to input data over multiple years in the query tool has been updated and made easier for users.

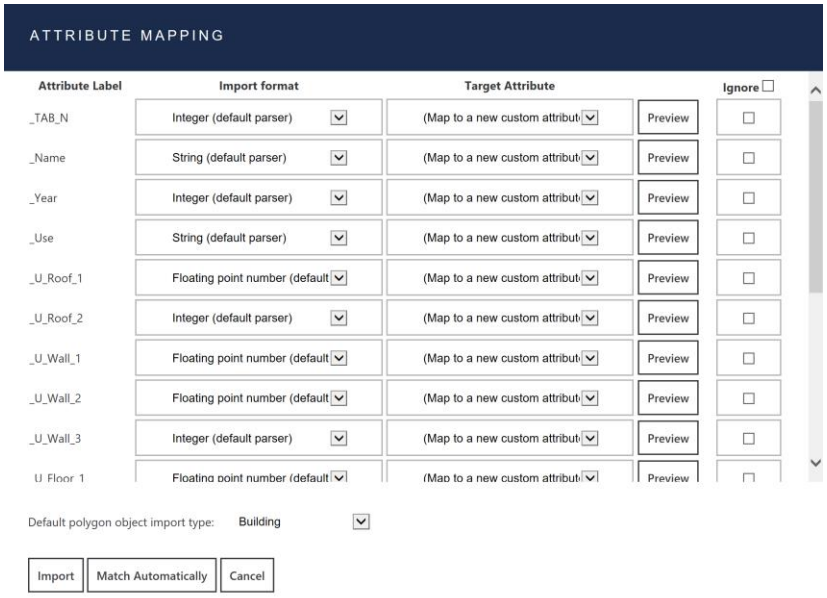
Now a clock icon appears when hovering on an attribute's value. Clicking this clock opens a dialog which allows to set the values for this attribute for multiple years.



SHP file import dialog re-shape

The SHP file import dialog was aligned to the Geojson import dialog and now gives the same options to the user to:

- Match SHP files fields to iCD attributes
- Allow the user to select the imported object type and import point objects



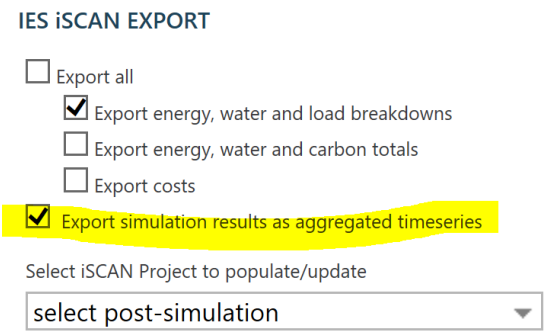
Simulation results sent as aggregated timeseries to iSCAN

iCD gives the user the possibility to export to iSCAN simulation results as hourly timeseries. The new functionality now offers to aggregate each variable across a group of simulated buildings and export them into a single channel in iSCAN.

As a result, now for each variable, instead of exporting one channel per building, the user can export a single channel for all the simulated buildings. This facilitate the use of iSCAN channels for later use in iSCAN and iVN.

To export simulation results as aggregated time series, the user needs to:

- Go to the simulation launcher
- Under IES iSCAN Export tick the “Export Simulation results as aggregated timeseries”



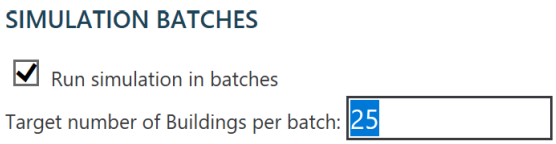
Simulation in Batches

Simulations can now be run in batches. This means that the user can specify the amount of buildings to simulated in one group.

This functionality can be particularly useful when simulating a large number of buildings: with this functionality, the simulation can be broken down into smaller batches preventing potential simulation failure to impact the entire model and only the batch the failure happened on. The other batch will simulate even if one batch fails

To simulate you model in batches the user can go to the simulation launcher > Simulation Batches > tick the Run simulation in batches tickbox > select the maximum number of building each batch will contain.

In the example below the selection will be simulated by groups of 25 buildings until the all selection is simulated



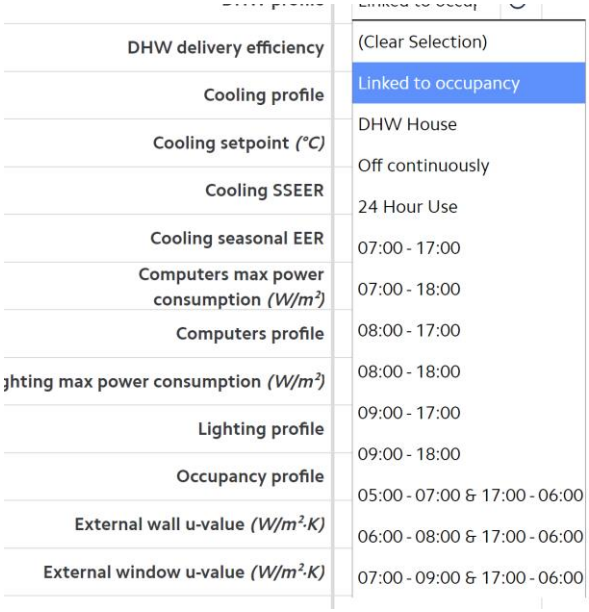
Note: If users come across an error during the simulation run it is possible that some batched will have already been simulated until the ICD has encountered the problematic building.

Decoupling DHW from HVAC

In the query tool, the category Advanced – MISC, the Attribute DHW profile gives the user to decouple the DHW use form the HVAC system.

The user has the choice to set the profile as:

- Default values: corresponds to the default profiles used by the Template (ASHRAE or ICL)
- Linked to occupancy: the DHW profile corresponds to the Occupancy profile attribute
- Independent profile: the user can select the DHW to follow one of the pre-set profiles



Notes: A new profile was added to this pre-set list (DHW house) which is meant to capture domestic use of DHW.

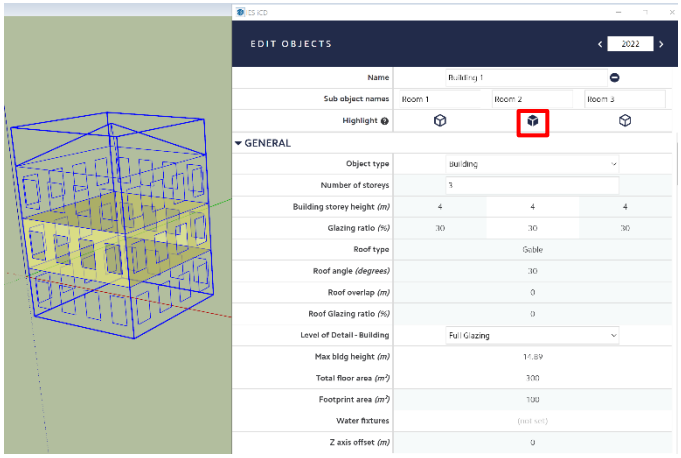
Release 2022.1.0 – April 2022

Object Highlighting

The highlight functionality allows to identify a sub-object within an object (like a space within a building) from Edit Object dialog or to identify a building within a group of selected buildings. It is useful tool to understand which column in the query tool corresponds to which space in the model.

To highlight an object or a sub-object from the query tool, simply the “box” icon of the desired column.

The example below shows Building 1. Clicking the box below “Room 2” highlights the position of this space in the model.



Dialog Re-work

The Channel association dialog was simplified and inconsistencies in the Scenario dialog were removed.

GeoJSON import improvement

The GeoJSON import now allows users to import point layers as point objects in iCD (PV, Streetlight, EV chargers and Trees).

In the import dialog, below the attributes’ settings, two dropdowns menus give the user the possibility to choose the object type corresponding to your GeoJSON import (see figure below).

<u>Polygon layers</u>

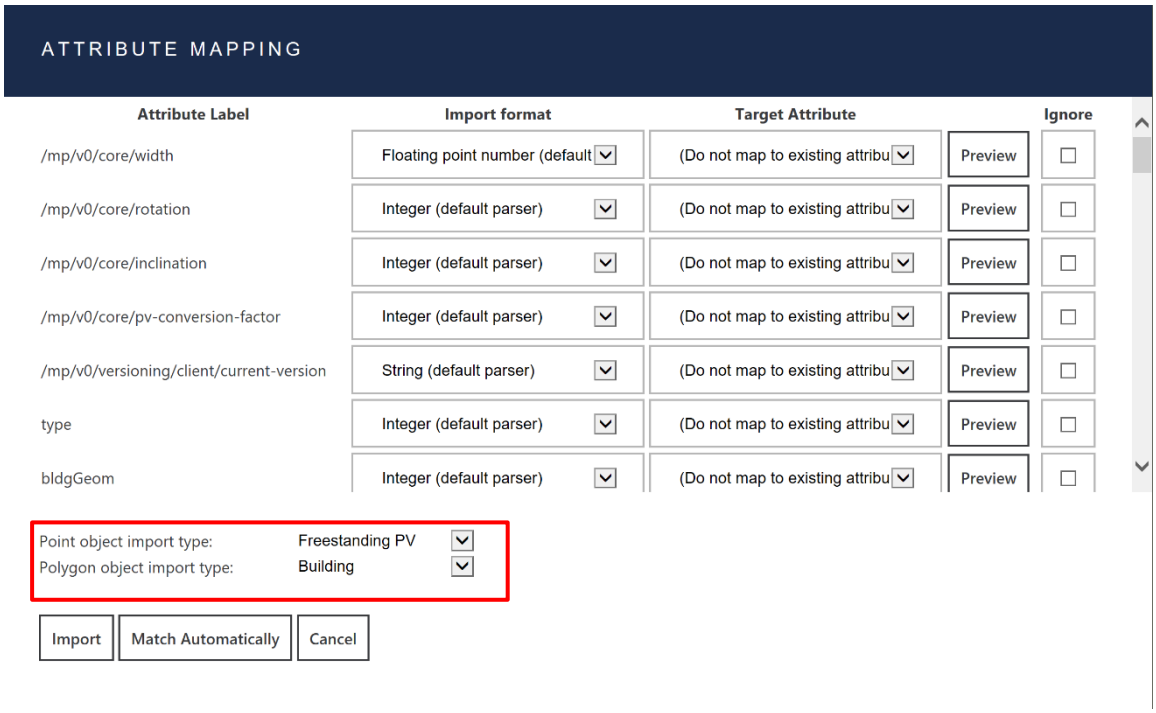
If the GeoJSON layer contains only polygons, only the “Polygon object import type” will appear.

Polygon layers can be imported as any object defined by their footprint in the iCD: buildings, boundaries, landscape, roads, water etc…

Point layers

If the GeoJSON layer contains only points, only the “Point object import type” will appear.

Polygon layers can be imported as any point object: PVs, Trees, Streetlights, EV chargers.



iCIM project-level scenarios

If the iCD model is part of a larger centralised iCIM project (multi-model iCIM projects) it is possible to create a scenario of the full iCIM project from the iCD. This functionality creates a duplicate of the entire iCIM project the iCD model is synchronised to as a new scenario. The scenario can then be synchronised later back in each iCD model being part of the iCIM project for editing.

This functionality is essential in order to create a scenario for an iCIM project that is an aggregation of multiple iCD models.

To create a scenario of the full iCIM project:

- Click the Synchronisation button to open the iCIM Synchronisation dialog;
- Click the + Create Scenario on iCIM;

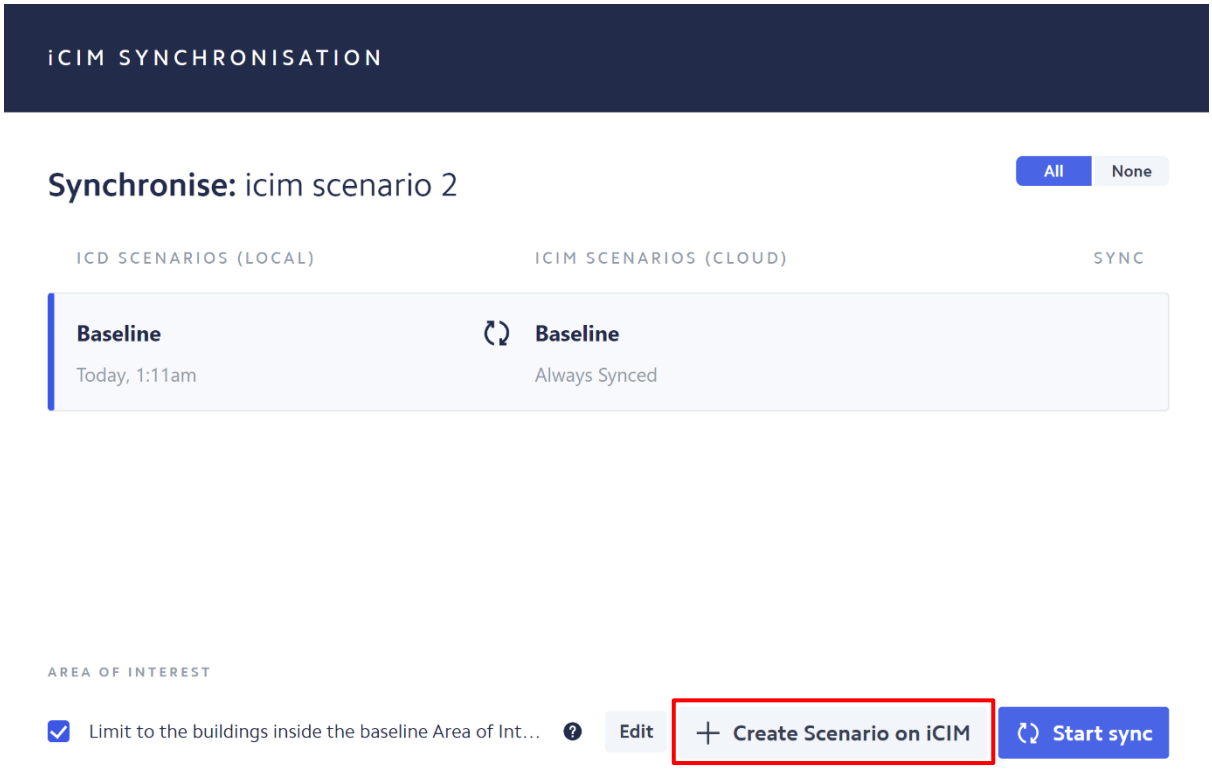


Figure 0-1 Create Scenario in iCIM

Note: this button will only appear in models that are already synchronised to an iCIM project.

- In the Scenario Name dialog that iCD prompts, enter the name of the new scenario and click Create scenario (see *Figure 0-2*).

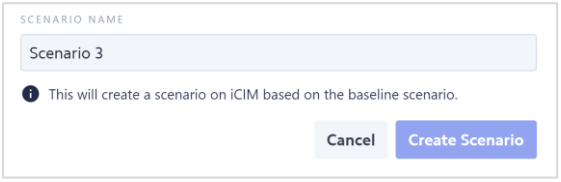


Figure 0-2 Scenario Name dialog

- Once the scenario is created in iCIM, iCD shows the newly created scenario in the synchronisation dialog. As this scenario has only been created in iCIM, it appears “Not synched” and is greyed out by default (see *Figure 0-3*).

Figure 0-3 Newly created iCIM scenario visible from the synchronisation dialog

- To retrieve the scenario for further editing in iCD, turn the Toggle button on, select "create in iCD" (see *Figure 0-4*) and click Start synch.

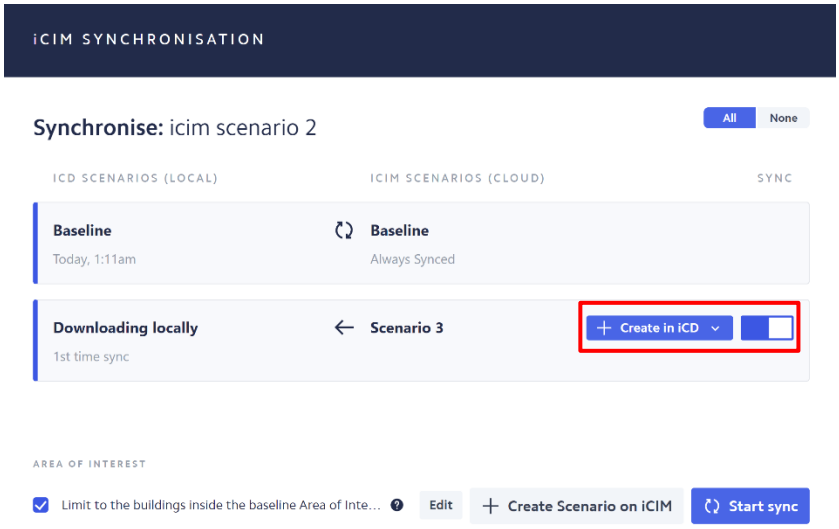
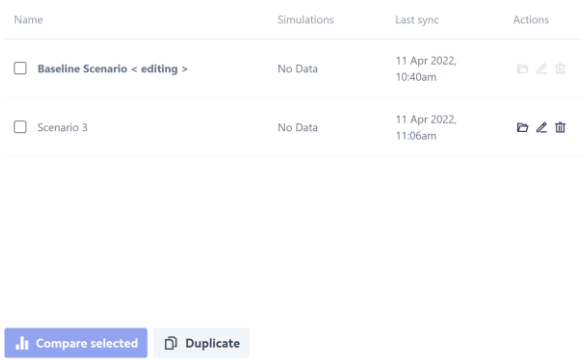


Figure 0-4 Importing newly created scenario 3 to iCD

- Once downloaded, the new scenario will be available as scenario in iCD (and located in the same folder as the baseline SketchUp model). To open it in iCD, select it from the scenario dialog (see more on that in chapter ***Error! Reference source not found.***) or open the .skp file with SketchUp.

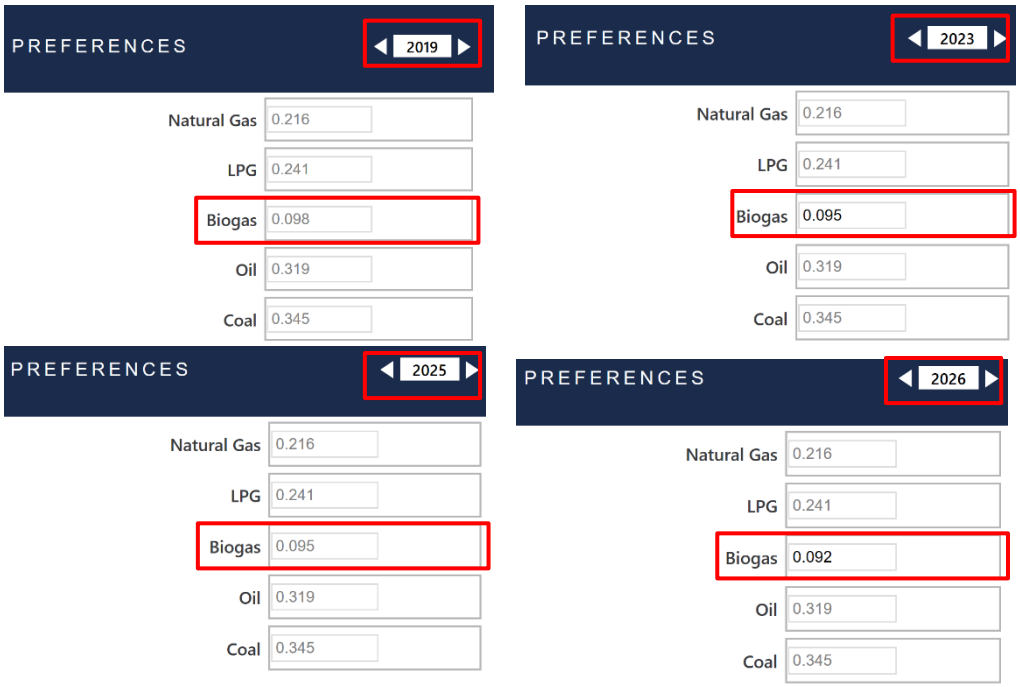


Preferences panel time awareness

Model-level inputs entered in the Preferences panel such as Carbon Emission Coefficient and Resource Costs Per Unit are now time aware and values can be entered manually for each specific year.

Values entered manually are applied to the year displayed in the top right of the dialog (see Figure below). All the following years retain this value.

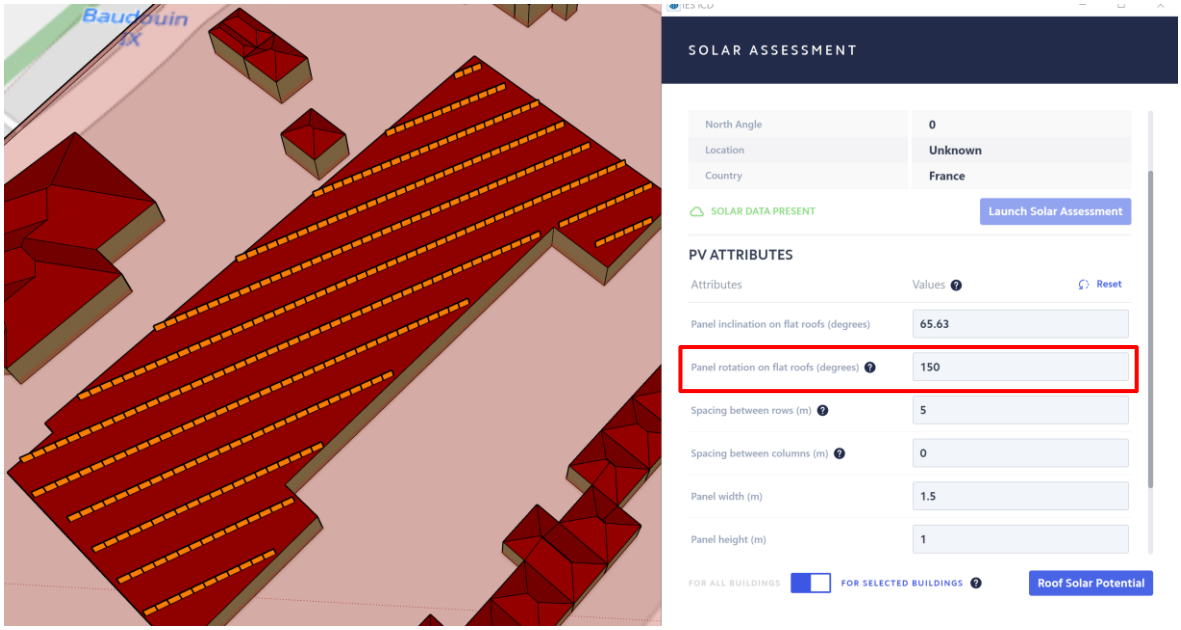
In the example below, the Biogas default value is set to 0.098. It is manually edited to 0.095 for year 2023. And then modified again to 0.092 in 2026. Note that for all the year before 2023 the default value applies. For 2023-2025, the value entered in 2023 is applied. For all the year from 2026 onward, the value entered in 2026 is applied.



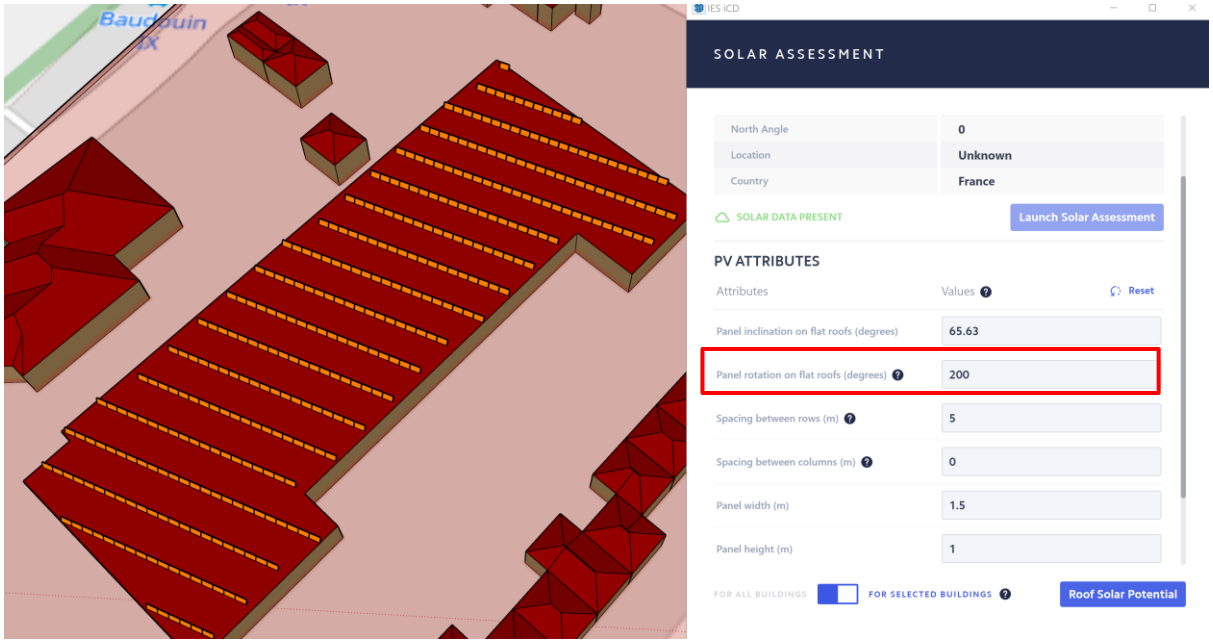
Additional attribute for Roof Solar Potential

In addition to the other available attribute, the Panel rotation on flat roofs gives the user the possibility to set the orientation of the auto-generated PVs.

Below the example when the rotation is set to 150°.



Below the same example but with the rotation set to 200°.



Release 2022.0.0 – January 2022

Complex geometry

iCD now allows users to create buildings from 3D shapes and not only from extruded footprint.

The general process to create a Complex geometry building is as follow:

- Importing or creating a 3D shape in Sketchup
- Checking the geometry and the identification of bounded volumes using the Geometry Preview
- Making the 3D shape a group and creating the building with the create

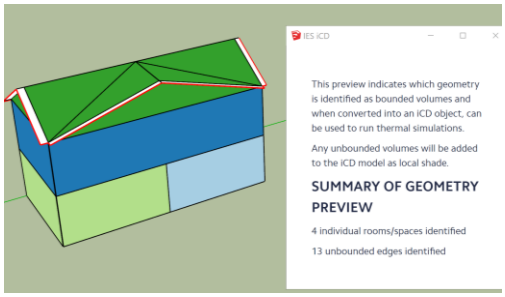
3D shapes can be created using all the usual drawing tools such as Line, Rectangle, Circle, Push/Pull, Follow Me, etc…

Note:

- shapes that don't define a bounded volume are treated as local shades by iCD
- Polygons fully within a face are treated as glazing

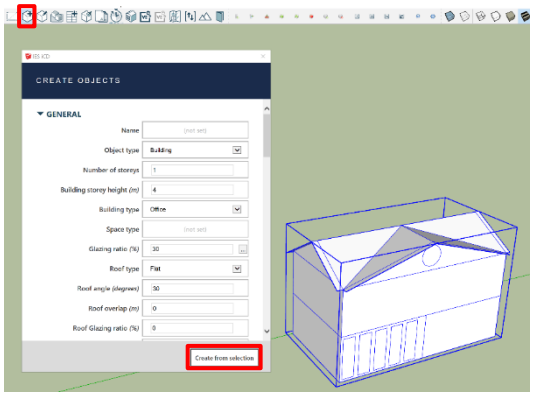
It also possible to import 3D models from other software such as Rhino, Blender but also the VE and convert them into Complex Geometry buildings in iCD.

To check how iCD will understand the 3D shape and create the building, users can use the Geometry Preview functionality before creating the building.



Once the 3D shape is properly defined, creating a complex geometry from it is done in 2 steps:

- Making a group out of the 3D shape
- Using the Create tool.



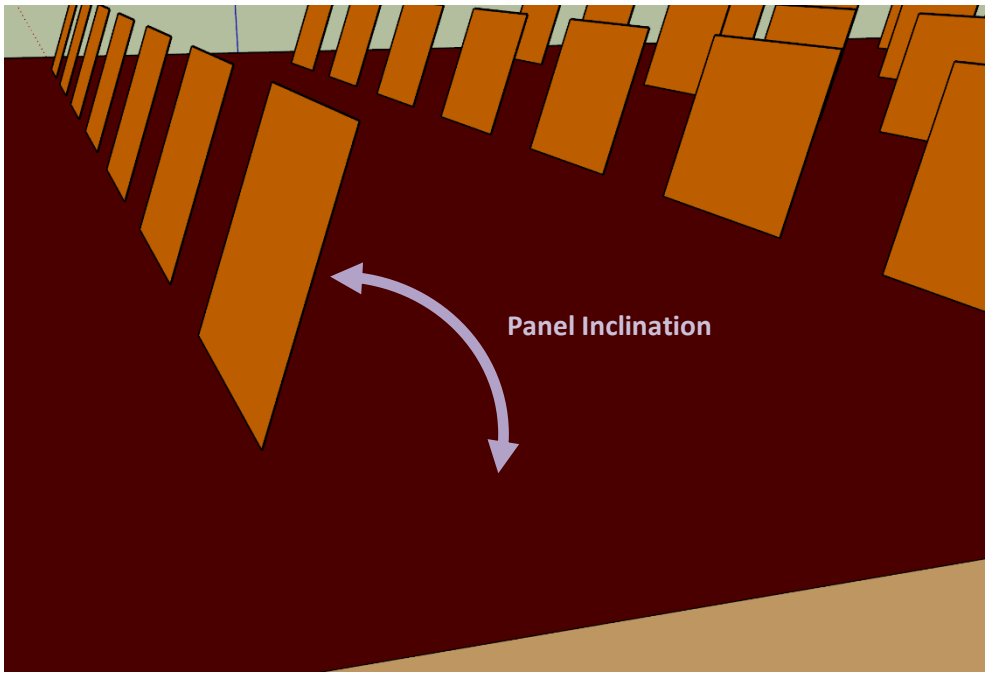
It is also possible to convert a Simple geometry Building that was initially created from a polygon – whether it was manually drawn or imported from an OSM or created from a GeoJSON file – into a Complex Geometry Building in order to edit the geometry in more detail.

Note: Converting a building into a Complex Geometry building is non-reversible process. A Complex Geometry building cannot be converted back into a simple geometry building.

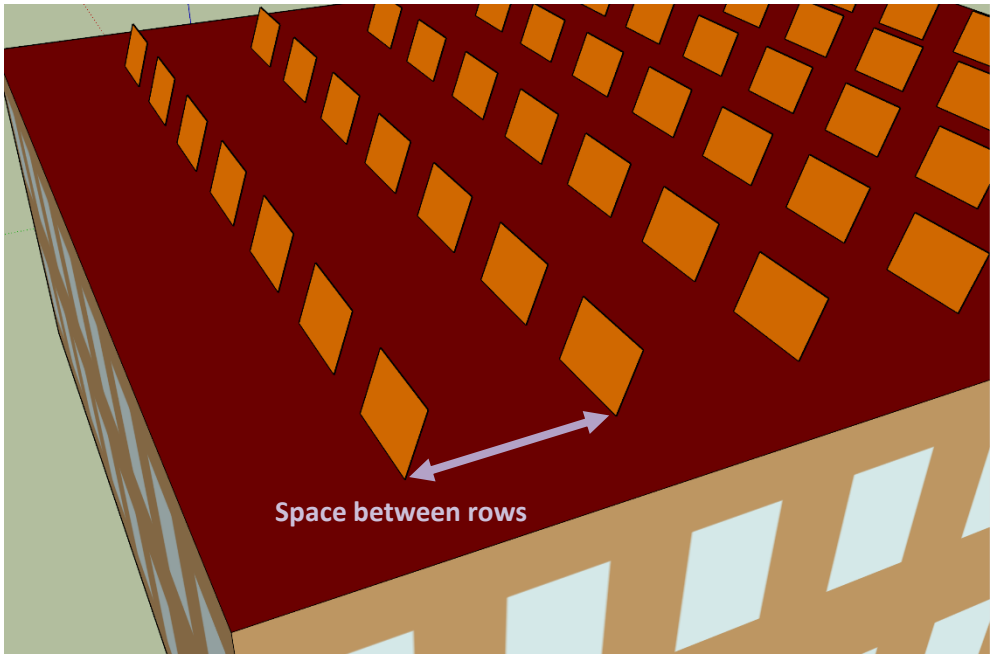
Improved flexibility for PV auto-generation

The Roof solar potential has been updated and now gives the user the possibility to set different parameters:

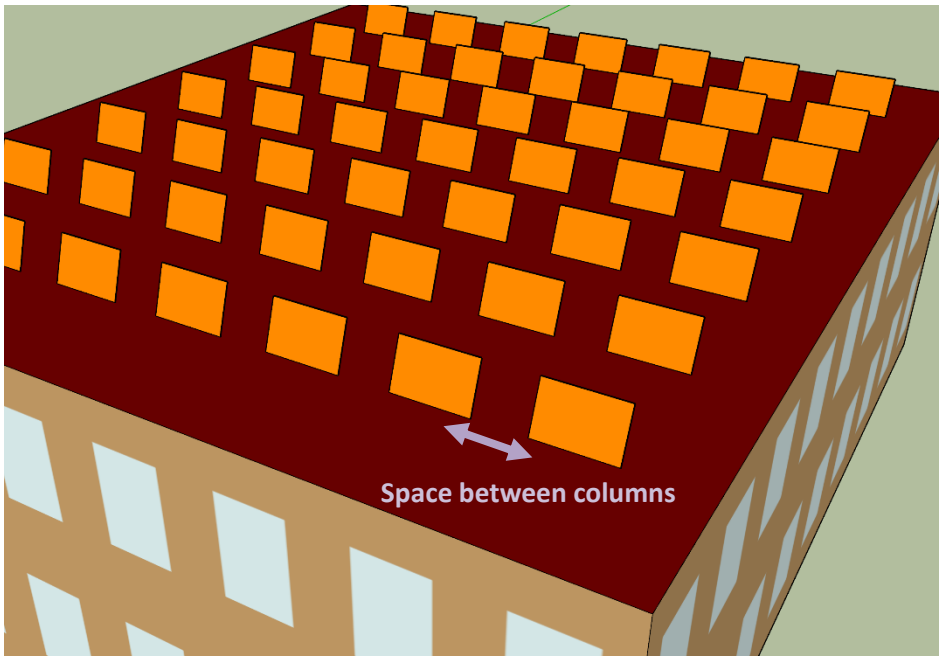
- Panel Inclination on Flat roofs: sets the angle the PV panel makes with the horizontal. By default, this value is set to the site's latitude + 15°. On slopped roofs, PV will be placed with the same inclination as the roof they are on.



- Spacing between rows: sets the distance between 2 consecutive rows of PV. By default, this value is set to 1m.



- Spacing between columns: Sets the distance between 2 consecutive PV in a row. By default, this value is set to 0m.



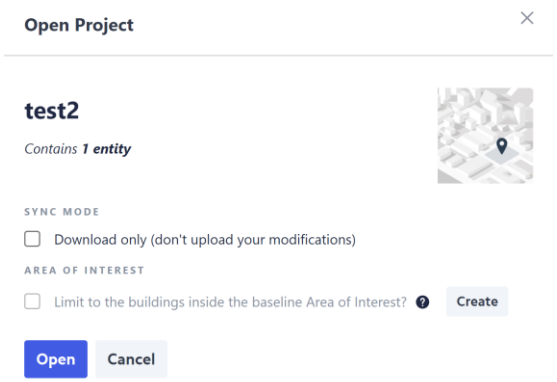
- Panel width: sets the panels' *width* attribute. By default, this value is set to 1.5m.
- Panel height: sets the panels height attribute called *Non-Building height*. By default, this value is set to 1m.
- Efficiency: sets the panels' efficiency also called *PV conversion factor*. By default, this value is set to 0.15.
- Minimum Solar insolation (kWh/m^2): This parameter sets the minimum threshold for roofs to be included in the Roof solar potential. All roofs with an annual solar insulation higher than this threshold will be included in the Roof solar potential. By default, this value is set to the median value solar insolation

Note: On flat roofs, PV will automatically be facing south if the model is located in the northern hemisphere or north if the model is located in the southern hemisphere

Improved iCIM synchronisation process

The iCIM synchronisation was improved to allow to connect to an existing iCIM project an iCD model that already contains objects. This process is meant to facilitate the synchronisation of several iCD model to a single iCIM project.

The synchronisation dialog now gives the option to the user to select the Synch Mode when synchronising an iCD model with objects to an existing iCIM



It is possible to tick the Download only option, in this case clicking Open will only import the object in the iCIM into the iCD model.

If the the Download only option is not ticked, then clicking open will both import what is on iCIM into the iCD model but also upload the objects in the iCD model to the iCIM project.

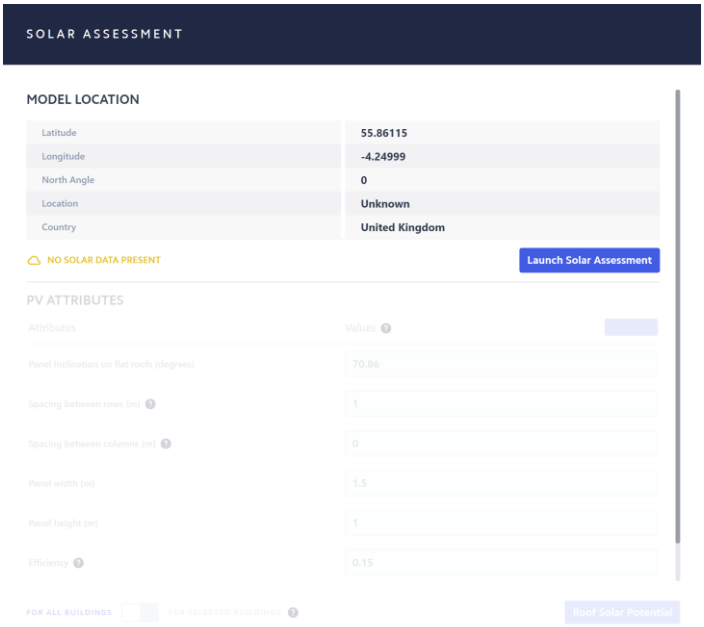
Updated import of iSCAN channel (channel association)

iSCAN channels can be associated to boundary objects in iCD

The channel association process was also improved and now allow to apply a single channel to several objects in CD. Object can import if they all share – in the chosen attribute – the same value as the channel's tag.

Solar assessment dialog UI updated (React-based)

The solar assessment dialog has been updated.


SOLAR ASSESSMENT
MODEL LOCATION
Latitude
55.86115
Longitude
-4.24999
North Angle
0
Location
Unknown
Country
United Kingdom
NO SOLAR DATA PRESENT
Launch Solar Assessment
PV ATTRIBUTES
Attributes
Values
Panel inclination on flat roofs (degrees)
70.86
Spacing between rows (m)
1
Spacing between columns (m)
0
Panel width (m)
1.5
Panel height (m)
1
Efficiency
0.15
FOR ALL BUILDINGS
FOR SELECTED BUILDINGS
Roof Solar Potential

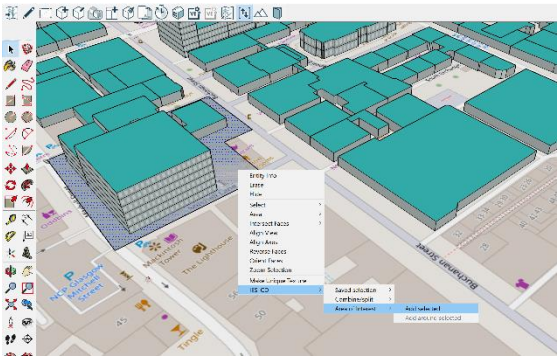
Release 2021.1.0 – April 2021

Selective Synchronisation between iCD and iCIM using the Area of Interest (AOI)

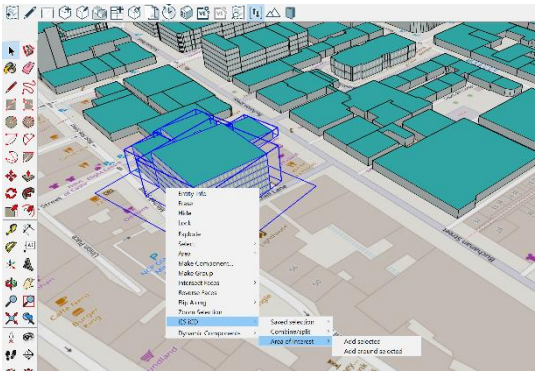
iCD now allows users to synchronise only part of the iCD model that are within an AOI. The AOI is a geographical zone that can be defined in iCD. The iCIM Synchronisation process can limit the synchronisation only to objects within an AOI. This can be particularly useful to synchronise several different iCD models (covering different geographical areas) into a single iCIM project or if multiple users are independently editing and synchronising specific parts of an iCD model.

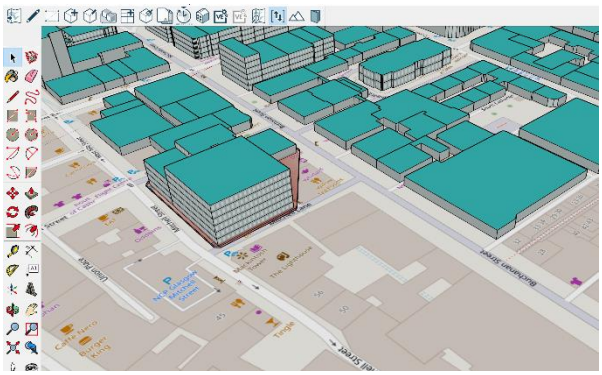
In order to use an AOI to synchronise a model, it is first necessary to create it in iCD beforehand. There are different ways to create an AOI:

- From a free form shape in iCD (see below)

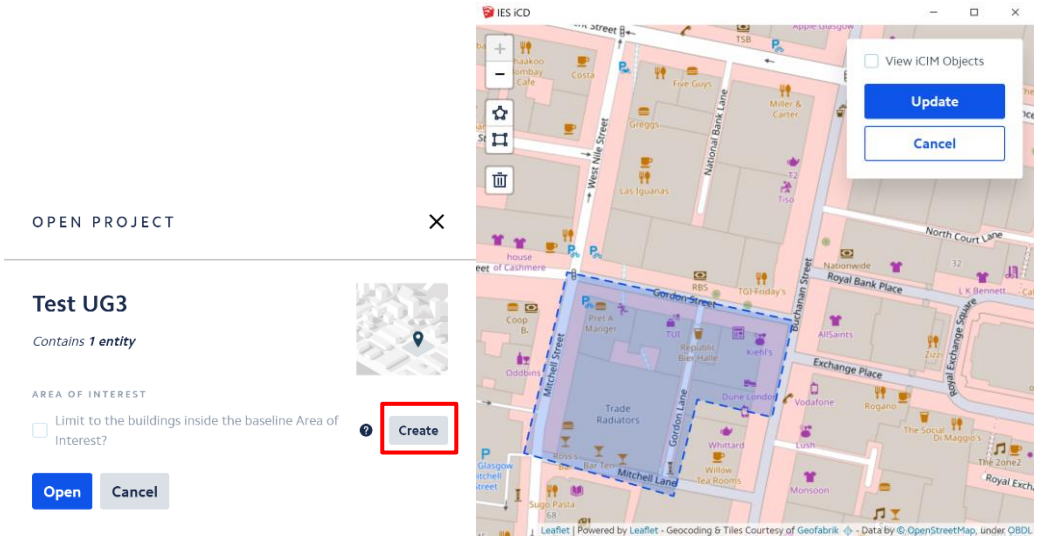


- Around selected objects (see below)



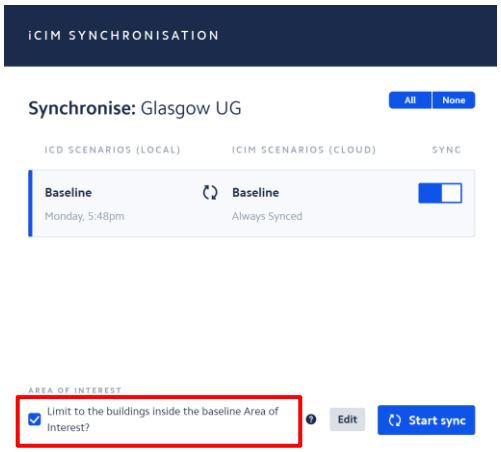


- In the iCIM Synchronisation window
  If the user is synching a model to an existing iCIM project the iCIM Synchronisation windows offers the possibility to create an AOI before synchronising (see below).

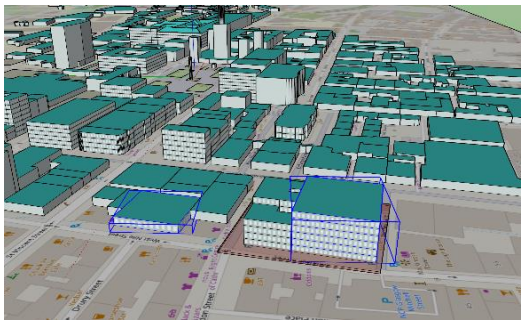


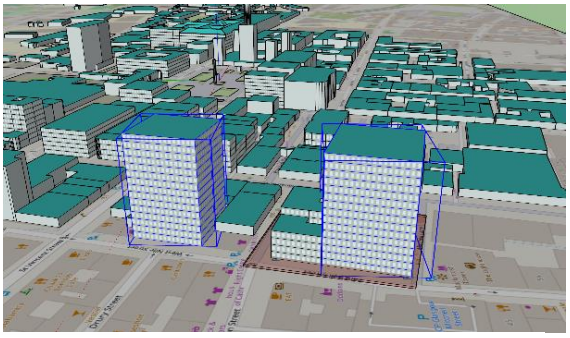
Once an AOI is defined in iCD it can be used to synchronise only part of the iCD model to the iCIM.

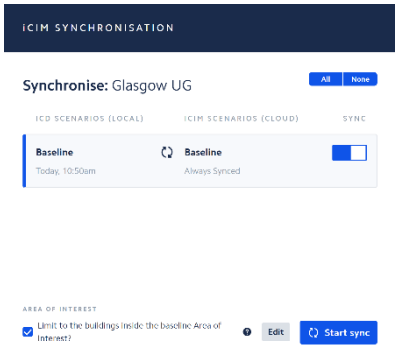
For the synchronisation process to consider only the changes that occurred within the AOI, the box *Limit to the buildings inside the baseline Area of Interest?* Should be ticked (see below)

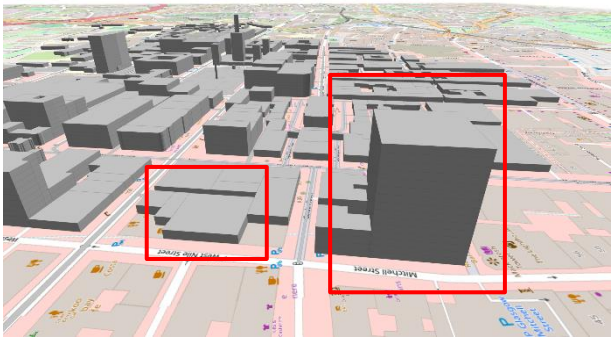


In the example below, one of the two highlighted buildings is located within a defined AOI. Both buildings were edited to have 15 storeys. The AOI is then synchronised with the iCIM project. In iCIM, only the building within the AOI was updated.









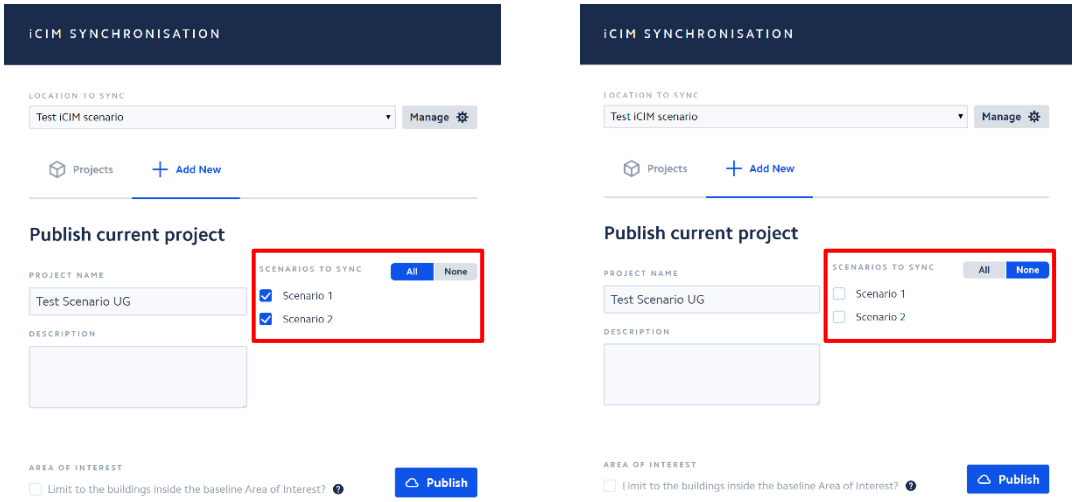
Multi-scenario synchronisation between iCD and iCIM

An iCD model with multiple scenarios can now also be synchronised and visualised in the same iCIM project.

In the example below, the baseline and two additional scenarios were created.

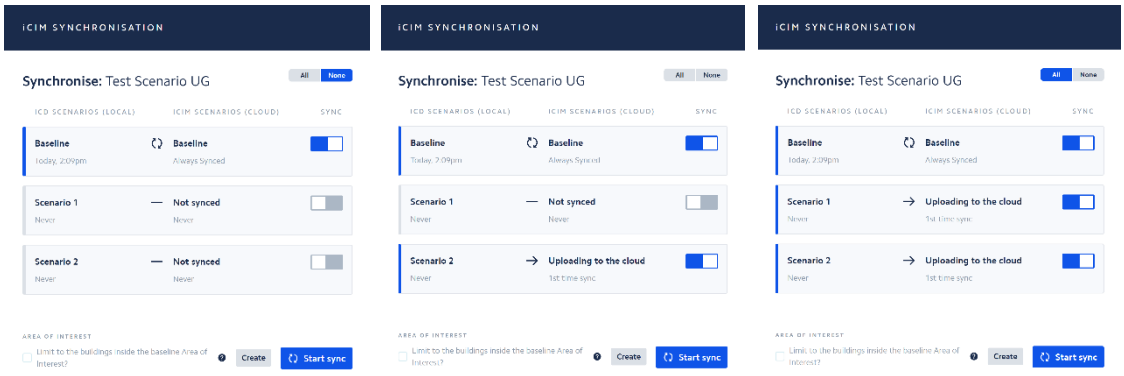
Figure 0-1: The baseline (left) and two scenarios in iCD

To synchronise the model for the first time, click the Synchronise button in the iCD toolbar and select the desired iCIM endpoint. As the model contains several scenarios, the synchronisation window gives the possibility to choose which scenario to synchronise (see image below)



If the model had previously been synchronised or if scenarios were added after the first synchronisation, the synchronisation window will display the different available scenarios with an indication on which of scenario has already been synched and the latest time of synchronisation. It is possible to choose which scenario to synchronise clicking on the blue switch button next to each of them (see image below).

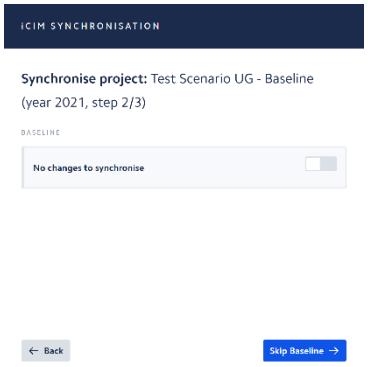
On the image below, the baseline had already been synchronised but not the other two scenarios. One the left image, only the Baseline will be synchronised. On the middle image, the baseline and scenario 2 will be synchronised. On the right image all the scenarios will be synchronised.

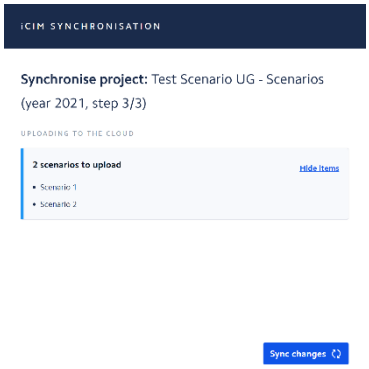


Note: Only the other scenarios can be ignored for a synchronisation, the baseline is always synchronised.

Note: any change made to the Baseline will be also applied to all other scenario while synchronising to iCIM. The user must then be cautious while editing and synchronising the baseline. Changes made to a scenario are only applied to this specific scenario.

If the baseline is already synchronised, iCD will prompt that no changes are to be synchronised for the baseline. Clicking Skip Baseline will then show the different scenarios that need to be updated (see image below).





Once all the scenario synchronised, they are available for visualisation in iCIM. To switch from one scenario to another, the desired scenario can be selected in the dropdown menu on the bottom left of the screen (see image below).

Faster results processing and timeseries export to iSCAN

The generation of the simulation results was improved in order to speed up the process and the export of timeseries to iSCAN.

Dialog UI updates

Some dialogs visuals were updated and harmonised

OSM Import - INCLUDE
Create tool - INCLUDE
Boundary tool - INCLUDE
Custom attributes - INCLUDE
Painter tool - INCLUDE
Time - INCLUDE
Vis tool - INCLUDE
Sim launcher - INCLUDE
Sim progress - INCLUDE
Locate entities - INCLUDE
Help - INCLUDE

Release 2021.0.0 – January 2021

Highlights for intelligent Community Design (iCD) Tool

Updated preferences panel

The preference panel layout is updated and a new section has been added. The panel is now organised into the following sections:

1. Templates and units:
2. Carbon emission coefficients
3. Resources cost per unit ***(New)***
4. Material colours
5. Miscellaneous
6. Troubleshooting

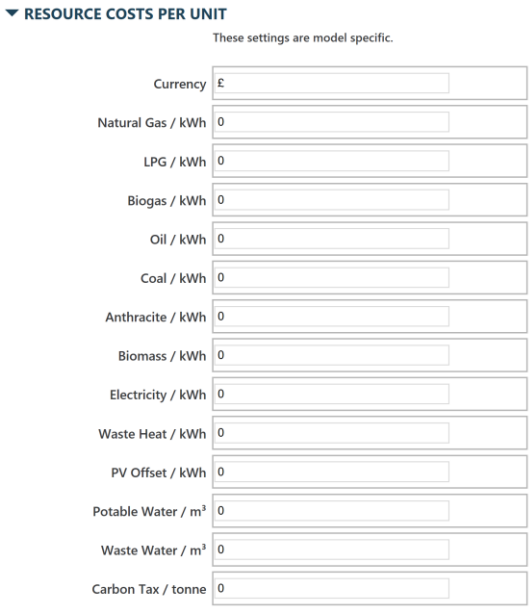
Basic Cost Analysis

In iCD, it is possible to complete an energy simulation with a basic energy cost analysis.

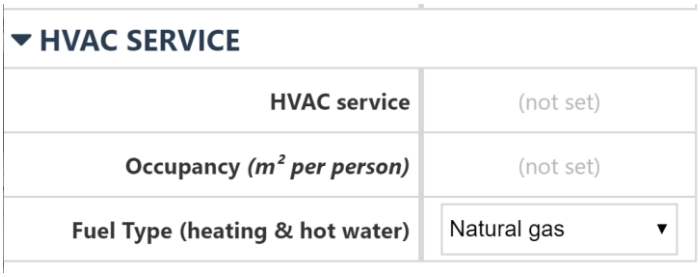
The cost analysis will allow the user to get some understanding the monthly energy costs per commodities over a community.

In order to give relevant results, the following steps are necessary:

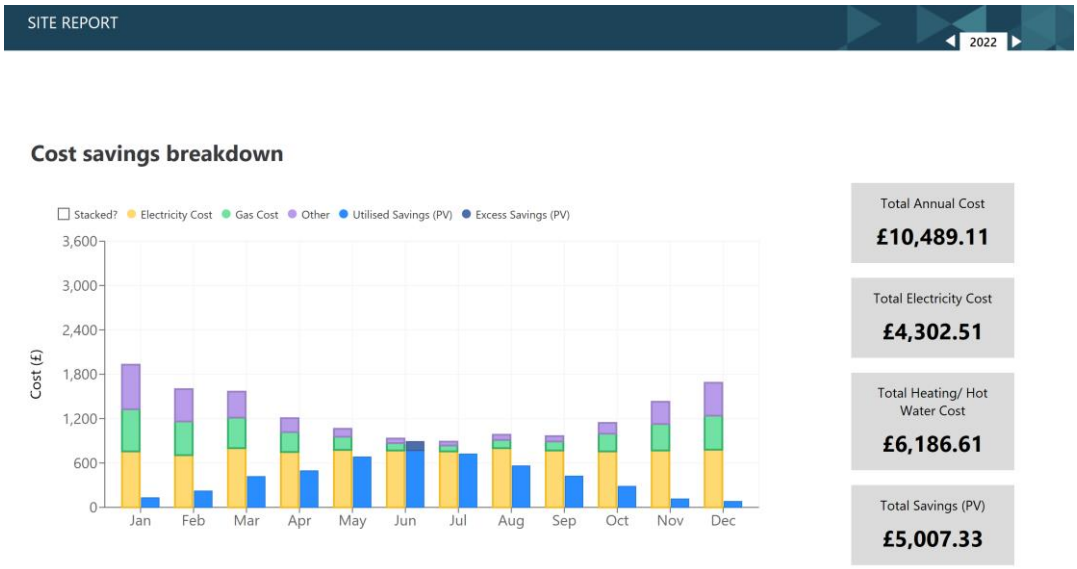
1. Set the Resources' cost per unit – from the preferences panel
    a. Set the desired currency and resource
    b. If the model includes some PV panels, it is important to make sure the value for PV offset / kWh is set. As this value will represent a saving, please note its value should be negative.



2. Set the Fuel type for heating and hot water for the buildings – from the Room/Building Query Tool



3. Set the PV layout if any – by adding PV panels and running a Solar assessment
4. Perform an energy/water simulation
5. View the report from the Reports section –
    a. Cost analysis results can be visualised in the Cost Savings Breakdown report. This report is accessible in Extension > IES iCD > Reports > Site Reports > Cost Savings Breakdown.



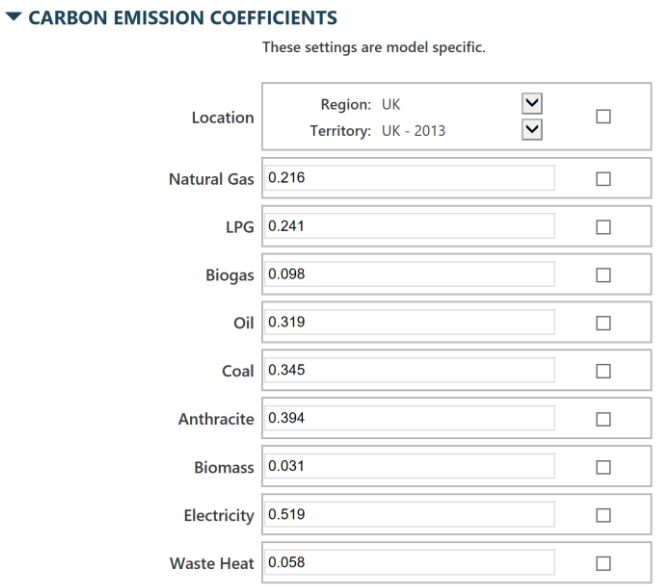
Carbon Emission Coefficients

In iCD, it is possible to complete an energy simulation with a basic carbon emission analysis for each type of commodity based on the applied ratio in the country the model is located in.

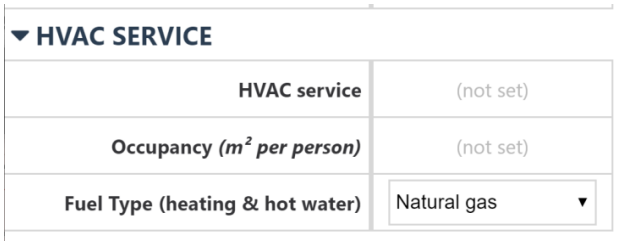
The carbon analysis will allow the user to get some understanding the total site's carbon emissions.

In order for this report to give relevant results, the following steps are necessary:

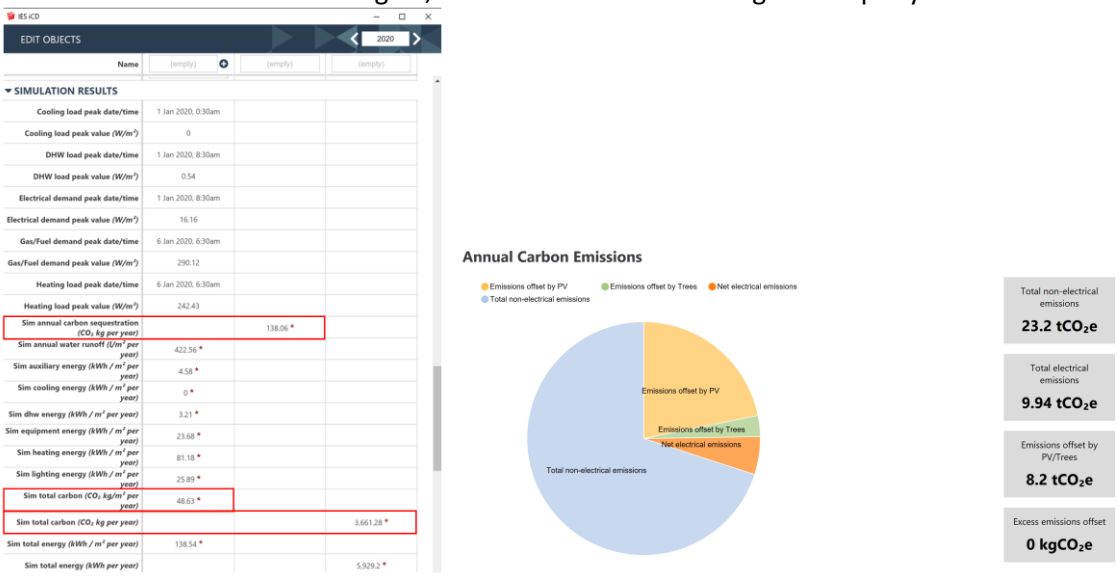
1. Set the Carbon emission coefficients – from the preferences panel
    a. It is possible to keep the pre-set coefficient or to manually overwrite each coefficient.
    b. When a value is manually overwritten, a tick mark will appear in the box next to it. Unticking this box will bring back the default value.



2. Set the Fuel type for heating and hot water for the buildings - from the Room/Building Query Tool



3. Set the PV and tree layout if any;
4. Perform an energy/water simulation
5. View the results in the Room/Building Query tool or in the report from the reports section
    a. The results are expressed as the following:
        i. For Trees, in Sim annual carbon sequestration in CO2, kg per year
        ii. For Buildings, is Sim total carbon, expressed in kg of CO2 per m^2 per year
        iii. For EV Chargers, it is Sim total carbon – in kg of CO2 per year

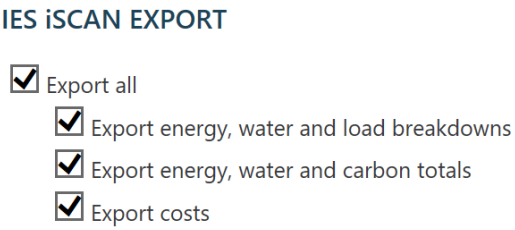


This report consists in a pie chart showing annual carbon emission (electrical and non-electrical) as well as PVs and trees emission offsets.

iCD to iSCAN

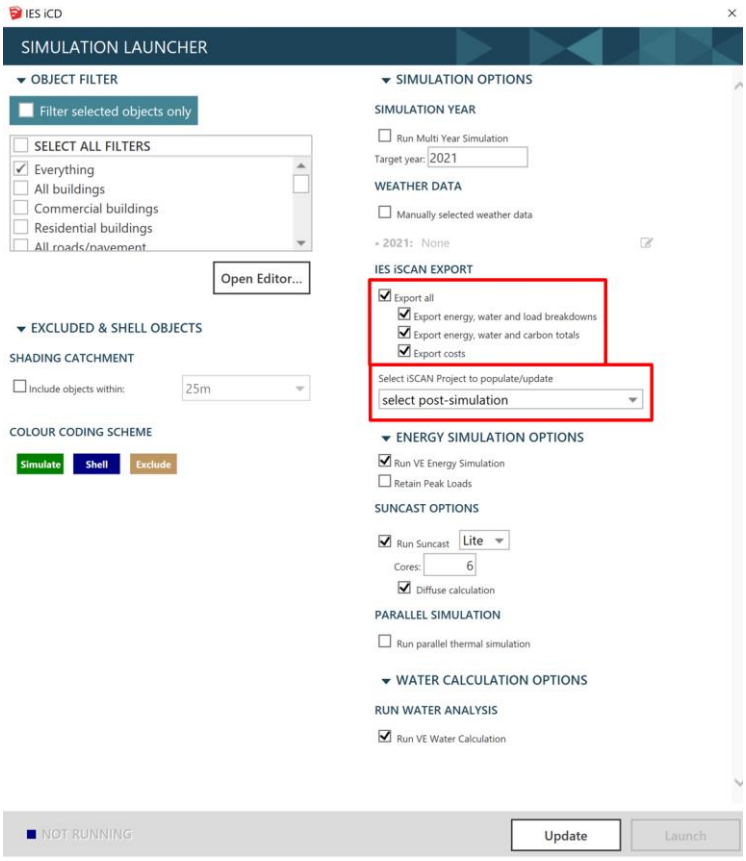
iCD simulation results can be exported to iSCAN. Exporting simulation results to iSCAN allows end-users to access them as hourly time series which are not available within iCD.

The user can choose which time-series to export to iSCAN by ticking the appropriate option.



Additional options to export the data to iSCAN have been added.

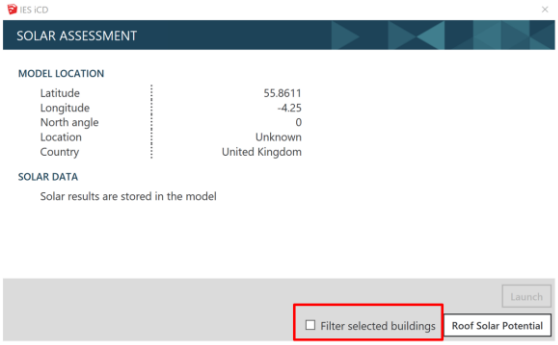
1. Select Post-Simulation - the use can select the iSCAN project post simulation
2. Add new endpoint – the user can add a new endpoint from here
3. iSCAN project URL - If the iSCAN project is already set up in iCD, the user can select the relevant iSCAN project URL directly from here



Updated PV Auto-generation

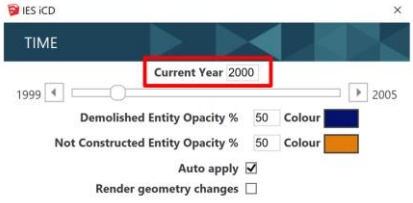
Once the solar assessment has been undertaken and the results saved. The user can click on the “Roof solar potential” button to generate PV panels. This button is available once the solar assessment has been run for the first time.

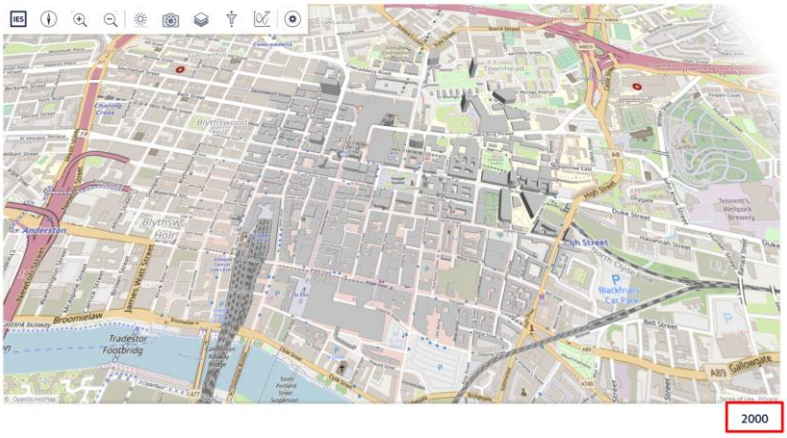
The user now has the option of selecting specific buildings for the PV auto generation, this can be done by checking the box “Filter selected building” and then selecting the building for the auto generation.



iCD current year displayed in iCIM

The current year as set in the iCD time dimension tool will be displayed in iCIM.





Release 2020.1.0 – October 2020

Highlights for intelligent Community Design (iCD) Tool

New Point Objects (Trees, EV charger and Street lights)

iCD now includes 3 new points objects: Trees, EV charger and street lights.

Similarly, to PV panels (freestanding PV), these point objects can be individually created in a model using the Create tool.

Trees

Tree objects sequester CO2 which is taken into account in the Site renewable report.

They also generate a water demand which is taken into account in the site water reports.

A tree's parameters – its type, age, size, water consumption - will have an impact on its CO2 sequestration and water demand.

Trees store two simulation results as attributes:

sim annual carbon sequestration: Total sequestered CO2 by the tree in a year.

Sim water total: Total annual water demand for the tree.

EV chargers

EV chargers generate an electricity consumption which is reflected in sites energy reports.

Adjusting the EV charger type, maximum power and daily profiles allows the end user to model different EV chargers, from small individual installations to larger charging stations.

EV chargers store two simulation results as attributes:

sim total carbon: Total CO2 generated by the EV charger in a year.

Sim total energy: Total annual energy consumption.

Street lights

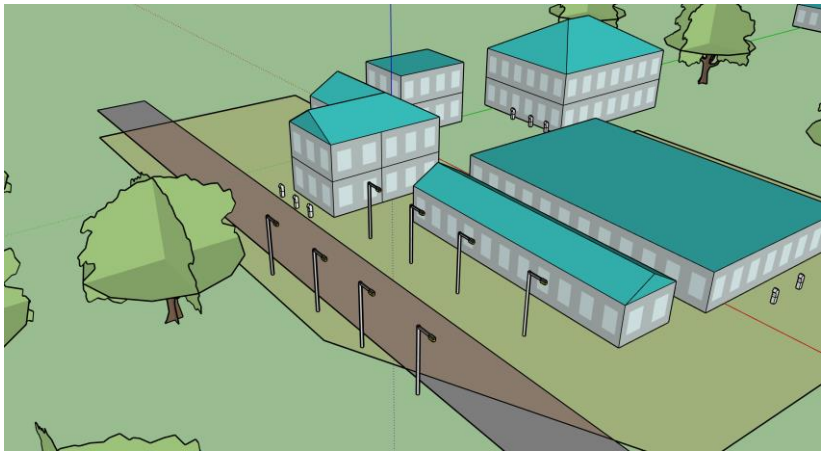
Street lights generate an electricity consumption which is reflected in sites energy reports.

Adjusting the Street light's type, maximum power and usage daily profiles allows the end user to model different street lights.

Street lights store two simulation results as attributes:

sim total carbon: Total CO2 generated by the EV charger in a year.

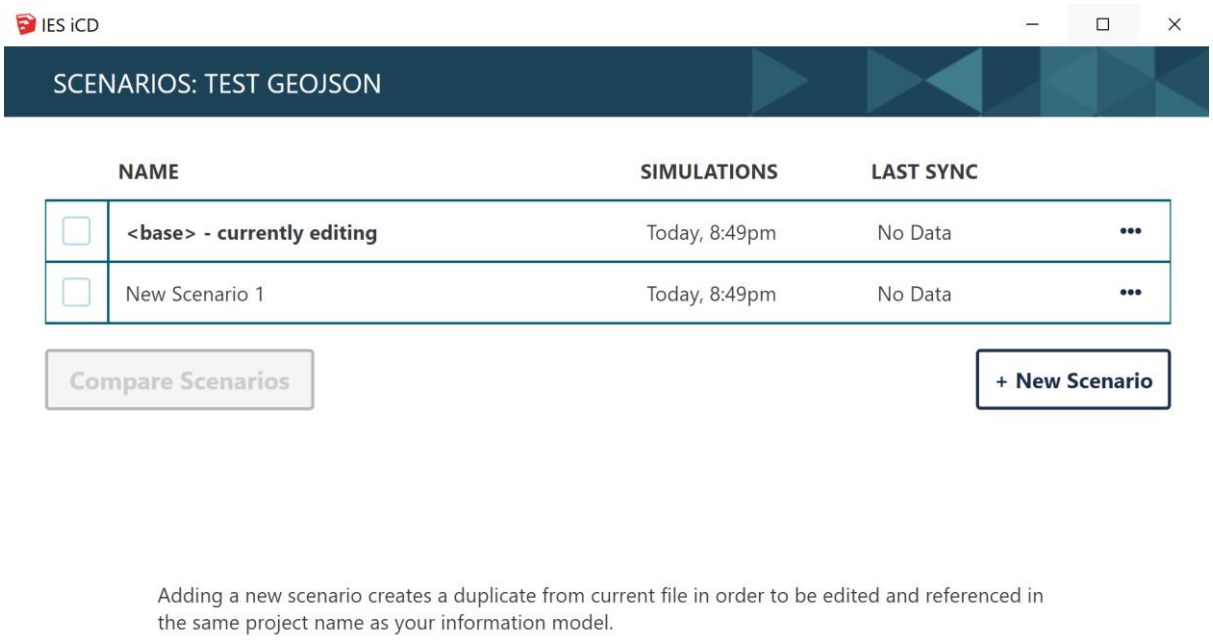
Sim total energy: Total annual energy consumption.



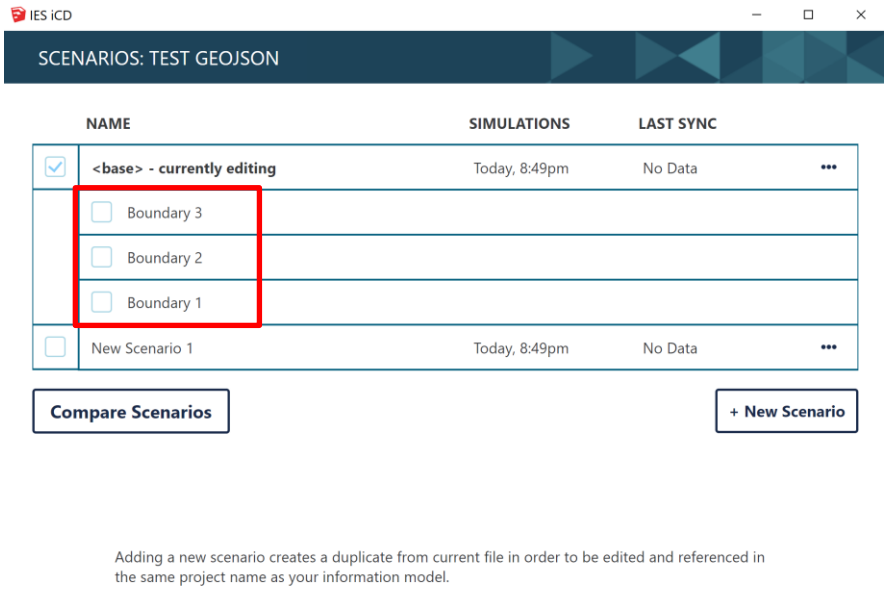
New Scenario dialog

The scenario dialog is improved.

The same functionalities remain: create new scenario, access the different scenarios to edit them, access the report for comparison.



The scenario dialog also allows the user to compare reports between boundaries in the same model. Ticking the box left of the model scenario, expands all the boundaries present in the model.



Updated Preference Panel

The preference panel is updated and organised into the following sections

Templates and units: allows the end-user to select the simulation template (ASHRAE or ICL) and the units (metric or IP)

Carbon emission coefficients: allows the end-user to set the carbon emission coefficients either manually or automatically by selecting the location of the project.

Material colours: allows the end-user to set the colour for the different material in the model

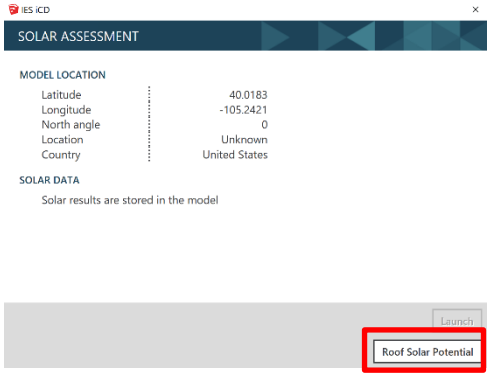
Miscellaneous: allows the end-user to set the VE location and enable the invalid annual occupancy warning

Troubleshooting: enable the end-user to optimise the visualise tool and the imports

PV Auto-generation

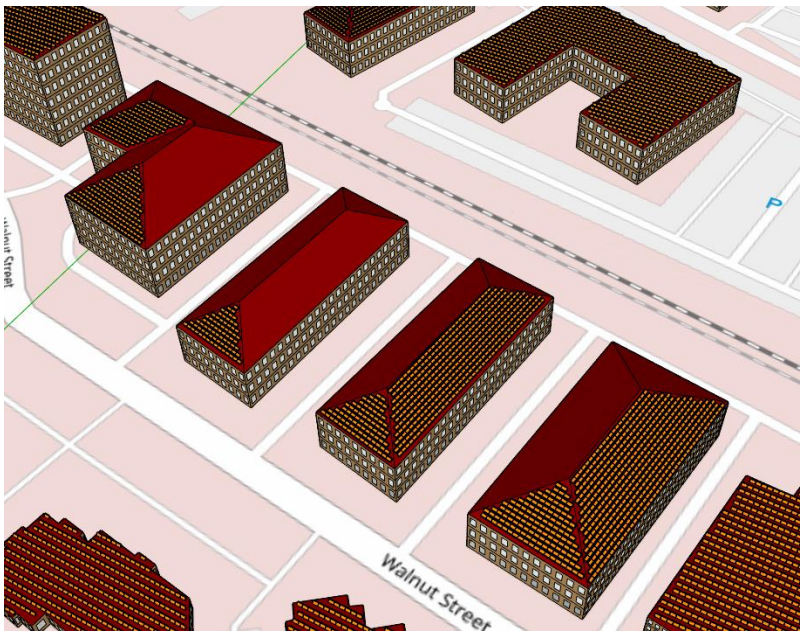
The Solar assessment now gives the possibility to run the Roof Solar Potential. This auto-generates PV panels on building's roofs in the model.

Once the solar assessment has been undertaken and the results saved. The user can click on the "Roof solar potential" button to generate these PV panels. This button is available once the solar assessment has been run for the first time.



Every roof space in the model within the highest 50th percentile of surface insolation will then be populated with PV panels. The panels will by default be 1.5m by 1m and have an efficiency of 0.15. The roof space will be filled with rows of panels, separated by 1m. On flat roofs the panels will have an inclination of 15°, on pitched roofs the inclination will match that of the roof surface. These panels will then be included in any future energy simulations undertaken on the site, with results showing in boundary and site renewables reports.

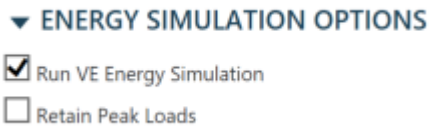
Note: running this analysis on large sites can take some time for the generation to complete.



Peak loads

Energy simulation includes the option to retain Peak loads in iCD.

To do so, in the simulation launcher under Energy Simulation Options, the box Retain Peak Loads should be ticked before launching.

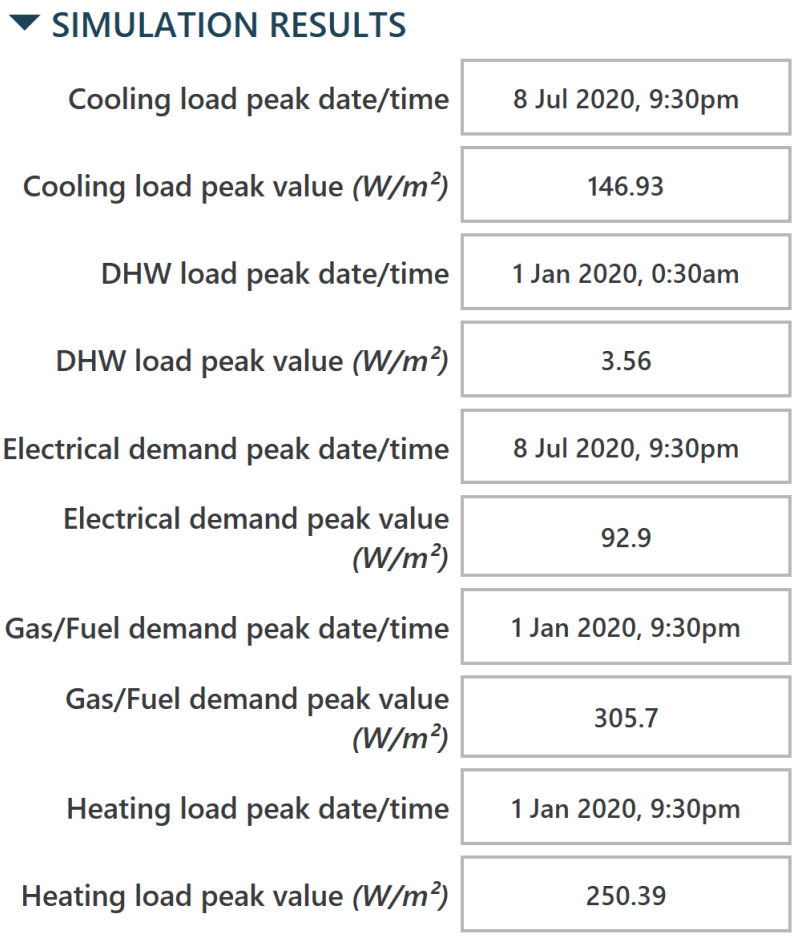


Peak loads can be retained for the following consumption type:

- Cooling;
- Domestic Hot Water;
- Electrical demand;
- Gas/Fuel demand and
- Heating

Retaining the peak loads will store, for each simulated building, values in new attributes in the Simulation Results section:

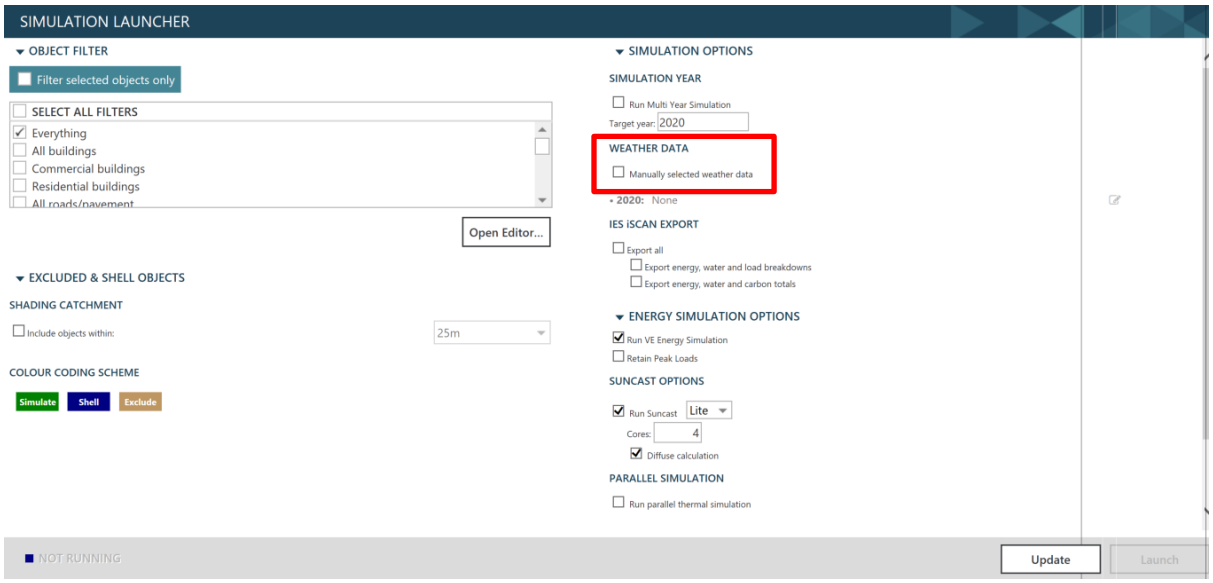
- Load peak date/time: it gives the time and date at which the peak load occurred in the building
- Load peak value: it gives value of the peak load in the building (W/m2)



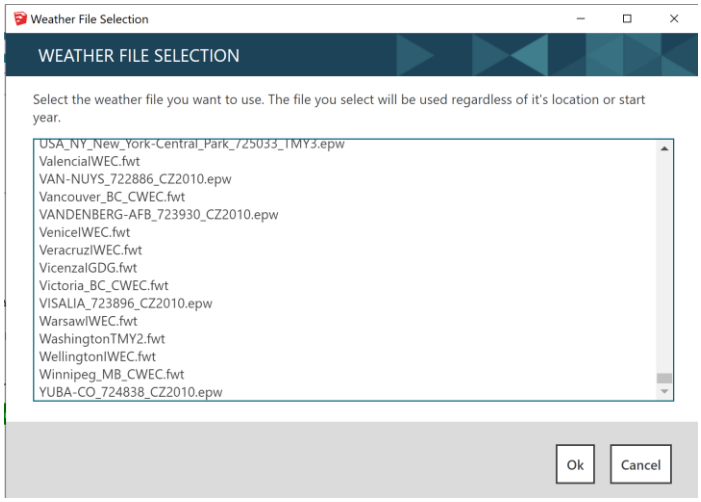
Custom Weather files

The Weather Data option gives the possibility to manually set the weather file to be used for the simulation.

Clicking the Manually Selected Weather Data box opens the Weather File Selection dialog in which the end-user can select any weather file amongst the available files in the installation.



The Weather File Selection dialog gives access to all the weather files available for the VE and the iCD. They are usually located in the following folder: C:\Program Files (x86)\IES\Shared Content\Weather.



If the simulation is a multi-year simulation, it is possible to independently assign a weather file for each simulated year clicking on the “edit” icon on the right side to each year.

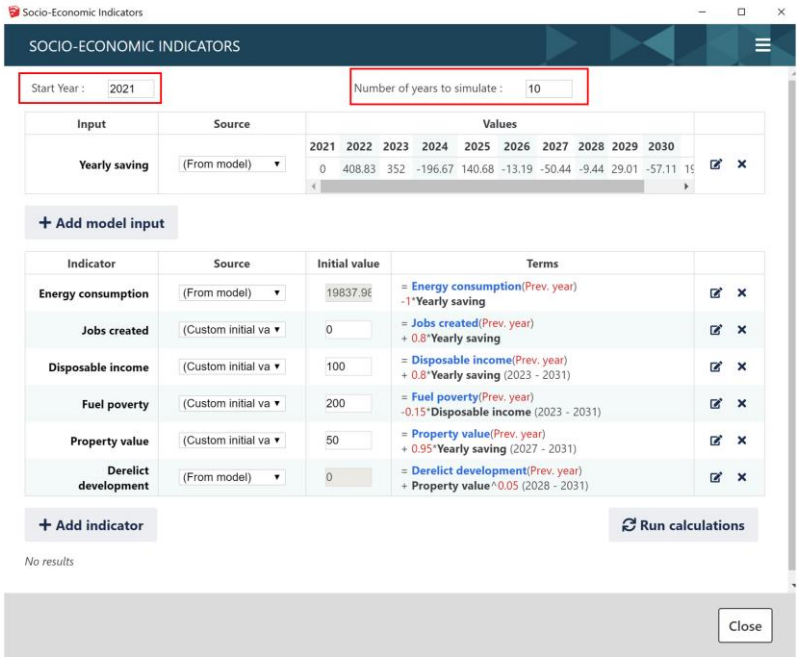
Socio-economic indicators and custom calculation

The Socio-economic Indicators dialogue allows the end-user to perform a series of bespoke calculations, over a number of years, based on specific inputs. The user can use these calculations to generate values for the default socio-economic indicators, or create their own custom indicators and calculations.

Custom calculations (or Socio-Economic Indicators) are done at a boundary level. It is then necessary to have defined boundaries in the model prior to doing these calculations and the dialog can be accessed via the Boundary tool.

Start Year and Number of years to simulate

When running calculations for socio-economic indicators the user must first select the 'start year', which is the first year that the indicators will be calculated for, and the 'number of years to simulate' which determines how many years indicators will be calculated for. For example, if the user selects a start year of 2022 and 10 years to simulate then indicators will be calculated for each year between 2022 and 2032.

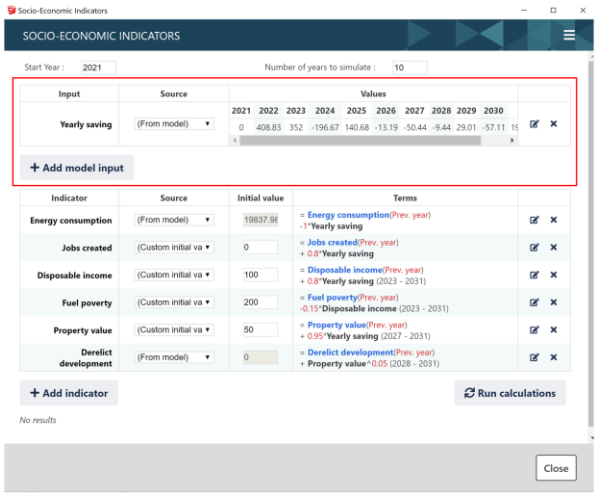


Inputs

Inputs are a set of yearly values that are used as inputs for the custom calculations.

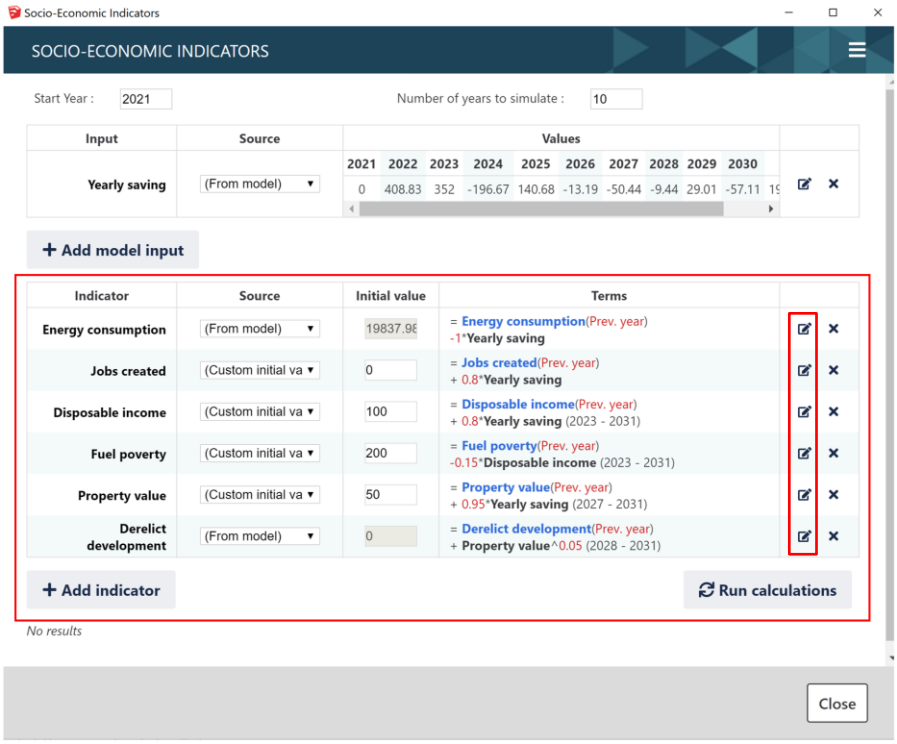
The only default input is yearly energy saving, which is determined from undertaking multi-year energy simulations of the model. All of the default socio-economic indicators can be calculated from this input.

The user can create their own custom inputs by clicking on the ‘add model input’ button. The input can then be named and custom values for each year inserted. Custom inputs can either be used to calculate new custom indicators, or can be incorporated into the equations used to calculate the default socio-economic indicators.

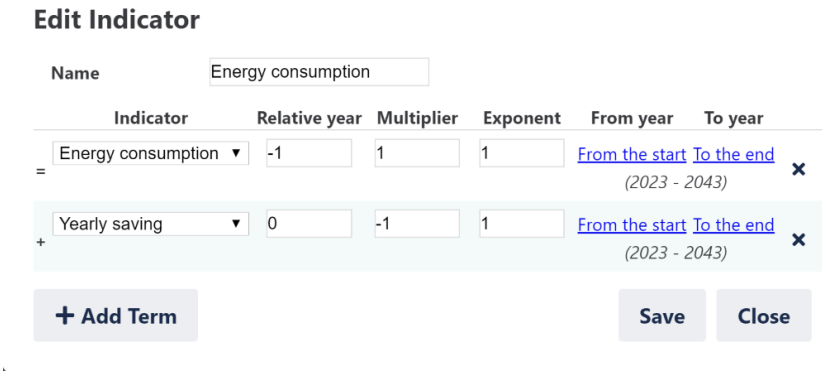


Indicators

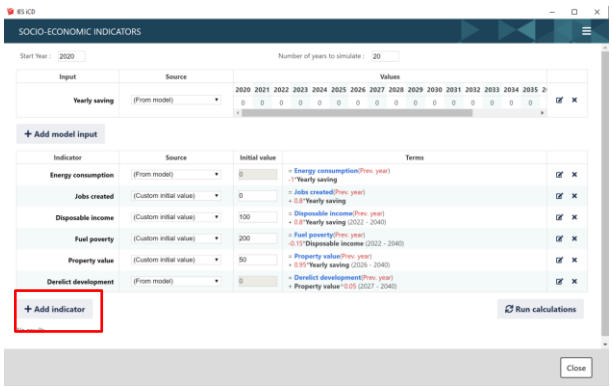
The indicators that will be calculated are then shown below the inputs. The default socio-economic indicators that are calculated from the yearly energy saving are: energy consumption, jobs created, disposable income, fuel poverty, property value and derelict development. The source column determines whether the initial value for the indicator used in the calculations comes from the model data or is a custom initial value, for some indicators only a custom initial value can be used. This value is set in the ‘initial value’ column. The equation used to calculate the indicator for each year is shown in the ‘terms’ columns. These equations are fully editable, allowing the user to add or remove terms based on inputs and other indicators, a full description of editing the equations is given below.



The edit indicator dialog which allows the end-user to edit the formula used to calculate a specific indicator. This shows a list of all terms used to calculate that indicator, presented in a table.



The dialog also allows the end-user to create and edit a new bespoke indicator clicking the +Add indicator button.



Socio-Economic Indicators can be visualised in the SEI report accessible in the Sites reports

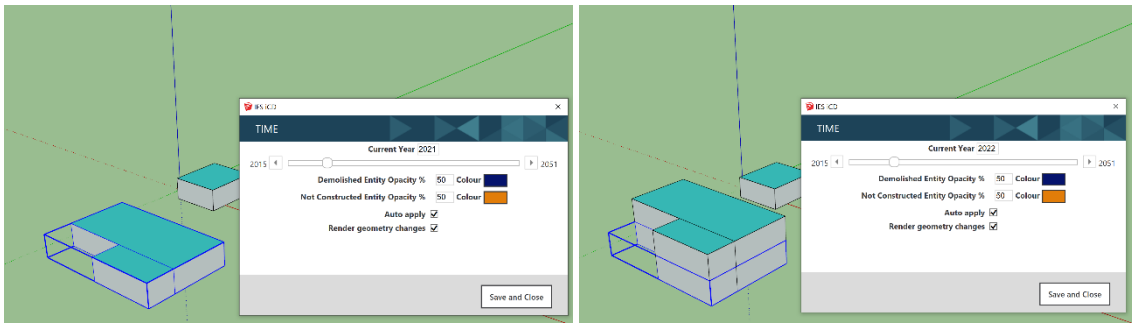
Time dimension dialog

The Time dialog now includes an option to render the change of geometry over time.

Ticking the Render geometry changes will adjust the building geometry with the year in addition to showing not constructed and demolished buildings. It will for example, directly show on the model the addition or removal of floors.

In the example below, a second floor was added to the building in the front in 2022.

With the *Render geometry changes*, switching from 2021 to 2022, directly reflects this additional floor.



IES iSCAN exports

The user now has the possibility to select which data to export to iSCAN as channels:

- Export energy, water and loads breakdowns
- Export energy, water and loads totals
- Export all

The options are accessed on the Simulation Launcher prior to running simulations,

Exporting the breakdowns will create the following channels in the iSCAN project:

- DHW demand load (Domestic hot water loads)
- Room units cooling loads
- Room units heating loads
- Sim auxiliary energy
- Sim cooling energy
- Sim equipment energy
- Sim heating energy
- Sim lighting energy
- Sim Potable water demand
- Sim waste water generated

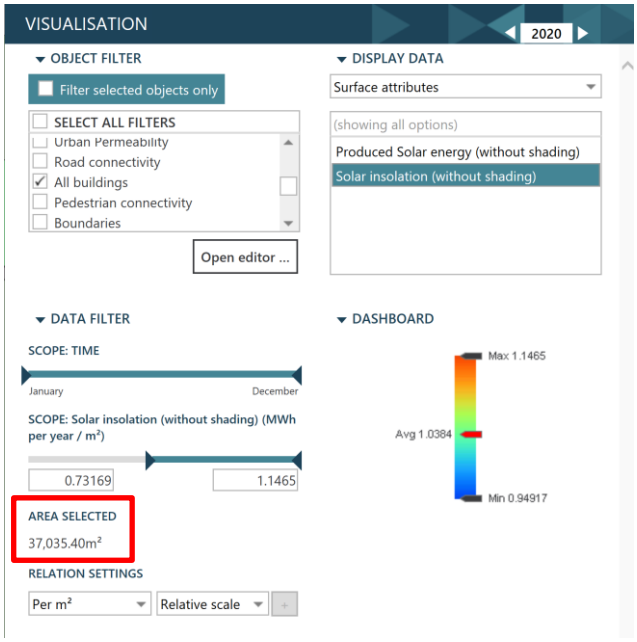
Exporting the totals will create the following channels in the iSCAN project:

- Sim Potable water demand
- Sim waste water generated
- Sim total carbon (kg/h)
- Sim total electricity
- Sim total energy
- Sim total Natural Gas (or Biomass or LPG or Coal etc… depending on the commodity set in the attribute Fuel Type)

Visualisation of solar insolation / Selected area

Using the visualisation tool to overlay the solar insolation over surfaces now gives a new output: the Area Selected. It gives the total area considered in the visualisation.

For example: Adjusting the scope of the visualisation may exclude or include some area for the visualisation, the total considered area is now clearly reflected in the Area Selected output.



Release 2020.0.0 – May 2020

Highlights for intelligent Campus Design (iCD) Tool

Validated ICL profiles

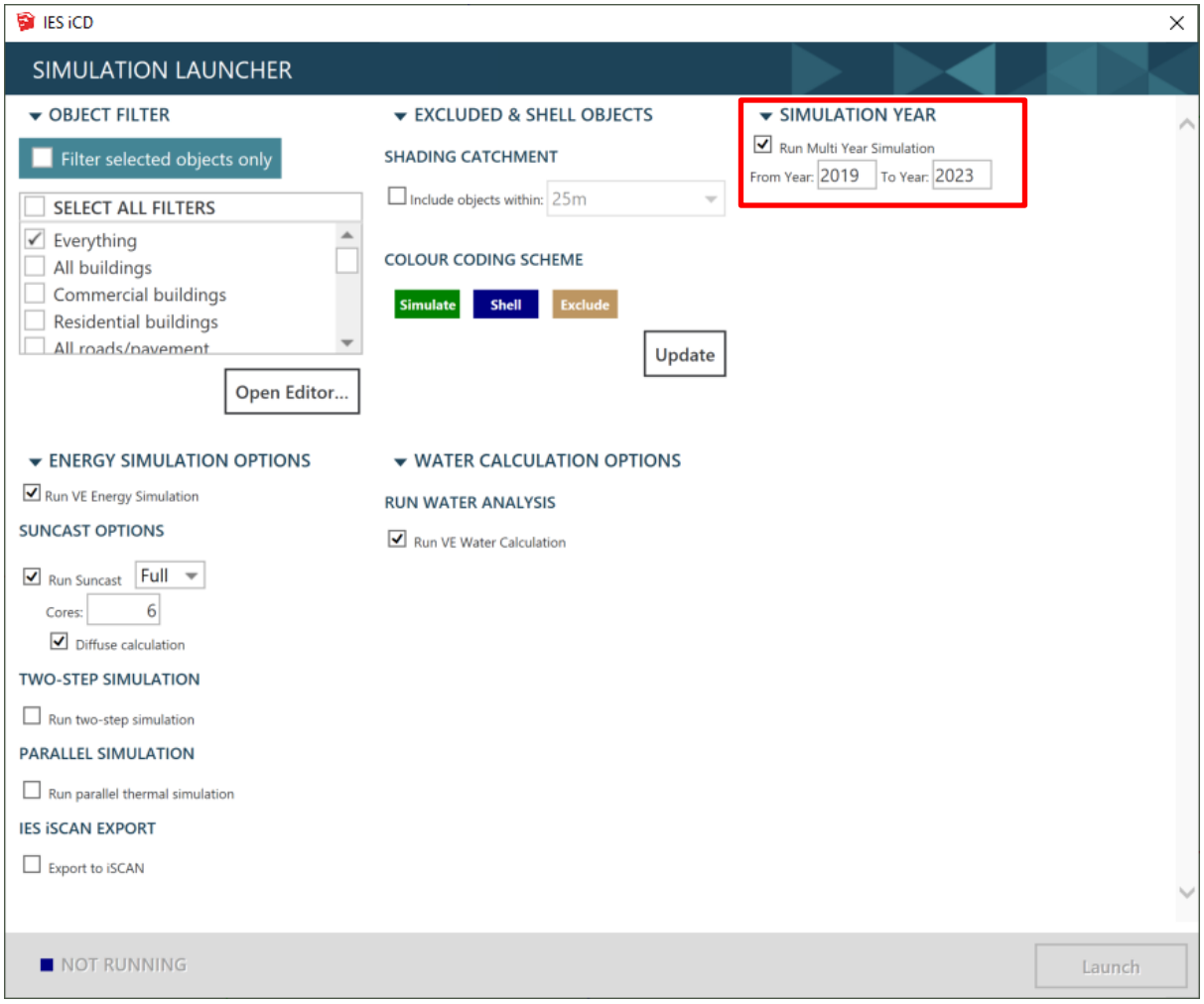
Includes Validated ICL profiles based on measured data across UK and Europe.

These ICL profiles provides a detailed set of attributes (different from the attributes available in the ASHRAE templates) allowing the user to define the necessary parameters to perform energy simulations on buildings.

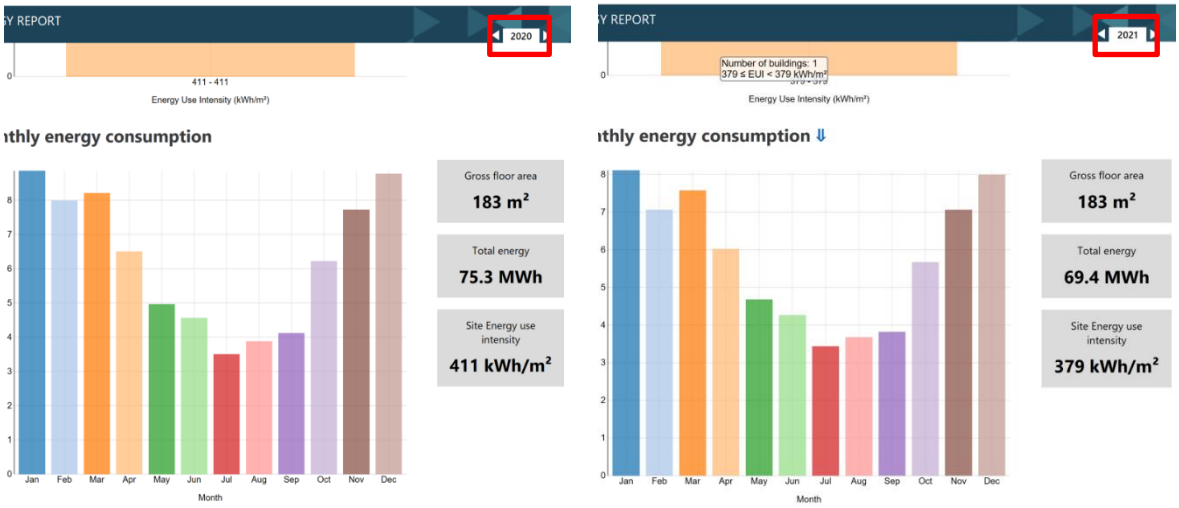
ICL profiles can be selected in the IES iCD extension under *Preferences*, *Simulation Templates*.

Multi-year Energy simulation

Energy simulation can now be performed over several years. The user can choose to run a multi-year simulation from the Simulation Launcher window and select the starting year and the end year of the simulation.

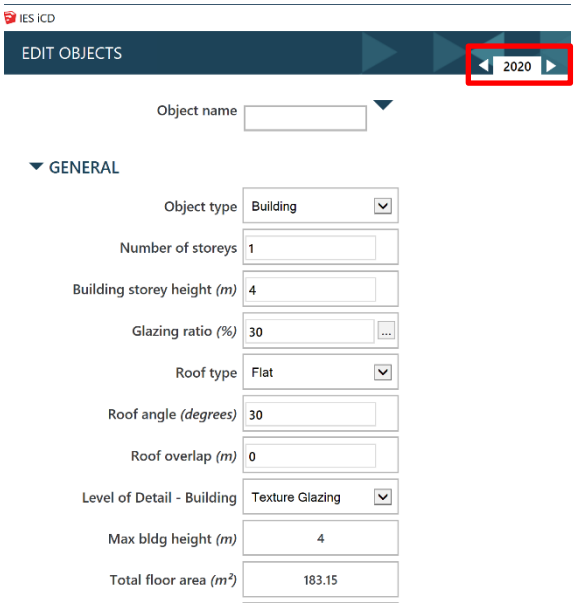


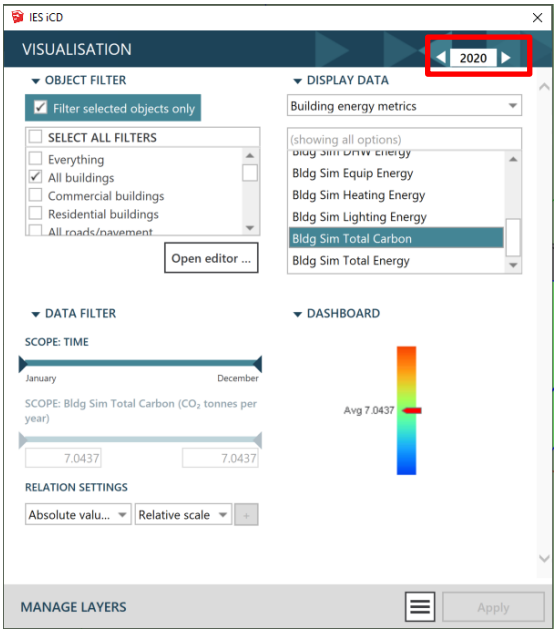
Energy simulation results are independently saved for each year. Results for each year are easily accessible for all reports as user can scroll through the year or directly type in the desired year within the reports dialog.



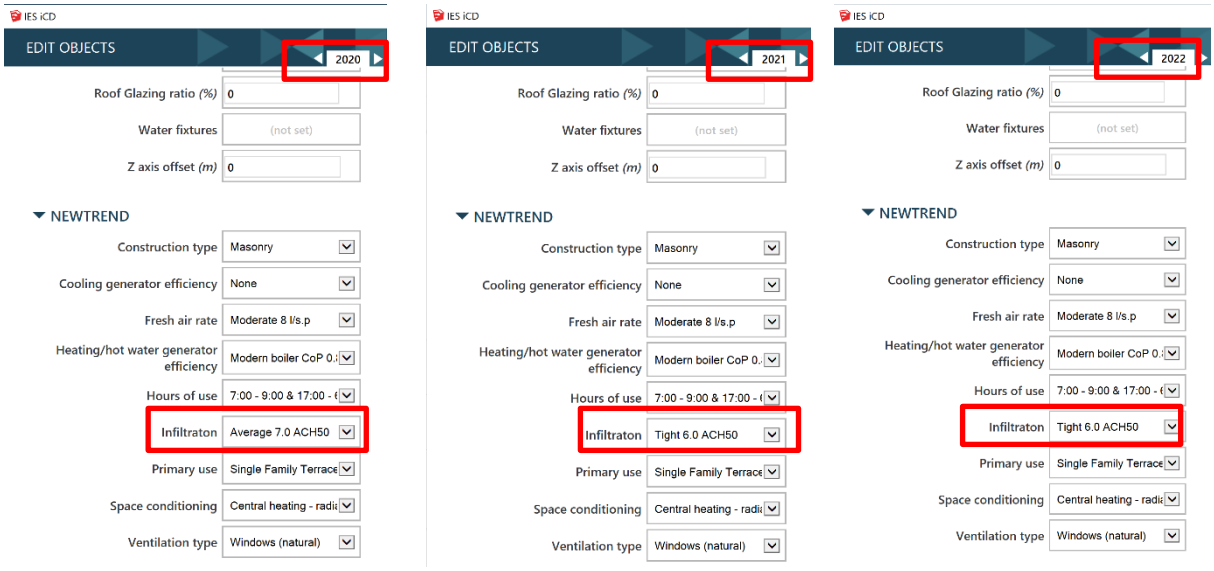
Similarly, when running energy or water simulation for multiple years across multiple scenarios, the scenario comparison tool allows the user to change the year the comparison is made of directly within the tool's UI.

It is now also possible to specify the year directly within any dialog window such as *Room/Building Query Tool* or *Visualisation* in order to view results or attributes for the desired year.





When an attribute is modified for a specific year the value it holds automatically persists on the following years (as if it was considered as a building renovation). For example, if an attribute is edited in 2015, its value in 2015 is automatically applied for all the following years.



Updated export to iSCAN

The *Total Energy* and *Total Carbon* channels are now automatically exported when the "export to iSCAN" option is selected.

Furthermore, two water channels are now automatically exported to iSCAN when the "export to iSCAN" option is selected: waterWaste (total waste water) and waterTotal (total potable water).

- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - waterWaste".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - waterTotal".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - DHW demand load".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim dhw energy".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim total carbon".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim auxiliary energy".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim cooling energy".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim heating energy".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim equipment energy".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim lighting energy".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Room units cooling load".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Room units heating load".
- Exported data to "Export to iSCAN script" - "Terminal Warehouse Building - Sim total energy".

Updates to reports

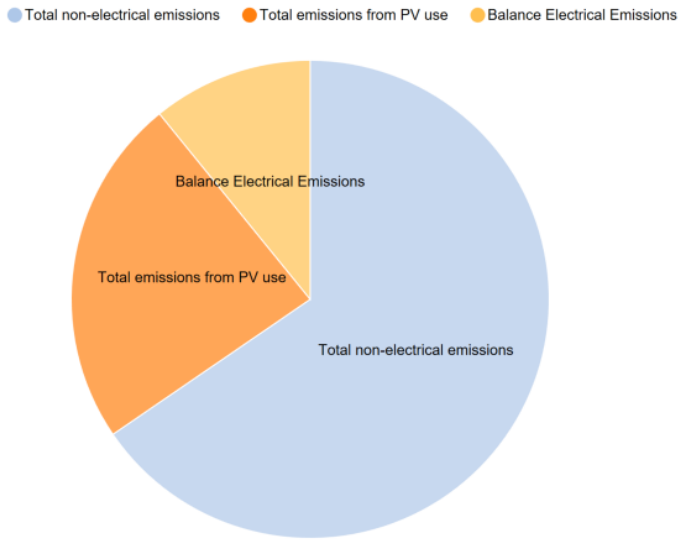
Reports in iCD now include a Carbon emission report. The Annual Carbon Emissions report compares the non-electrical emissions, the electrical emissions and (if modelled) the share of GHG emissions offset by PV panels.

IES iCD

SITE RENEWABLES REPORT

2020

Annual Carbon Emissions



Total non-electrical emissions
13.3 tCO_2e

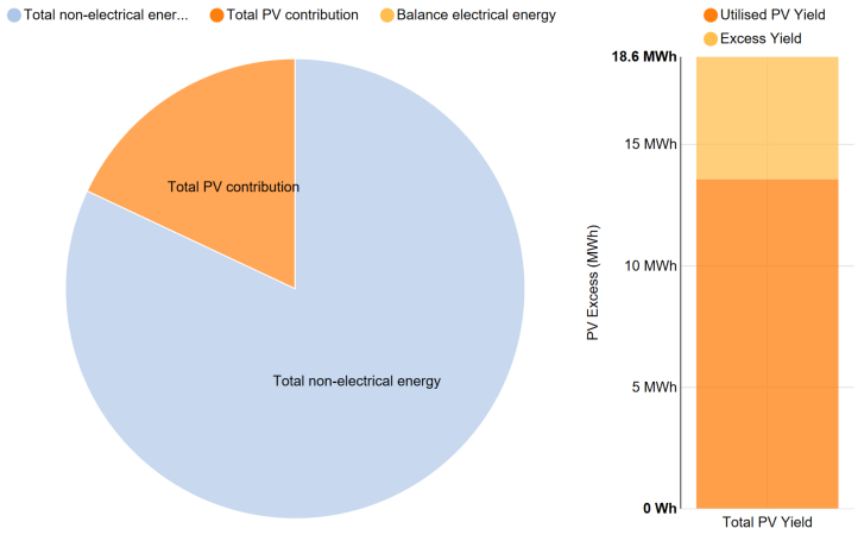
Total electrical emissions
7.04 tCO_2e

Emissions offset by PV
4.83 tCO_2e

Excess PV yield
0 $kgCO_2e$

Photovoltaic generation reports were updated and now highlight the excess of PV generation.

Annual PV contribution vs Total energy use



Total non-electrical energy
61.8 MWh

Total electrical energy
13.6 MWh

Total PV contribution
13.6 MWh

Excess PV yield
5.04 MWh

Updated Carbon Emission Coefficient (aligned with VE 2019)

The Carbon emission coefficients now automatically update based on the geolocation from the OSM import.

If the imported location is not within one of the region with pre-set carbon emission coefficients, the UK values will be set as a default parameter.

Release 2019.1.0 – October 2019

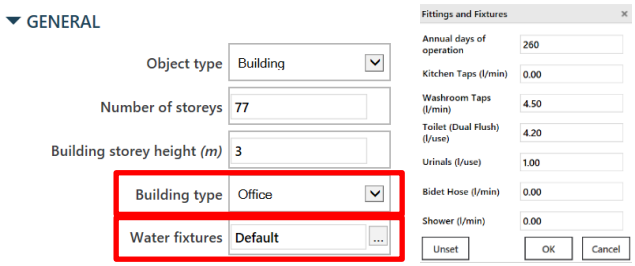
Highlights for intelligent Campus Design (iCD) Tool

Water Simulation

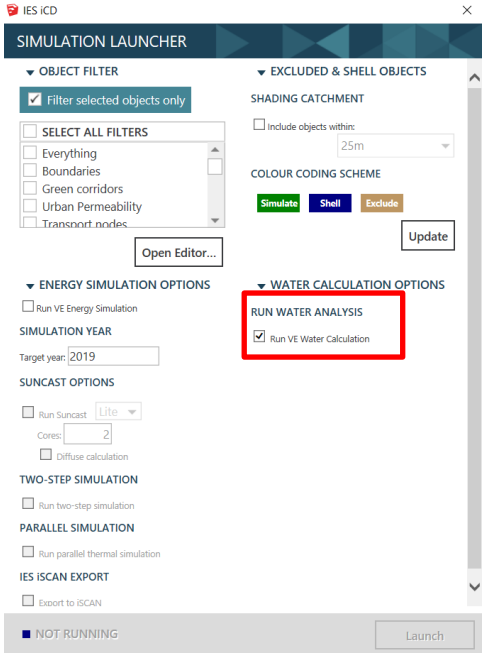
A new feature has been added to undertake water analysis. Once we run the water simulation we can view the results of the annual water consumption and breakdown, annual waste water and breakdown and the annual rain and storm-water run off (at present for roofs and hardscape objects only).

To do this we have to first assign flow and flush rate data to the building. Click on the building and open the room/building query tool. Next we set the Building Type, then click on “not set” in the water fixture text box. The word default will appear. The default values that the tool automatically populates is based on the selected building type.

To view the data click on the three dot  next to the text, a pop up window opens. In here you can view the pre-populated data or edit it based on project specific data.



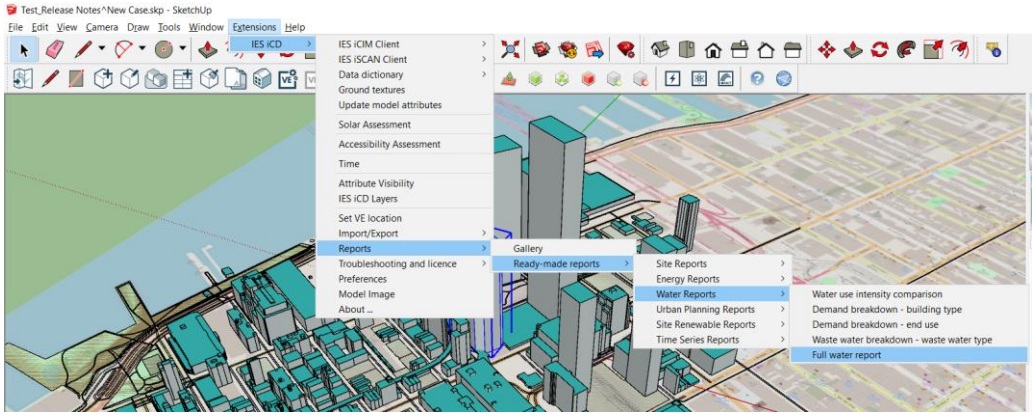
Once you have added the data to all the buildings, open the simulation dialog to analyse water consumption. Select the objects in the ‘Object filter’, select ***Run VE Water Calculation.*** Update and click on Launch to start the simulation.



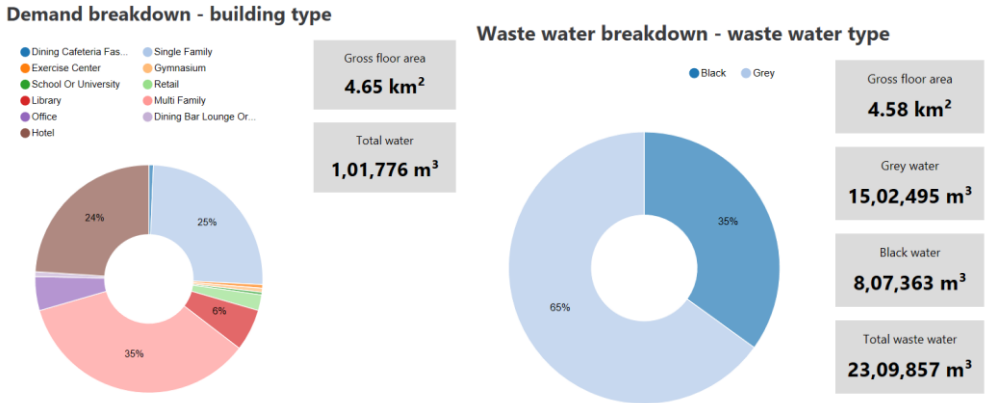
You can view the individual building results of the water simulation as well as annual water run off in the room/building query tool.

SIMULATION RESULTS	
Sim water bidet spray (l/m^2 per year)	0
Sim water kitchen tap use (l/m^2 per year)	0
Sim water shower use (l/m^2 per year)	0
Sim water toilet use (l/m^2 per year)	78.22
Sim water total (l/m^2 per year)	150.54
Sim water urinal use (l/m^2 per year)	9.36
Sim water washroom tap use (l/m^2 per year)	62.97
Sim auxiliary energy (kWh/m^2 per year)	(not set)
Sim cooling energy (kWh/m^2 per year)	(not set)
Sim dhw energy (kWh/m^2 per year)	(not set)
Sim equipment energy (kWh/m^2 per year)	(not set)
Sim heating energy (kWh/m^2 per year)	(not set)
Sim lighting energy (kWh/m^2 per year)	(not set)
Sim total energy (kWh/m^2 per year)	(not set)
Sim annual water runoff (l/m^2 per year)	422.56

We can also view the report via the gallery or the ready-made reports. If you view the project level readymade reports, similar to the approach for energy use, they will show combined results for all of the buildings that have been simulated; as this is a 'model' level report rather than a building level one.



Based on the size and type of building, this analysis provides us with an overview of the overall breakdown of water use within different types of buildings and identify areas where water efficiency measures can be targeted. You can also view the waste water breakdown, this can help in planning for a waste water recycling plant around the site.



Export Data to iSCAN

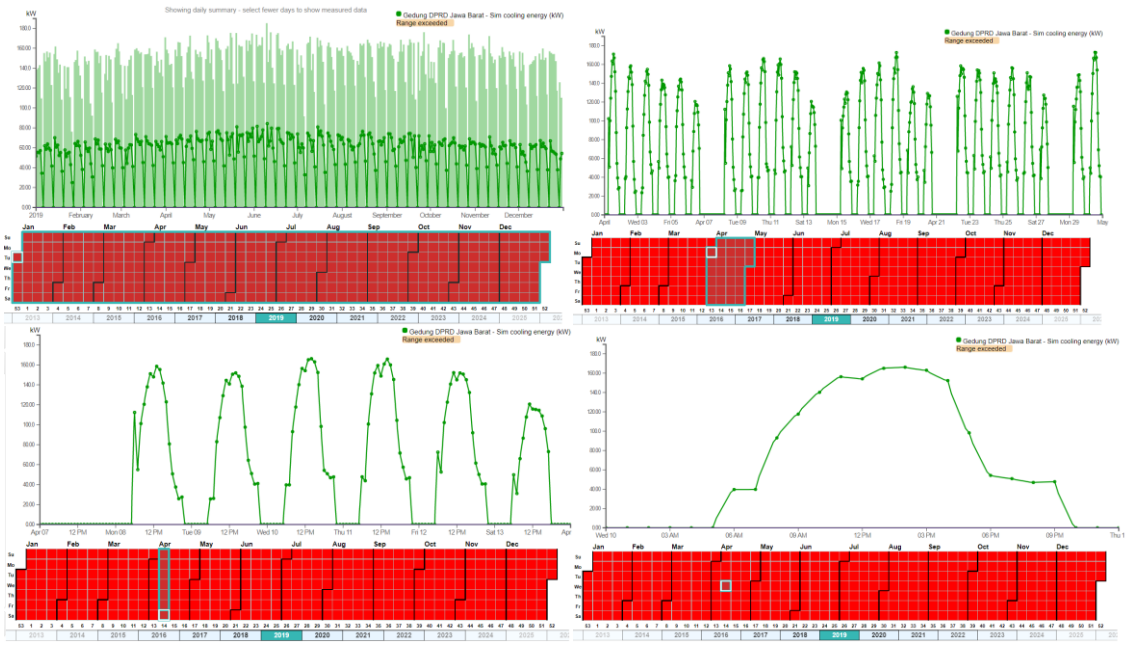
In the simulation launcher tool, a new feature, Export to SCAN has been added. The target year cannot be edited from this feature, it needs to be set in the Time tool.

Before this tool can be used to export a model, the project needs to be first set up in SCAN with associated tag vocalbulary to match the building names. This way all the simulated channels generated will automatically be mapped onto the correct buildings within the iSCAN project.

After checking the Export to SCAN box, click update and then launch.

The export process to SCAN has been revised as follows:

- All channels now include the relevant building names to make it easier to map in iVN
- All channels are in on iSCAN 'Building' and so can be compared to each other in terms of performance
- The iSCAN 'building' name will be the same as the iCD Model for ease of tracking
- Channel data exported to iSCAN can be updated multiple times within 48 hours (previously gave an error)

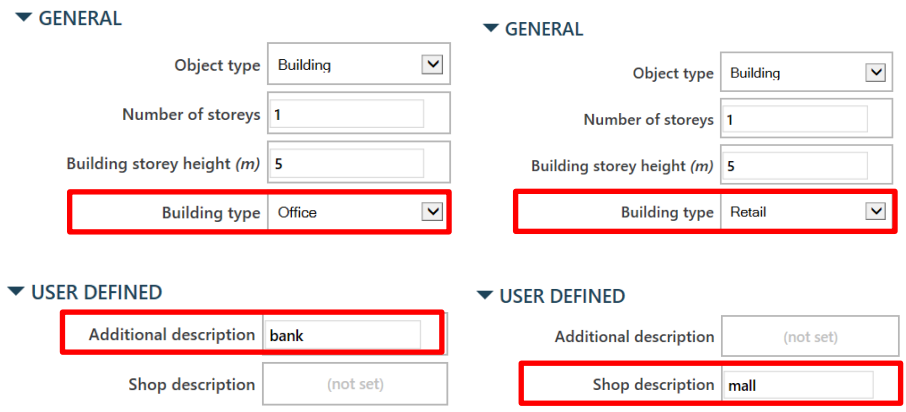


Better recognition of building types from OSM Import

One new feature that has been added to OSM import is the ability of the tool to be able to automatically populate the *Building Type* attribute based on the available information in OSM.

At the time of the import, if data is available it is added to two custom attributes called *shop description* and *additional information*, based on which the building type attribute is categorised.

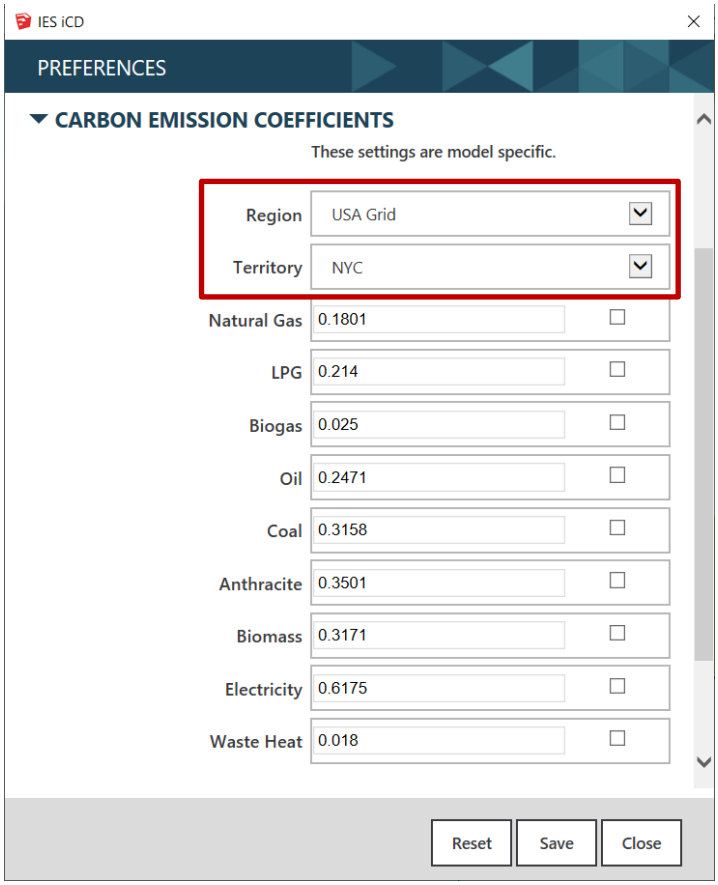
So for example, a bank has been categorised as an *office* while a mall has been categorised as a *retail* building.

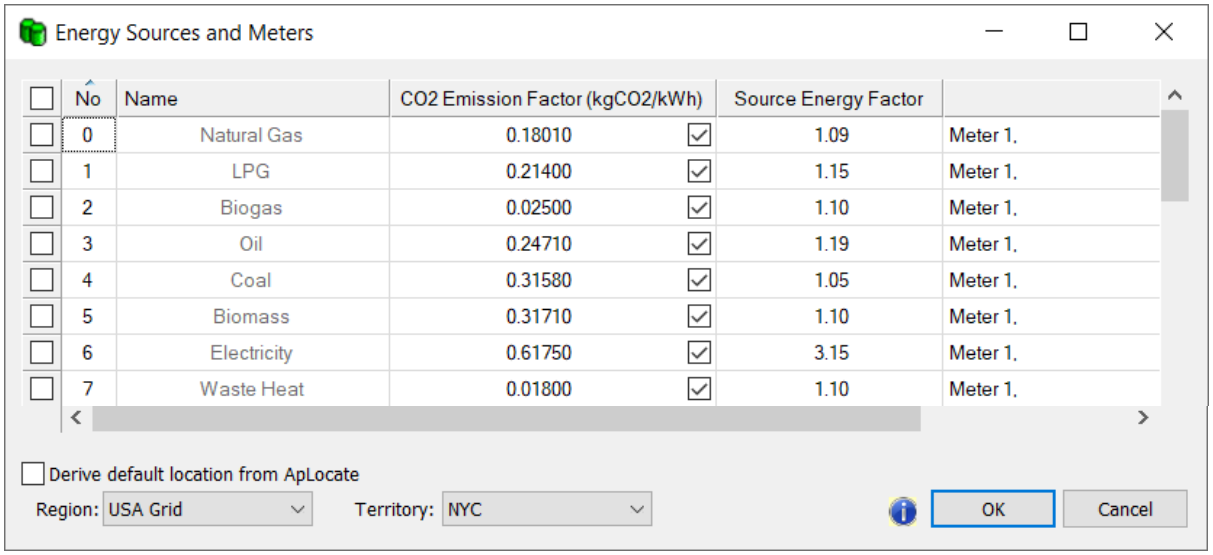


Updated Carbon Emissions Coefficient (aligned with VE 2019)

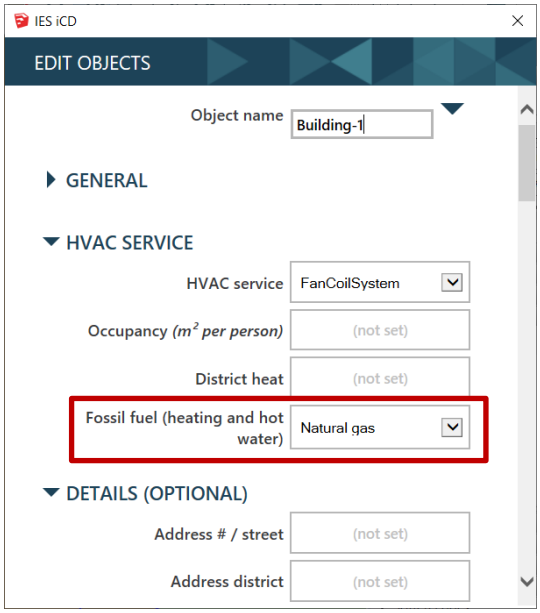
In the preferences panel, end users can now see an additional setting for carbon emission coefficients for a variety of fuels based on region and territory, similar to the energy / carbon meters in the VE. These factors are based on location and default data is available only for locations in US, UK and Australia, in line with information in the VE.

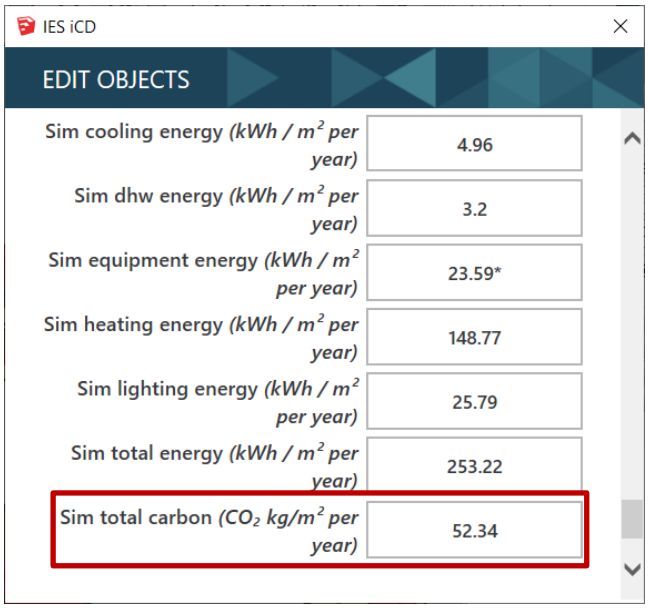
If end users do not specify a location, it defaults to the UK. These values are references, and if end users have more relevant or specific emissions coefficients available, the values in the iCD are editable and highlight when values are changed from the default. The images below show the implementation in the iCD and the associated version in the VE.





In addition to default electrical uses (cooling, lighting, equipment, auxiliary energy use), these emissions coefficients also include various fuels that can be specified for heating / hot water in individual buildings as shown in the image on the left.
The overall CO_2 emissions in kg/m^2 is calculated per building post simulation based on the total emissions for electricity, heating and hot water end uses.



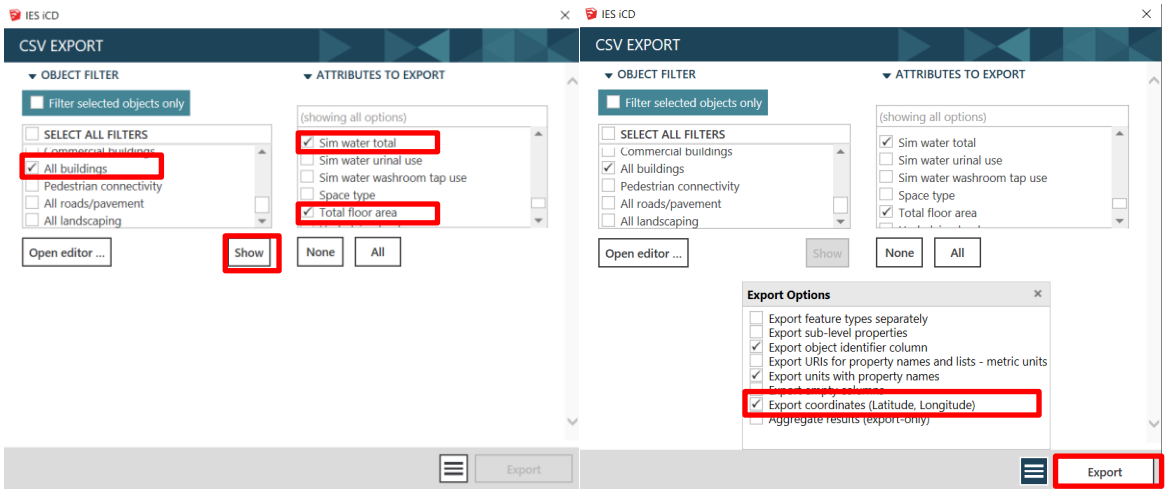


CSV export for iPIM

A new feature that has been added to directly create a CSV for importing data to iPIM.

This can be accessed via *Extensions -> IES iCD -> Import/Export -> Export CSV.*

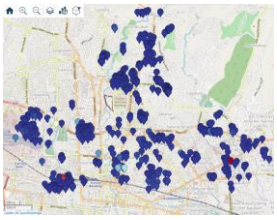
To be able to use this feature you need to select the applicable options from the object filter and select the attributes that need to be exported to iPIM. Next click on Show, the buildings whose data is to be imported will be highlighted in Green. Next click on Export options and check the box against Export coordinates (Latitude, Longitude). Finally click Export to create a CSV.



You can now use this CSV to create an iPIM project.

Note the columns description in the CSV needs to be tagged appropriately prior to creating the iPIM project.

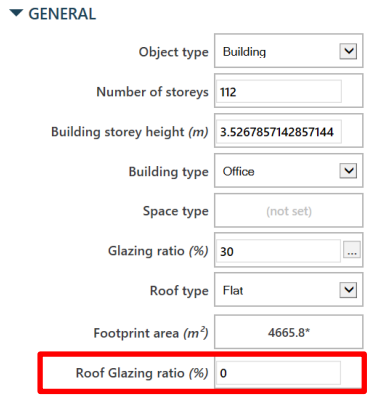
	A	B	C	D	E	F	G
1	Total floor area (m2)	Footprint area (m2)	Name<CATEGORY>	Building type<CATEGORY>	Number of storeys	Latitude<LAT>	Longitude<LONG>
2	525.7281029	525.7281		Single Family	1	-6.896020122	107.5890953
3	348.9441365	348.94415		Single Family	1	-6.895900744	107.5889151
4	116.8516195	116.85162		Single Family	1	-6.896140479	107.5892004
5	143.9621426	143.96215		Single Family	1	-6.896125247	107.5890638
6	977.2583315	977.25833	Hotel Nyland	Single Family	1	-6.89517382	107.587169
7	96.96678979	96.96679		Single Family	1	-6.896156987	107.5893246
8	419.4081745	419.40817		Single Family	1	-6.895711721	107.5882007
9	674.3043617	674.30436		Single Family	1	-6.896110507	107.5886361
10	779.4392494	779.43928		Single Family	1	-6.894452734	107.5865266



Addition of Roof-lights/Sky Lights

It is now possible to add roof-lights or sky lights to a building in iCD. Similar to the glazing ratio attribute for windows here too you will need to enter the percentage of roof glazing.

Note at present, this is only applicable for flat roofs, however this feature is being revised to include all roof types in future releases.

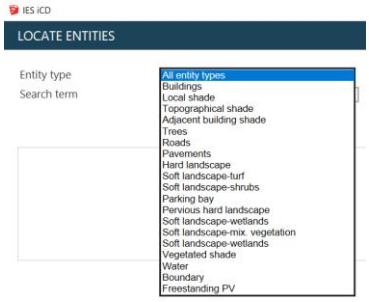


In case you are not able to view this attribute, go to *Extensions -> IES iCD-> Attribute Visibility* and make the attribute visible.

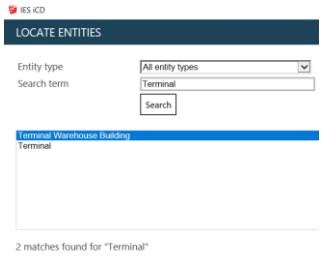
Locate Entities

In the toolbar, this feature has been added to search objects in the model based on the “Object Name”.

When you click on the icon, a new window opens, in the Entity Type drop down menu you can select the object type or leave it as the default search option of “All entity types”.



Next in the search term add key search words for an object. All the objects with the key work will appear in the window below, click on the name to zoom to the object.



Release – December 2018

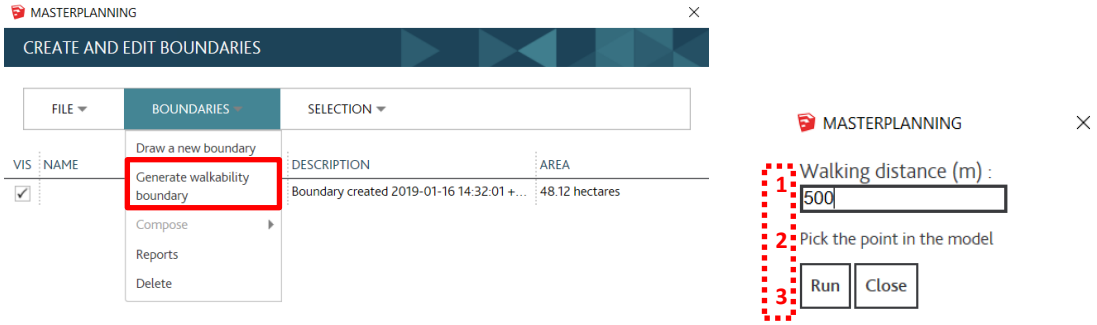
Highlights

Walkability

A new feature has been added to undertake coverage analysis for walkability, bike-ability and other types of road and pedestrian access. It defines a free flowing boundary for realistic walkable access to a service along a road/pathway/pavement.

It can be accessed via the boundary tool. Important to note that roads need to be imported for this feature to work.

In the boundaries tool, when you select generate a walkability boundary, a new window opens. It is here that you need to first specify the walking distance, then select a point at any desired location on the model and run the tool.



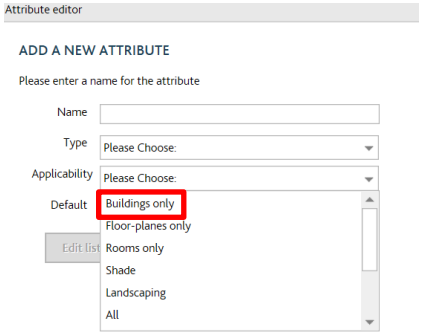
The image below shows a potential end use of this type of analysis; a walkability study of the London Tube stations indicating that some locations are not adequately serviced by the tube network. Only the areas highlighted in orange (walkability boundaries) have walkable access to at least one station in London Tube network.

Accessibility

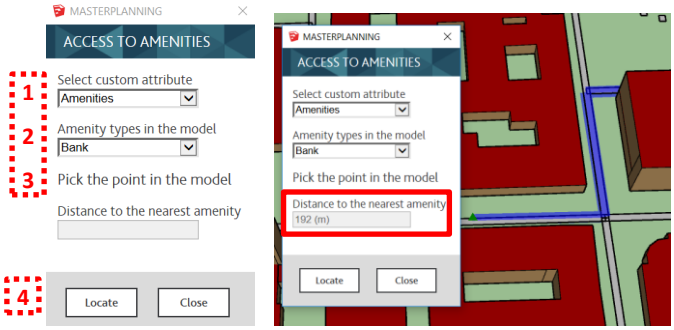
The Walkability and Accessibility tool are related and utilise the same road network. Where Walkability gives a service coverage analysis, Accessibility allows end users to measure distances to specific amenities/services.

Similar to the walkability tool, roads need to be imported for this feature to work. This can be accessed via *Tools -> IES Masterplanning -> Accessibility Assessment.*

To use this feature, create a custom attribute of the amenities and assign the same to buildings in the model. Note, at present custom attributes assigned only to buildings can be analysed by this feature. The feature is under development and will represent other elements in future releases.



Open the Accessibility Assessment dialogue box and pick the custom building attribute (will need to do this in case you have created more than one type of custom building attribute) and the amenity type. Now pick a point on the model (a green arrow will indicate the selected point) and click locate. It will highlight a path (in blue) and give the distance from the selected point to the amenity.

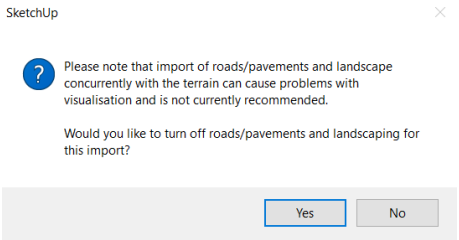


Terrain and Map Tiles from OpenStreetMap

iCD now has the option to import the terrain and map tiles (ground texture) directly from OpenStreetMap.

Currently, the terrain feature works best for buildings. As a result, it is recommended that you exclude roads, pavements and landscaping from the OSM import as these features do not map well over the terrain.

In case these options are selected together, a message will appears prior to proceeding with the import. Select “yes” to import.



Note that while it is recommended not to import them together, it can still be done by selecting the “No” option above. In this case, it is recommended that you use the roads/pavements/landscaping

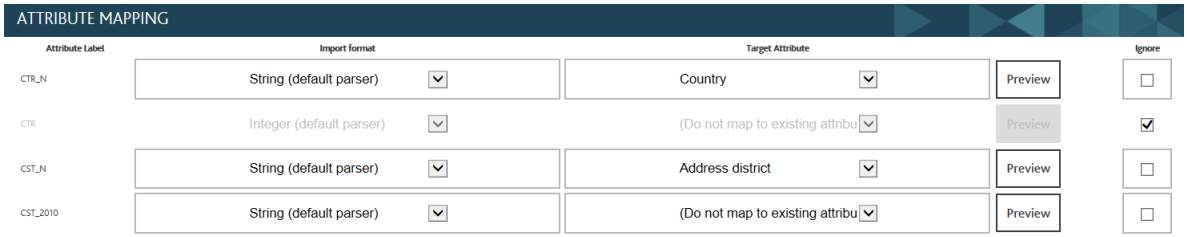
and terrain layers independently for a better visual and work experience. You can control the visibility from the “layers” tray in SketchUp.

GeoJSON Import

It is now possible to directly import GeoJSON files. This can be accessed via *Tools -> IES Masterplanning -> Import/Export -> Import GeoJSON (with attribute mapping).*

In the attribute mapping dialogue box, you can customise the target attribute prior to importing in the following ways:

- The user can chose to ignore the attribute, in this case the attributes will not be imported.
- The user can leave the dialogue boxes as it is. In this case, all the attributes will appear as User Defined attributes.
- The user can also chose the Target Attribute from an attribute in the drop down list in this case it will enter this data in the chosen existing attribute.

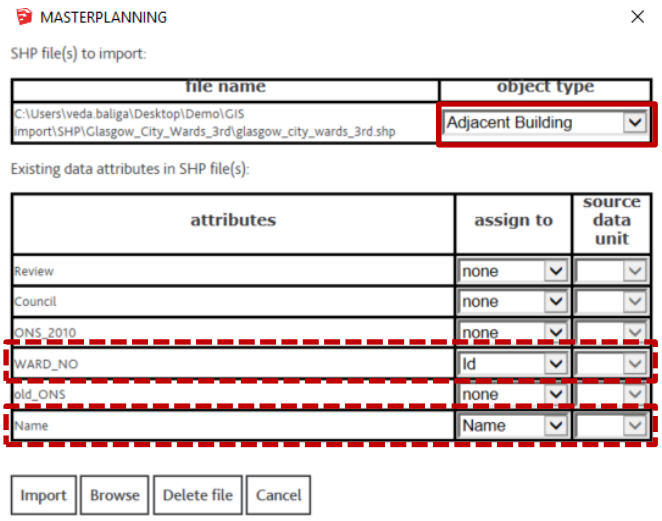


Once the customisation is complete, click on Import.

SHP Import

Shape files can now be directly imported. This can be accessed via *Tools -> IES Masterplanning -> Import/Export -> Import SHP.*

The attributes need to be manually mapped, as shown in the image below rather than automatically. After this is done you click on import. Please note that currently, objects can only be imported as adjacent buildings for now. They can be edited post import to represent other object types (buildings, boundaries etc.) the ability to map SHP objects to any object type in the iCD will be supported in future versions of the tool.



Time Dimension

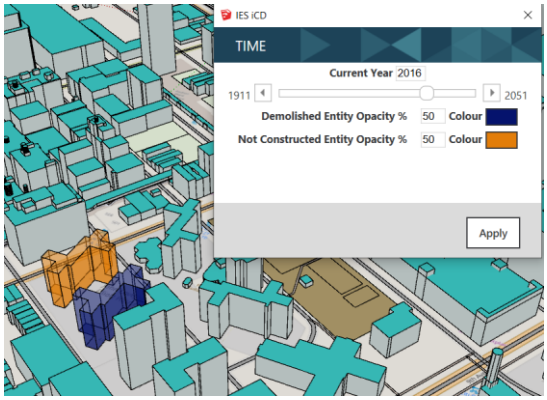
A new feature has been added which has the ability to add time as a dimension. Currently allows end users to track and visualise construction and demolition of buildings and/or entire phases of development. Future versions will include energy results saved separately for each year and the ability to visualise all aspects of the development over time.

This can be accessed via *Tools -> IES Masterplanning -> Time*.

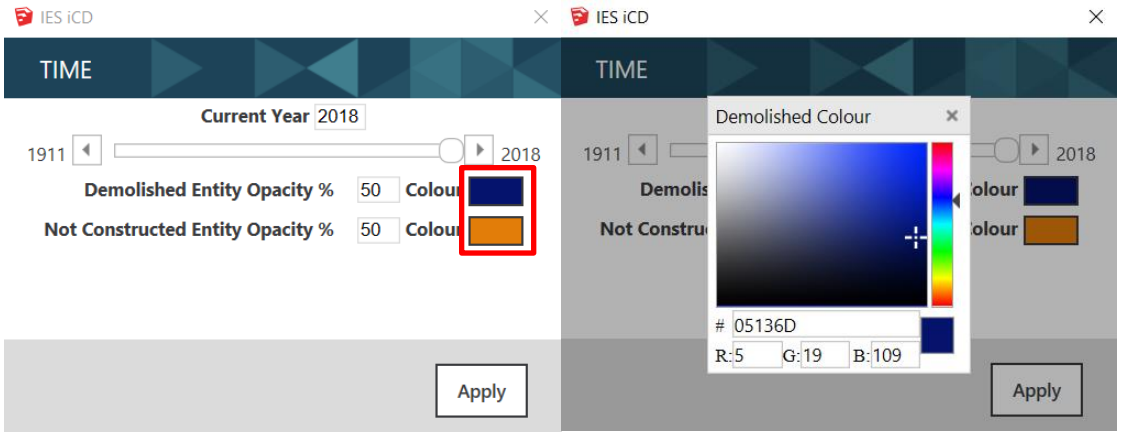
To be able to use this feature, first data needs to be entered in the Date Constructed and Date Demolished attributes. The demolished buildings and not constructed buildings will now appear in different layers and can be made visible/invisible as per the end user's requirement.

Once the attribute data is entered, open the time tool and set the transparency for the building types (range 0 to 225). The current year can be set in the tool. This is especially important for using the next new feature which is exporting data to SCAN.

To view the time feature, move the cursor along the year bar. Note, at present the results are not stored.



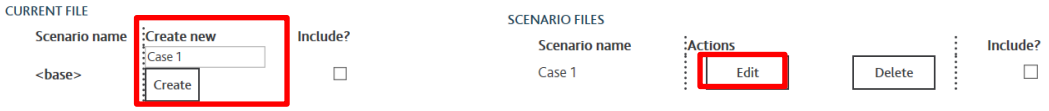
It is also possible to view the Demolished Entities and the Not Constructed Entities in different colours. You can also click on the colour to change it.



Scenarios

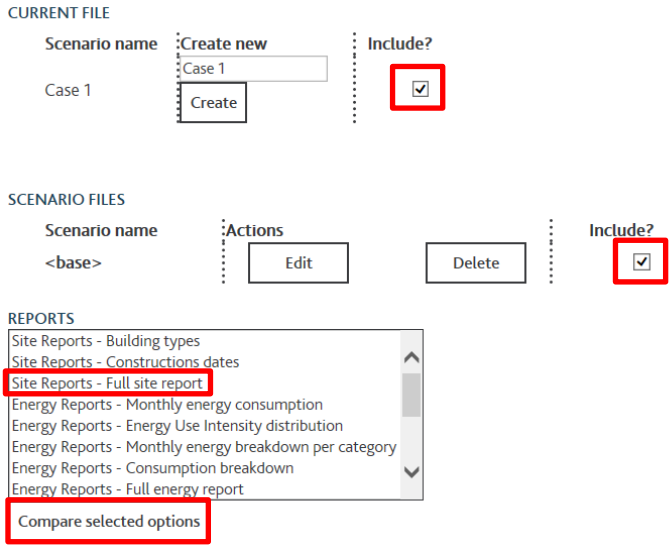
A new and interesting feature that has been introduced is comparison of multiple options. Once the model is created, click on the button highlighted below.

This will open up the current/base option. You can create a new option by entering a name and clicking create. The option created, can now be modified by clicking on the Edit button. A new model will open with the same file name and the suffix of the name given to the option. All of the attributes can be edited and saved in this new model. The new file can be opened and edited as an independent file as well.



To compare both the options, select include, then pick the desired report from the drop down menu and click on compare reports. The reports will appear below each other.

Note that each of the options can be created and edited in the same way as a normal model / option, however this feature allows us to compare multiple options in a more coherent way.



Note, for the feature to work properly, it is recommended that all options created be located in the same folder. The feature is under development and will be refined further in future releases.

You can also add model images against each of the scenarios that you have created.

To do this go to *Extensions -> IES iCD -> Model Image*. Here you can either select a snapshot, in which case the current window will be added as an image or you could import an image by browsing through your computer.

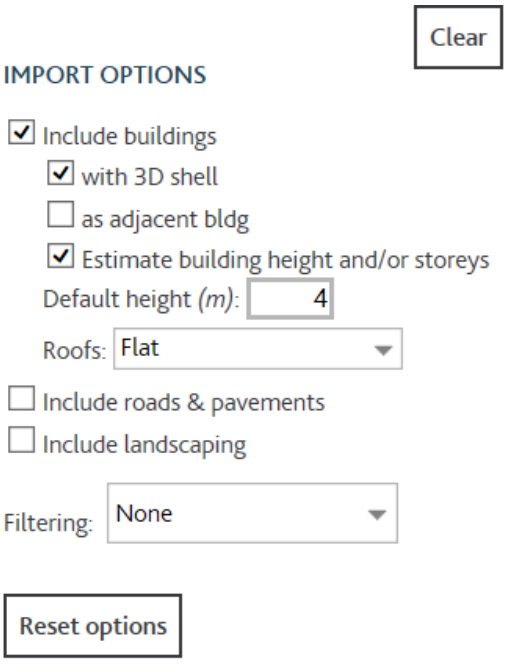
Release – June 2018

Highlights

Inclusion of Terrain

A new feature has been added to show underlying terrain for models imported via OpenStreetMap. If you attempt to use this feature in a new, blank SketchUp file, it will prompt you to save the file first. Once the file is saved use the OSM import button highlighted below

Select the location and radius which you intend to import. Currently, the terrain feature works best for buildings. As a results, it is recommended that you exclude roads, pavements and landscaping from the OSM import. The feature is being revised to appropriately represent these elements in future releases.



Initially, you will see all buildings on the ground plane as with previous releases. If you click on the terrain button highlighted below, the program will prompt you to confirm that you want to import terrain into the model.

When you select “Yes”, it will generate a dialog box outlining details of the map tiles to be imported. If you accept the default (recommended) settings, it will inform you of how many tiles are required to be imported ask if you want to continue. Click “Yes” and once the download is complete, click zoom extents in SketchUp to view the model with Terrain. Depending on the altitude of the location in

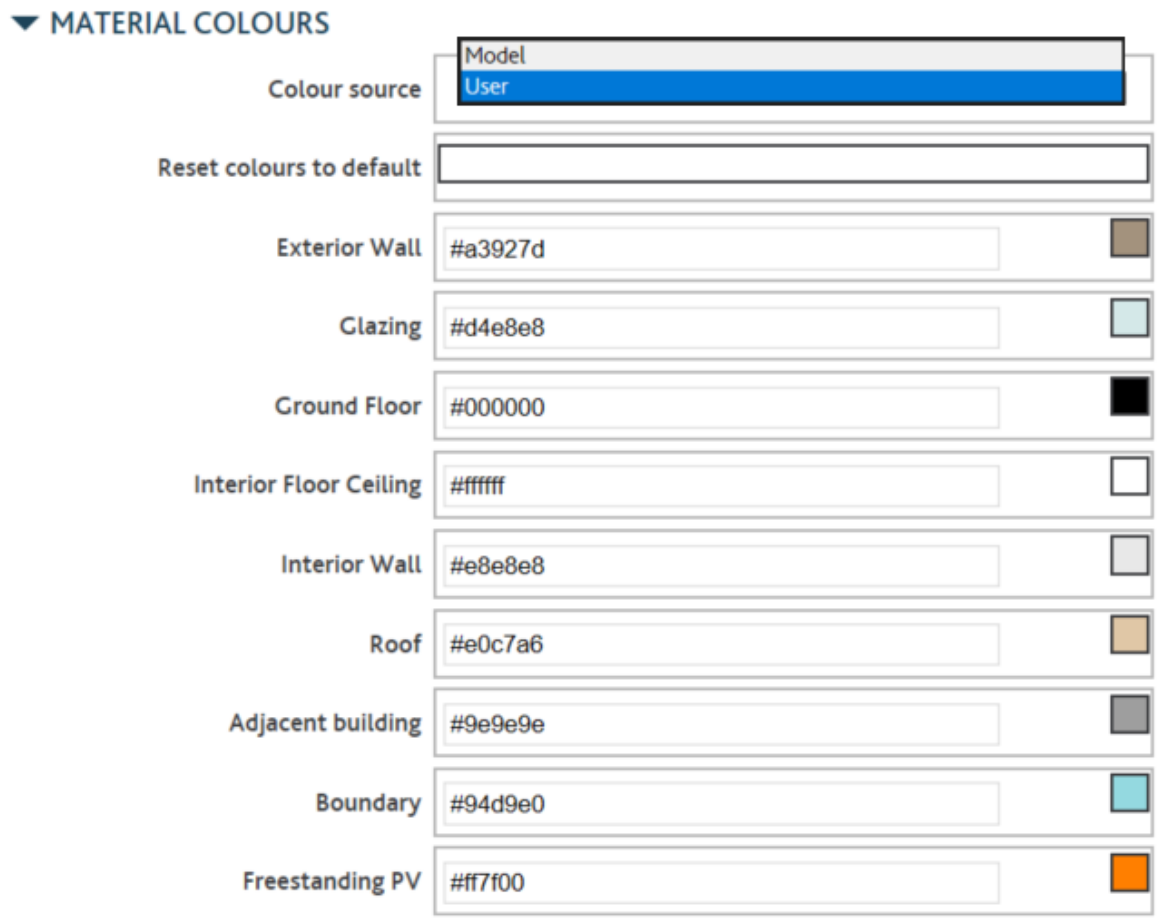
relation to the local datum, you may notice the terrain 'floating' above the ground plane. If you click on the terrain button again, the model and all buildings involved go back to the ground plane.

User Defined Colours

This allows users to select colours by feature type / object type. This can be accessed via *Tools -> IES Masterplanning -> Preferences*. The Material colours section will have a list of objects / features and the colours associated with them. You can change it as desired.

There are two sets of Materials Colour Sources, "User" and "Model". All colour palettes associated with the "User" colour source with used for every new model created / opened by that end user.

The "Model" colour source applies to a given model only. It will not be implemented in other models by default.

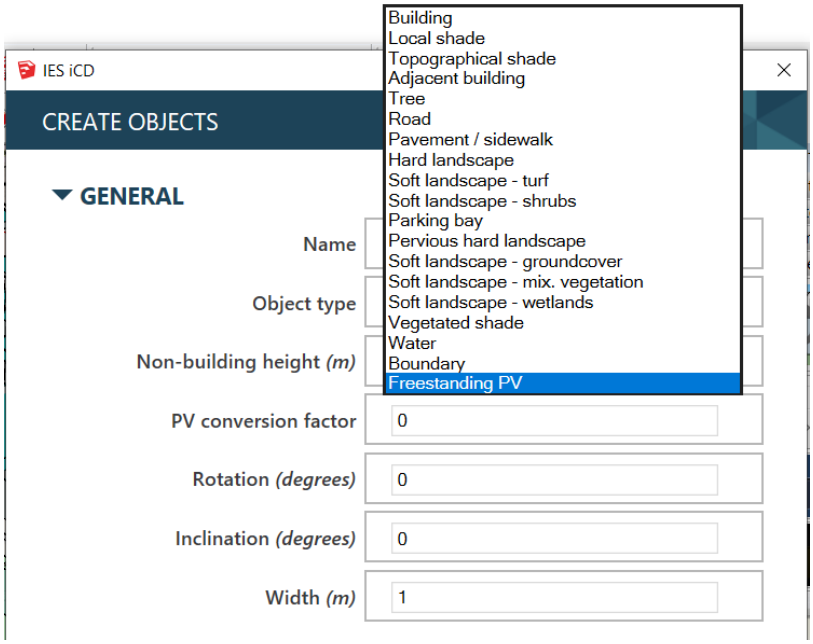


Inclusion of PV's as objects

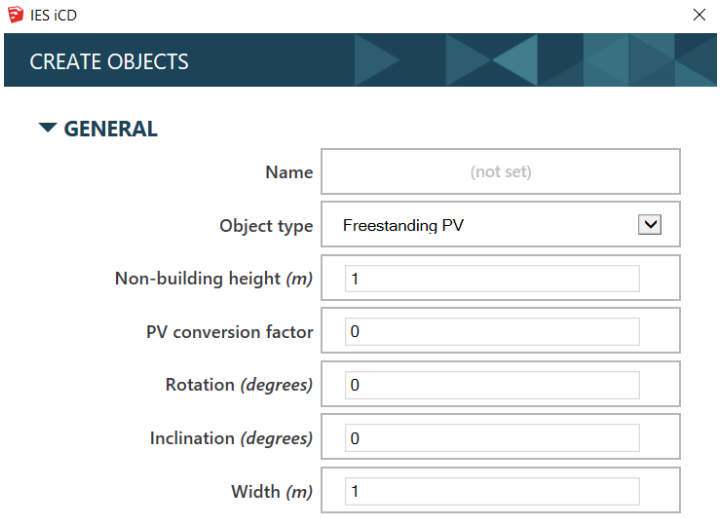
PV's can now be added to an iCD model using the create dialog box and selecting freestanding PV.

Step-1

Step-2



Step-3: you can specify the size of the panels (height, width), the rotation (orientation) and inclination. A default rotation of zero equates to facing north, 90 -> east, 180 -> south, 270 -> west.



A brief description of each of the items is below to help you with the data entry:

Non-building height in meters: This is the size of the PV panel. Let's say 1 meters.

PV conversion factor: Efficiency is the comparison of energy output to energy input of a given system. For solar photovoltaic (PV) cells, this means the ratio of useful electrical energy they produce to the amount of solar energy incident on the cell under standardized testing conditions. Most commercial cells are below 30%. For this case let's consider that the efficiency is 15% or 0.15.

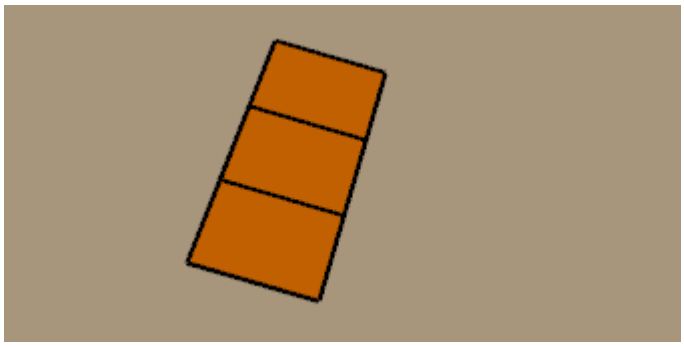
Rotation: Solar panels work best when they face directly into the sun. So for best results, your solar panels should face toward the equator. If you live in the Northern Hemisphere, face them south. If you live in the Southern Hemisphere, face them north. In our case here it will be 180 degrees so that the panels faces south.

Inclination: The tilt angle of the photovoltaic (PV) array is the key to an optimum energy yield. The optimum tilt angle is calculated by adding 15 degrees to your latitude during winter, and subtracting 15 degrees from your latitude during summer. For instance, for this model of Glasgow the latitude is 55° and since it is summer the optimum tilt angle for your solar panels will be 55 - 15 = 40°.

Width in meters: Let's assume the width will be 1.5 meters.

You will need to click at any point on the model to place these PV panels you can add as many panels as required for your project.

These panels will now be included in any solar analysis you run via *Tools -> IES Masterplanning -> Solar Assessment*

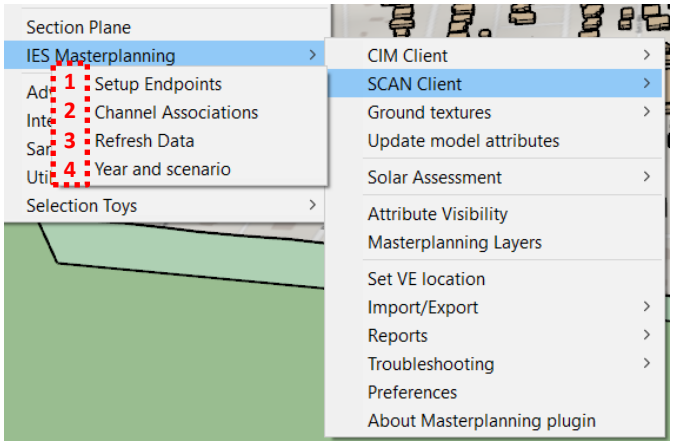


You can then view the report from *Extension -> IES iCD -> Reports -> Ready-made reports ->Site Renewable Reports*

In the full site renewable report, we can view, the monthly PV radiation, the monthly PV electricity yield, the annual PV yield versus electricity and gas loads and the annual PV yield versus total energy loads.

Import Data from iSCAN

Building objects within iCD can now be linked to detailed simulated and measured time-series data from SCAN projects via *Tools -> IES Masterplanning -> SCAN Client* and these links can also be exported to CIM projects for visualisation.



Please get in touch with IES support for more details.

Release – October 2017

Highlights

More data from OpenStreetMap

iCD will now import the number of storeys for buildings in OpenStreetMap when this information is available. iCD will also handle intelligently weird cases where both building height and number of storeys seem to be inconsistent.

Two-step simulation for the Virtual Environment

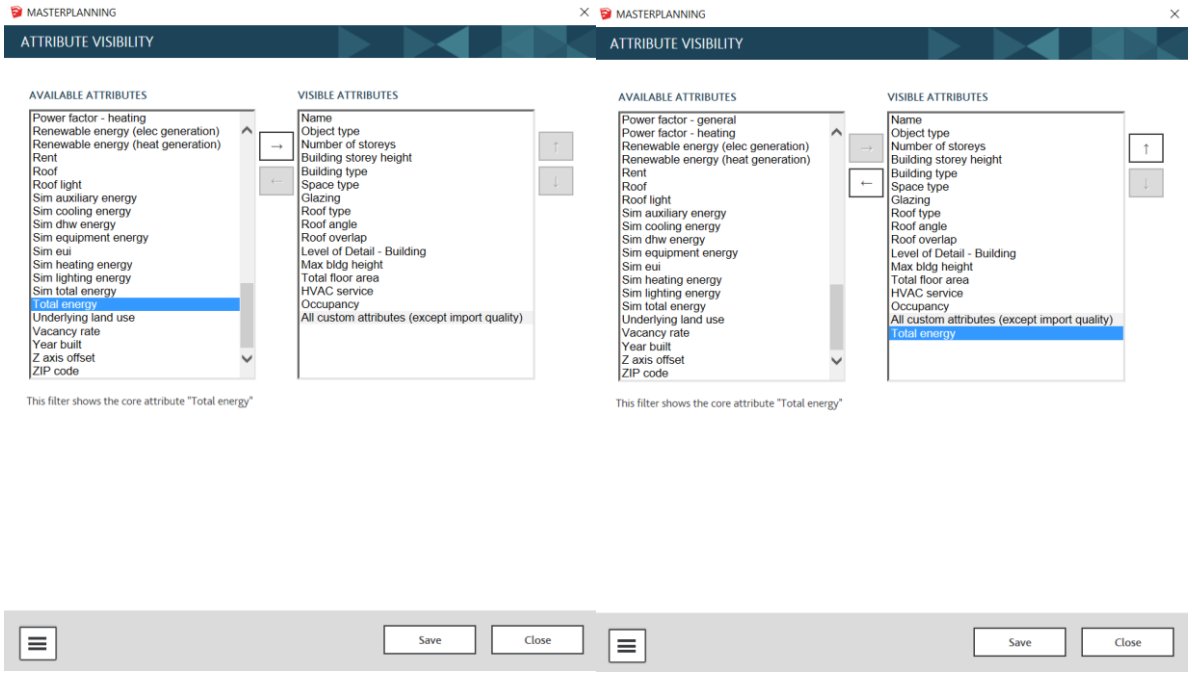
When a VE simulation is launched, the user can choose to perform a two-step simulation. In the first step, the selected buildings are exported to the Virtual Environment. At this point the user is able to open the model locally, perform any required modification and finally perform the actual simulation. This new feature allows users to personalize even more the VE simulation and use more detailed results in their iCD models.

Attribute visibility

In this release we have added a new feature called *Attribute Visibility*. *Attribute Visibility* can be accessed via *Tools -> IES Masterplanning -> Attribute* Visibility. Users can now choose the attributes that they want to be shown in every panel of the plugin. At any given point the user can add or remove attributes.

To use the feature one needs to select the attribute on the AVAILABLE ATTRIBUTES side and click on the arrow button. The attribute will now be visible on the VISIBLE ATTRIBUTES side. Click save and close.

See example below



New ground texture data source

We have now have a new ground texture data source called *Geofabrik*. This new source is much faster and can download a larger area quickly.

To enable the use of this new data source the user first needs to import the settings file.

The import has to be done via *Tools -> IES Masterplanning -> Ground Textures -> Import Settings ->* (browse and select) ***tile-services.json***.

The ground texture will now appear in *Tools -> IES Masterplanning -> Ground Textures -> Add image -> Tile service -> geofabrik*

Please get in touch with IES support for the settings file.

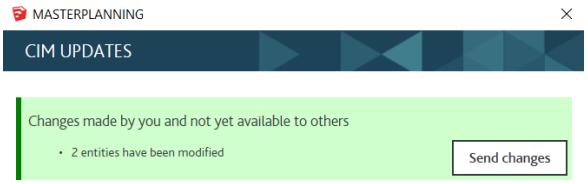
New CIM synchronization

A new *synchronization* button has been introduced to connect your iCD model to a central Community Information Model (subscription based). The new feature makes the synchronization with the central model very easy and robust.

Any changes/edit made to the iCD model is now automatically and correctly synchronized with the centralized model at the click of a button.

The list of changes is clearly listed in a pop up window so the user will always know what it is happening.

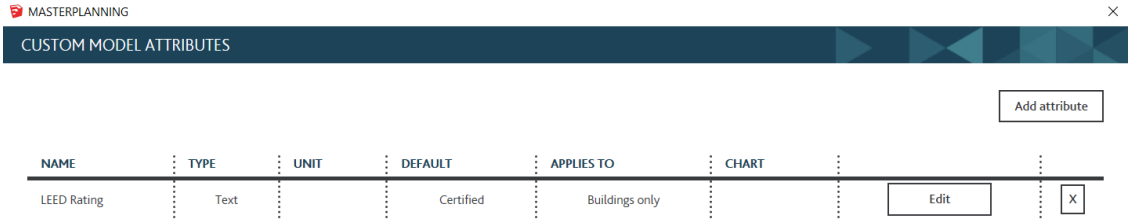
Changes from multiple users are also possible and will be automatically kept in sync with the new synchronization features



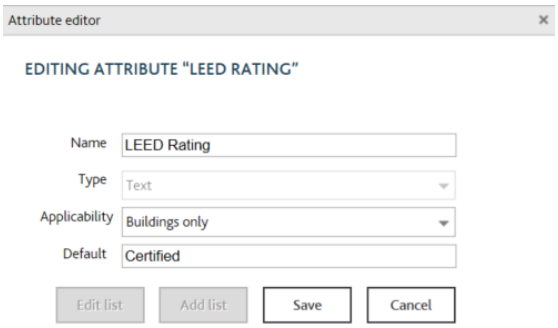
Please get in touch with IES support for more details and subscriptions.

Attribute edit

It is now possible to edit custom attributes. Click on the *Edit* button to view and edit the attribute.



To edit, simply click the edit window, the user can now edit all the data except the *type*.



Faster import

We have now enabled a faster import method. This will help the user import a larger area in a much shorter time.

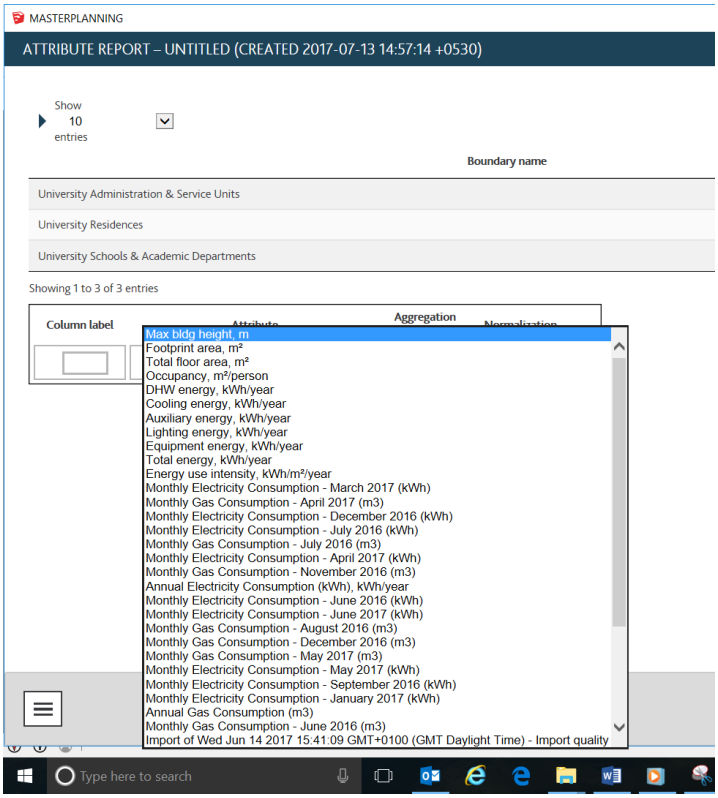
For example for the city of Glasgow, to import a radius of 2500m it would ordinarily take eight minutes. However now with the new and faster import the same radius would take only **two minutes**. The difference will be more prominent as and when the user imports larger areas.

Release – June 2017

Highlights

Simulation results in Boundaries Dynamic Report

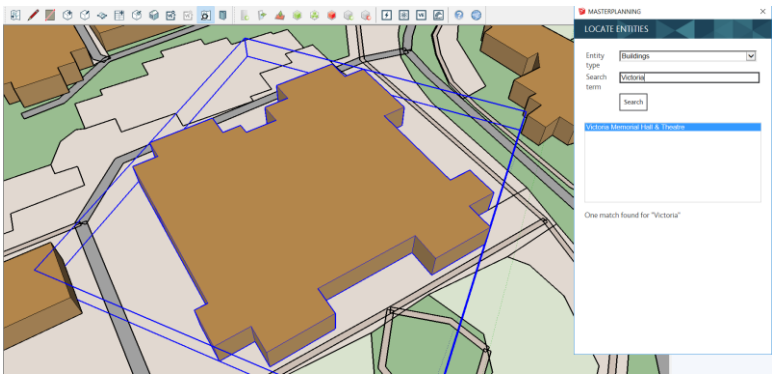
In this release we greatly expanded the list of attributes available in the Dynamic Report. This enhancement will allow users to perform even more detailed analysis of their masterplan.



Search Tab in iCD

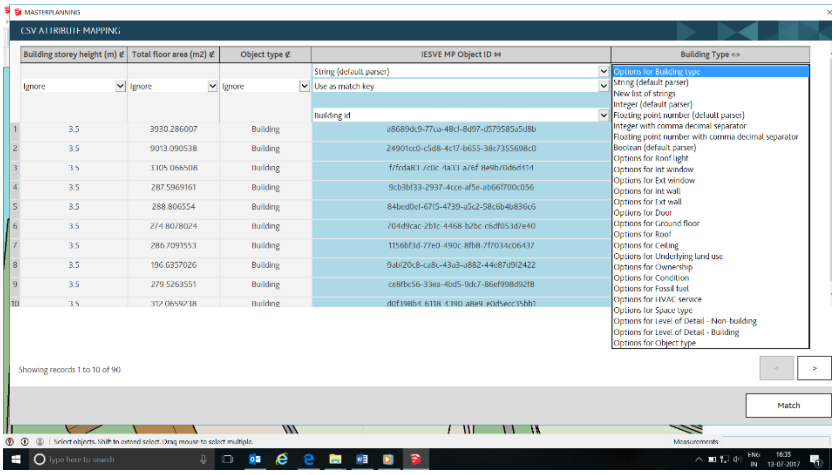
A new search tab has been introduced in the iCD tool bar.

Users can now easily search for any urban feature included in their model; iCD will automatically move the camera to the feature' location. If multiple entries are found, users can simply move between them using the arrow keys.

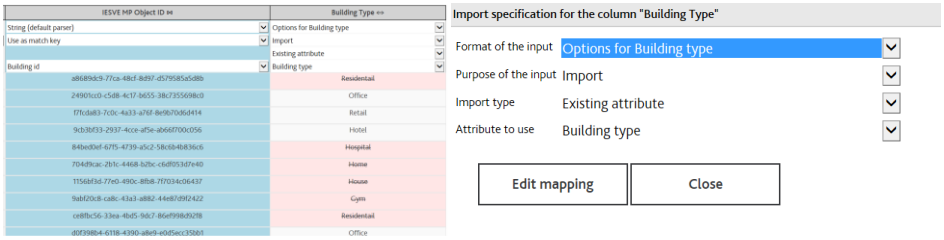


Import of lists from geoJSON and CSV

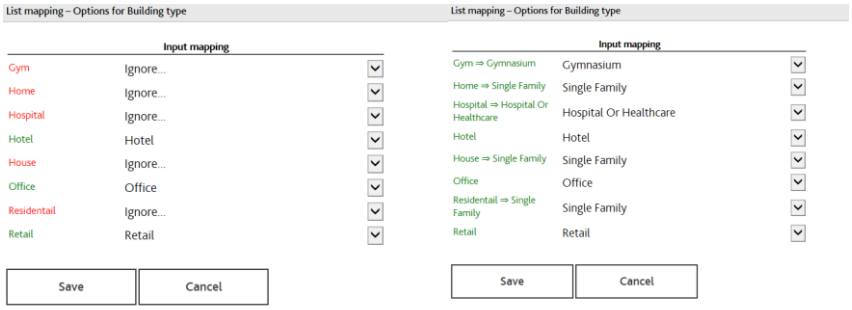
It is now possible to import lists in iCD from geoJSON and CSV files. While importing, users can choose to map to existing core lists or previously created lists.



It is also possible to edit the actual mapping and fix incorrect inputs. In this way users can easily import dirty data and iCD will take care of the correct mapping without any further user intervention.



By clicking on the attribute being imported and then on *Edit mapping*, users can edit the specific mapping that will be applied during the import. It should be noted that, by design, it is not possible to change core lists such *Building type*, *HVAC system*, etc…



Release – May 2017

Highlights

Improved User Interface

We have made some small, but important changes to the UI (fonts, spacing, headers). There is now more space available and it is possible to visualize more information even on smaller screens.

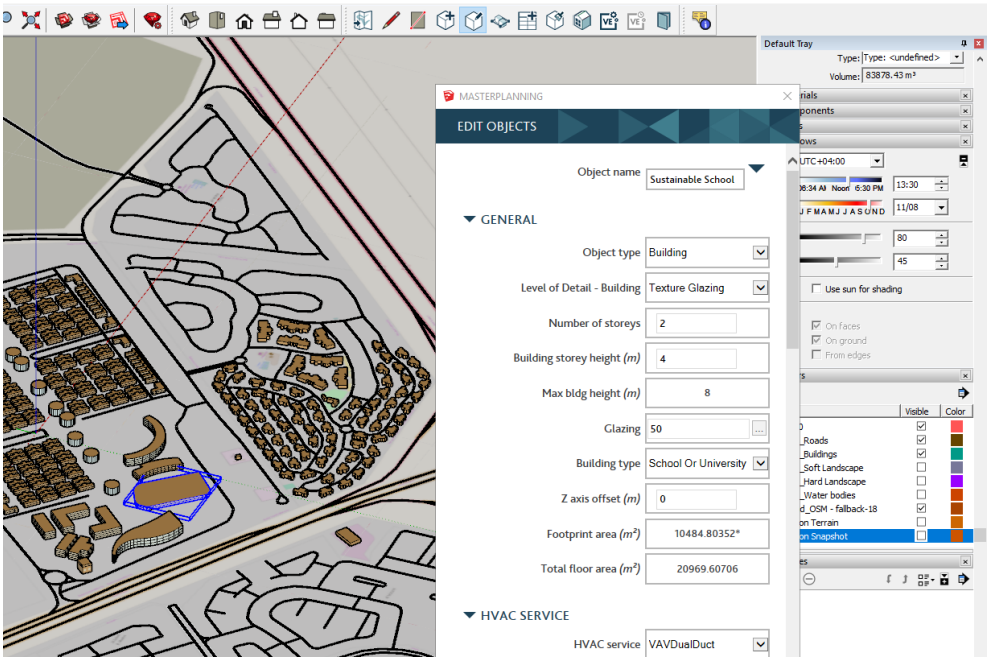


Figure 2: New iCD compact layout

New automatic reports for site and boundaries

We think our users will really enjoy this new features. Users can now generate summary site (and boundary) reports for three themes: site, energy and urban features. These reports are generated automatically and dynamically and give users aggregate site data, KPIs, useful info.

The reports can be accessed from *Tools -> IES Masterplanning -> Reports*.

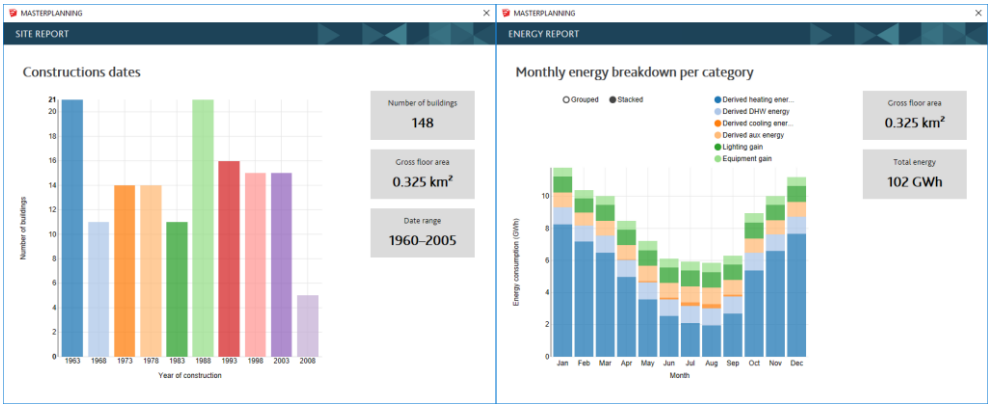


Figure 3: Site summary reports

Dynamic reports for boundaries update

All the reports can now be saved in the model as template

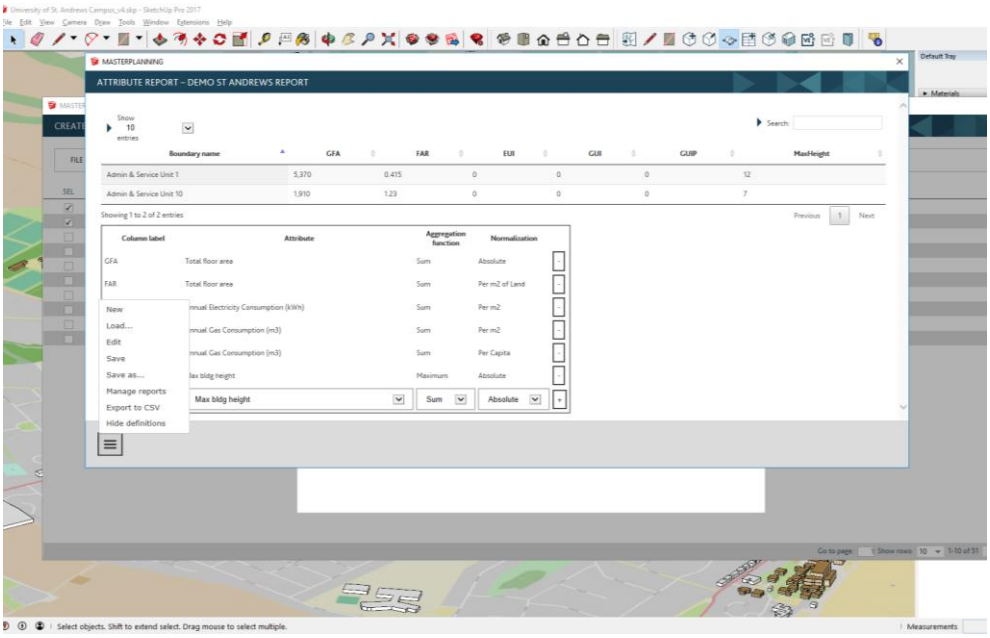


Figure 4: Dynamic boundary reports can now be saved as templates

Under the hood

- Fixed a minor bug with the iCD visualization tool not working with older graphic cards
- Minor bug fix in geoJSON and CSV import
- All windows now scale and resize as expected

Release – March 2017

Highlights

- Improvements to boundary tool
- CSV import into iCD (QGIS-like Spatial join)
- Export model and object attributes to CSV
- Peak values added to simulations results

Under the hood

- Fixed a few bugs

Release – February 2017

Highlights

- Layers management for iCD objects. It is now possible to select, deselect and hide all the urban features imported from OpenStreetMap. Layers can be managed from SketchUp or from within the iCD plugin itself.
- Improvement in geoJSON import. It is now possible to import geoJSON files with arbitrary attributes. iCD will do its best to guess the type of attribute and to clean up dirty data.
- Ground textures from OpenStreetMap can now be added to the iCD model.
- Faster Boundary tool

Under the hood

- We are working to create a seamless link between iCD and our 3D database.
- Fixed a few minor bugs

Release – January 2017

Highlights

- GeoJSON import with attributes. It is now possible to import a geoJSON file with all the associated attributes. The import tool can automatically parse the data and suggest the best type for each attribute.
- Dynamic Reports for boundaries.
- It is not possible to *unset* any attribute value.
- Much clearer distinction between building level attribute and floor level attribute

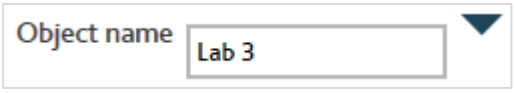
Under the hood

- We are working to create a seamless link between iCD and our 3D database.
- Fixed a few minor bugs

Release – November 2016

Highlights

- Full compatibility with SketchUp 2017
- In the *Building Query Tool*, it is now much easier to 'unset' values.
- Clearer building hierarchy in *Building Query Tool*:
    - In the *Building Query Tool*, it is not possible to assign a *space type* to a building anymore.
    - To assign a *space type*, expand the floors view for the building and assign spaces as required



- It is now much easier to deal with mixed-use buildings.
- It is now possible, if required, to specify *glazing ratio* by eight orientations.

Under the hood

- We are working to create a seamless link between iCD and our 3D database.
- Fixed a few minor bugs

Release – October 2016

Highlights

- Full restyling of the plugin interface
- It is now possible to specify Glazing Ratio by Orientation
- General improvements in user experience such as faster menus, clearer inputs, etc…

Known Issues

- With new object colouring, glazing is not displayed for buildings that use texture glazing

Release – September 2016

Highlights

- General restyling of the plugin interface
- Improvements to OSM import tool.
    - Added filter to avoid import of geometries that are too small
    - Added option to let iCD to infer the number of storeys from the building height
- Improvements to geo-location and search when importing from OSM
- Added prototype dashboard for reporting on boundary properties
- Added Import/Export of JSON format for boundaries

Known Issues

- With new object colouring, glazing is not displayed for buildings that use texture glazing

Release – July 2016

Highlights

- Significant optimisation of object colouring (used in various tools)
- Improvements to Boundary tool
- Improvements to geo-location when importing from OSM
- Added Import/Export of custom variables, boundaries and filters

Known Issues

- With new object colouring, glazing is not displayed for buildings that use texture glazing

Release – April 2016

Highlights

- Added initial Boundary Tool
- Added GeoJSON and CSV import/export
- Improved filter editor
- Added custom scale to visualisation tool
- Added utilities to combine/split objects, save object selection and override building floor area
- Added troubleshooting utilities

Known Issues

- Filters are now stored per-model rather than per-user, and cannot be imported/exported in this build

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