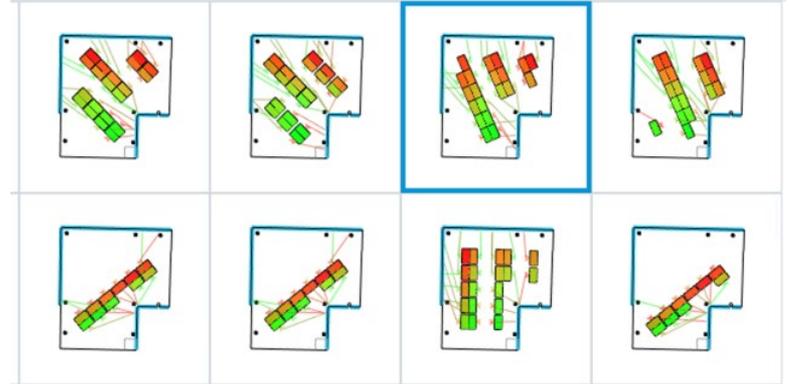


Generative Design

New in Revit 2021

“As an architect who uses Revit but is not a skilled computational designer, I want to perform generative studies so that I can evaluate better performing design alternatives.”



“It will be a huge time saver to generate and evaluate options so quickly”

AU Idea Exchange Participant

“This will automate repetitive work and create better designs”

AU Idea Exchange Participant

Benefits of Generative Design

[Video: Introduction to Generative Design](#)



Designers can generate options using the power of computation



Explore the full range of options while focusing on the higher performing solutions



Gain more insight into your designs by studying the relationships between inputs and results at scale



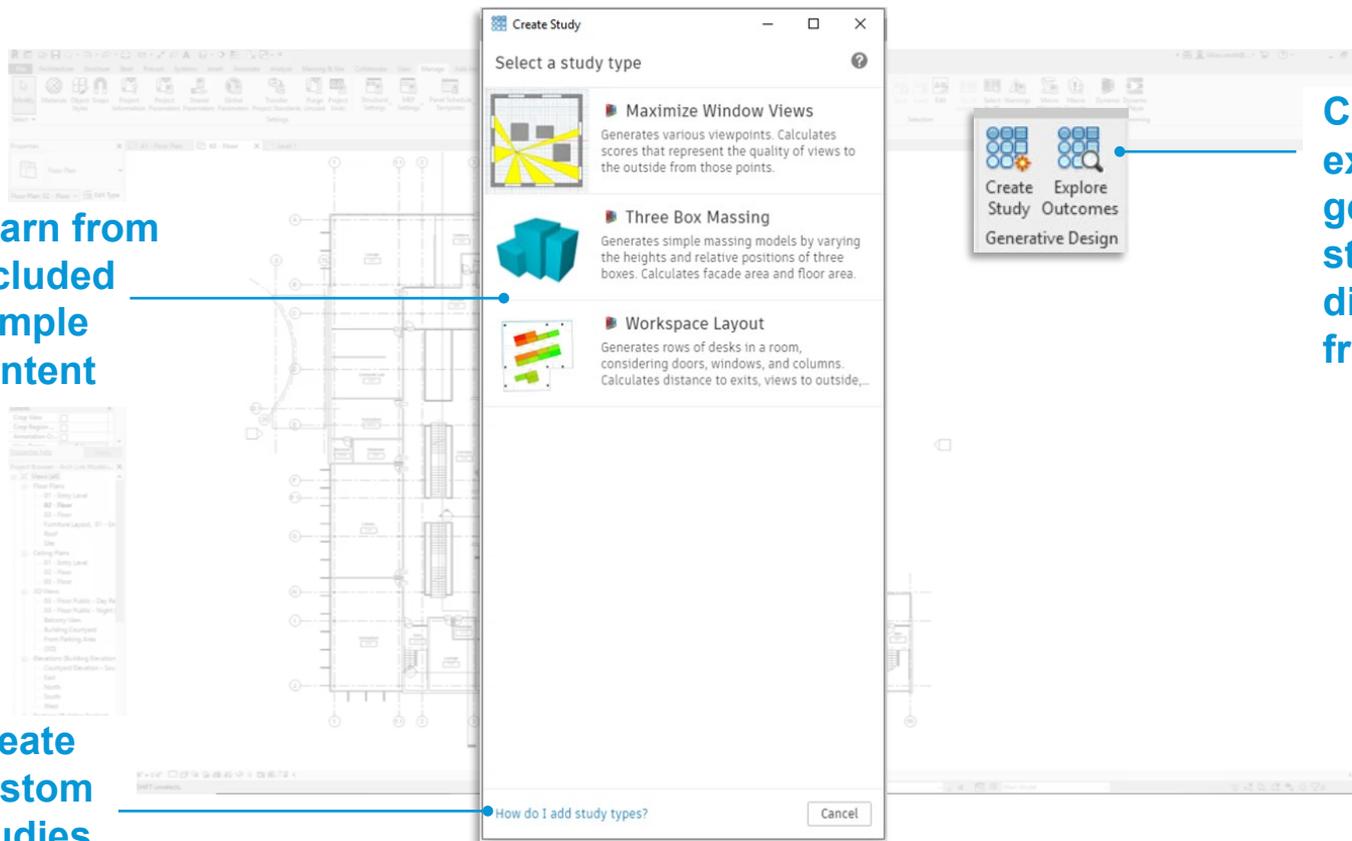
Make more informed decisions in less time by leveraging what is learned in each study

Create a Study

[Video: Create a Study](#)

Learn from included sample content

Create custom studies



Create and explore generative studies directly from Revit*

* For AEC Collection and enterprise subscribers

Define the Study

Set design goals

Workspace Layout

Study Name: Workspace Layout 001

Method: Optimize

Select in model

- Select a room (Element : 281513) Select
- Select desk family instance (Element : 281519) Select

Choose variables

- Desk row rotation -90 to 90
- Spacing between rows (ft.) 10 to 16

Set goals

- Average distance to exits Minimize Maximize
- Views to outside Minimize Maximize
- Number of desks Minimize Maximize

Set constraints

- Average distance to exits Min: Max:
- Views to outside Min: Max:
- Number of desks Min: Max:

Generation Settings

How do I define a study?

Select Revit elements to use in the study*

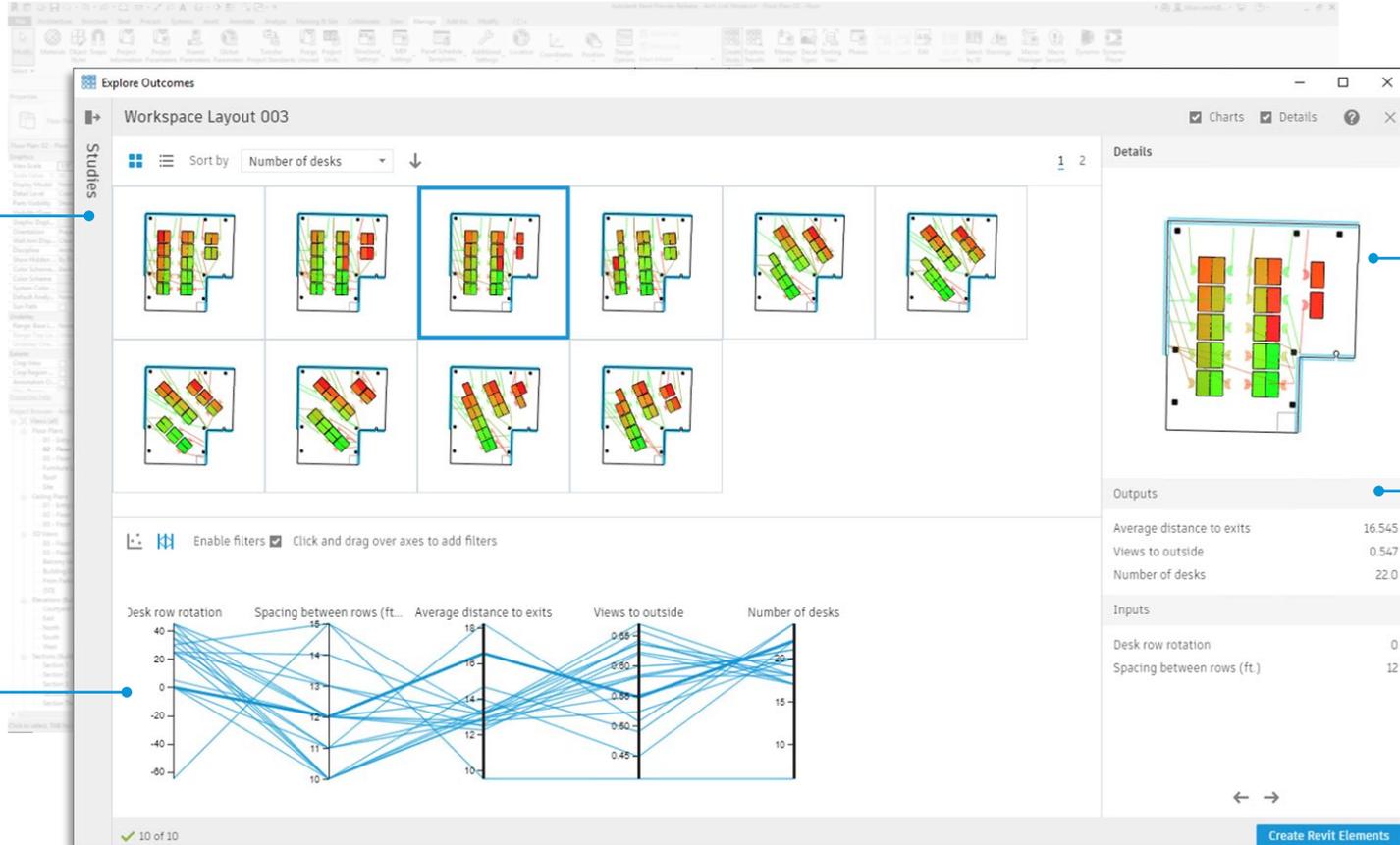
Generate design alternatives

* For AEC Collection and enterprise subscribers

Explore Outcomes

[Video: Explore Outcomes](#)

Track studies



Explore outcomes

Evaluate goals

Filter and rank results

Create Revit elements*

Create Revit Elements

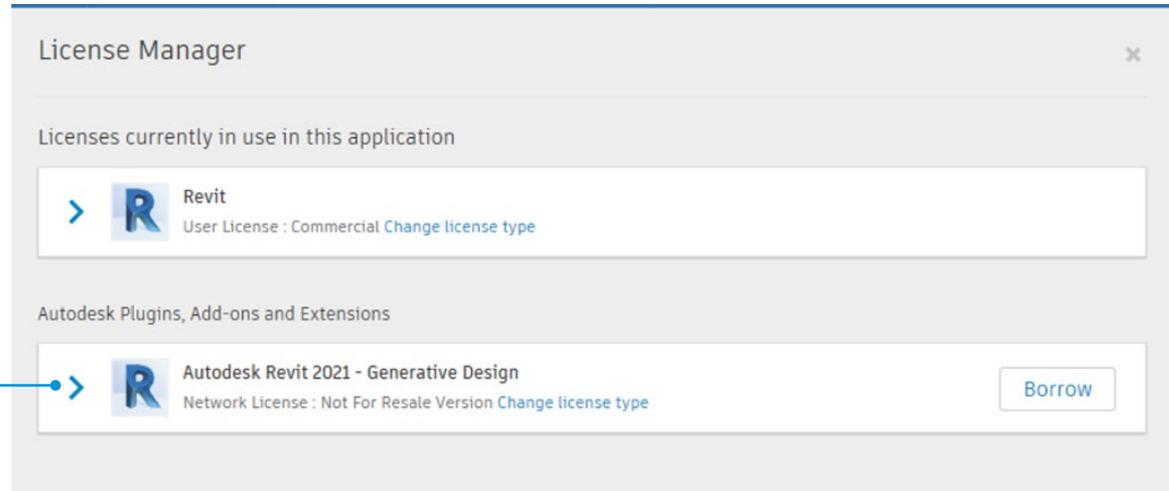
* For AEC Collection and enterprise subscribers

Installation and Licensing

Generative Design is

- automatically installed with Revit
- updated via Autodesk desktop app and Revit updates
- available in the 14 languages supported by Revit

For AEC Collection and enterprise subscribers, the Generative Design license enables direct access from Revit*



* If you are not an AEC Collection or enterprise subscriber, you can access similar functionality using Dynamo for Revit.

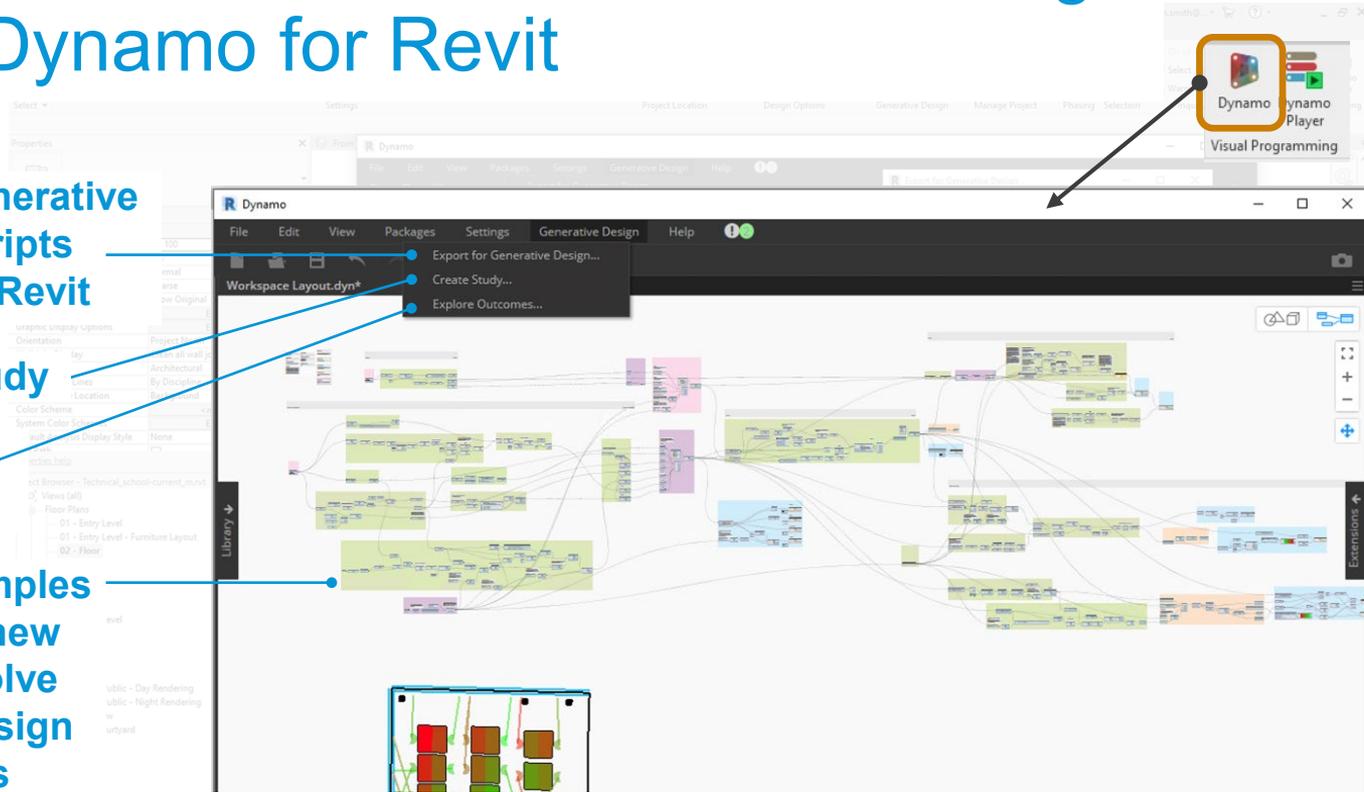
All users can access Generative Design from Dynamo for Revit

Export generative design scripts for use in Revit

Create Study

Explore Outcomes

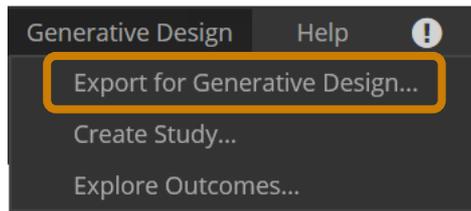
Tweak samples or create new logic to solve unique design challenges



Export for Generative Design from Dynamo for Revit

From Dynamo, export new or updated scripts for use with Generative Design in Revit

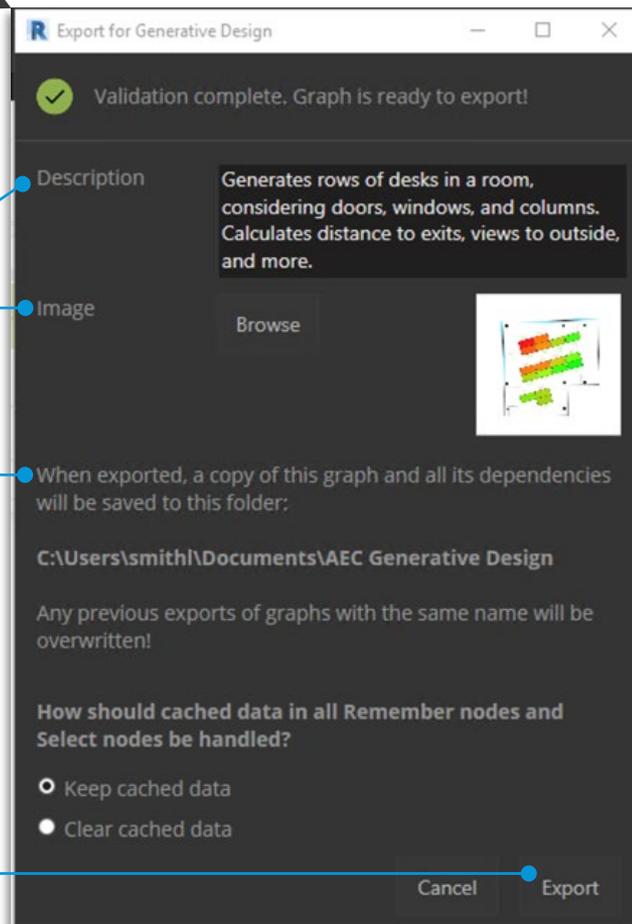
Revit help: [Add a Study Type](#)



Provide a description and preview image

Automatic dependency handling

Export script for use in generative design studies



Dynamo access to Create and Define Study

The image shows a sequence of three windows from the Revit Generative Design tool. The first window is the 'Generative Design' ribbon, with the 'Create Study...' button highlighted by an orange box. An arrow points from this button to the 'Create Study' dialog box. The 'Create Study' dialog has three options: 'Maximize Window Views', 'Three Box Massing', and 'Workspace Layout'. An arrow points from the 'Workspace Layout' option to the 'Define Study' dialog box. The 'Define Study' dialog is filled with configuration options for the 'Workspace Layout' study, including 'Workspace Layout', 'Workspace Layout 001', 'Optimize' method, and various checkboxes for goals and constraints. A blue arrow points from the 'Select' buttons in the 'Define Study' dialog to the text 'EXCEPT no direct selection of Revit elements from UI'.

Generative Design Help !

Export for Generative Design...
Create Study...
Explore Outcomes...

Same experience as from Revit

EXCEPT no direct selection of Revit elements from UI

How do I add study types? Cancel

How do I define a study? Cancel **Generate**

Revit help:
[Workflow:](#)
[Generative](#)
[Design](#)

Dynamo access to Explore Outcomes

Generative Design Help

Export for Generative Design...

Create Study...

Explore Outcomes...

Same Explore experience as from Revit

EXCEPT no creation of Revit elements from UI - Open in Dynamo instead

Explore Outcomes

Workspace Layout 001

Filter list by study type

All

Workspace Layout 001

Feb 11, 2020, 1:23 PM 20/20 ✓

Sort by Average distance to exits ↑

Details

Outputs

Average distance to exits	13.250
Views to outside	0.599
Number of desks	20.0

Inputs

Desk row rotation	25
Spacing between rows (ft.)	11

Enable filters Click and drag over axes to add filters

Desk row rotation Spacing between rows (ft.) Average distance to exits Views to outside Number of desks

Create Study 20 of 20

Open in Dynamo

Summary of Generative Design features by license

Feature	Revit Standalone	AEC Collection or Enterprise
Create Study, Explore Outcomes from Revit ribbon	✗	✓
Select Revit elements via Generative Design interface	✗	✓
Create Revit elements via Generative Design interface	✗	✓
Sample study types	✓	✓
Export to Generative Design from Dynamo	✓	✓
Create Study, Explore Outcomes from Dynamo	✓	✓
Online help	✓	✓

Generative Design Learning Content

Revit Help

The screenshot shows the Autodesk Revit 2021 Help interface. The left sidebar contains a navigation menu with categories like 'Get Started', 'Model the Design', and 'Generative Design'. The main content area is titled 'Add a Study Type' and includes the following text:

From Dynamo, you can make more study types for use with Revit Generative Design.

For information about the sample study types provided with the Revit installation, see [Sample Study Types](#).

Adding a study type is typically performed by someone who is familiar with Dynamo for Revit. See [Revit Generative Design for the Dynamo Author](#).

To add study types to the Create Study dialog in Revit

- Use Dynamo for Revit to create and test the graph.
 - The graph must follow specific rules for use with Revit Generative Design.
 - Inputs and outputs have unique names.
 - Inputs are set to "IsInput".
 - Outputs are set to "IsOutput".
 - Additional requirements are satisfied. For complete details, see [Generative Design Primer: Setting up a Graph](#).
- In Dynamo for Revit, click **Generative Design > Export for Generative Design**.
- In the dialog, complete the fields to provide a description and an image.

This information appears in the Create Study dialog in Revit to describe the study type.
- Click **Export**.

The graph is exported to the folder indicated in the dialog, along with any dependencies needed to run it. As long as the graph resides in that folder, it appears as a study type in the Create Study dialog.

The Dependencies folder contains the following files, which you can update directly if needed.

 - `info.json`: the study type description that appears on the Create Study dialog
 - `study_type.png`: the thumbnail image that appears on the Create Study dialog
- Share the study type with team members.

If other team members want to use the new study type, send them the exported DYN file and its Dependencies folder.

Generative Design Primer

The screenshot shows the 'Generative Design Primer' webpage. The main heading is 'Generative Design'. Below the heading, it states: 'In this section, we'll look at what the term *generative design* means in relation to AEC. We will look at the following:

- What is Generative Design?
- Why Should I Use Generative Design?
- What Goes Into a Generative Design Process?
- Examples of Generative Design

The page features a large architectural visualization of a building complex with a color-coded massing analysis. A data table is overlaid on the image, showing the following values:

Parameter	Value
design ID: 66-122	
Variety	0.4
Yield Size	6
Solar Gain	0.3
Program	1.1
Total Cost	\$5,769,000
VW Revenue	\$92,833,334
Input1	0.900229136
Input2	0.448278891
Input4	0.428612159
Input5	0.442411629

Below the table is a circular radar chart with axes labeled 'Variety', 'Yield Size', 'Cost', 'Program', and 'Solar Gain'. The chart shows a distribution of values across these categories. At the bottom of the page, it says 'Massing analysis - Alkmaar Housing Commission - The Living' and 'Powered by GitHub'.



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