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FormIt Pro Product Briefing

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Learning Objectives

- Discover the value of FormIt Pro for early stage design modeling.
- Realize how FormIt Pro contributes to workflows with other AEC Collections products.
- Learn about the three investment areas for future prioritization.
- Find out the future direction of early stage design and review the roadmap.

Description

FormIt Pro software is Autodesk's premier architecture, engineering, and construction 3D modeling and analysis environment for conceptual and computational design workflows. Take advantage of FormIt Pro in the Architecture, Engineering & Construction (AEC) Collection to expand and diversify your services while designing with sustainability in mind. This class will address the value that FormIt software brings to early stage design. We'll talk about the simplicity of getting started, the direct connection to Revit software with less rework, the unique combination of Dynamo computation and direct manipulation, the ability to maximize location and weather data for sustainable analysis, and more. We will review how FormIt Pro complements other products in the AEC Collection, including Revit, Dynamo, and the Insight Energy Analysis tool. We will cover a brief history of FormIt and the product principles that we use to prioritize new work and future directions. Finally, we'll address the future of the product, where we'll be investing and lay out a road map for achieving the future vision.

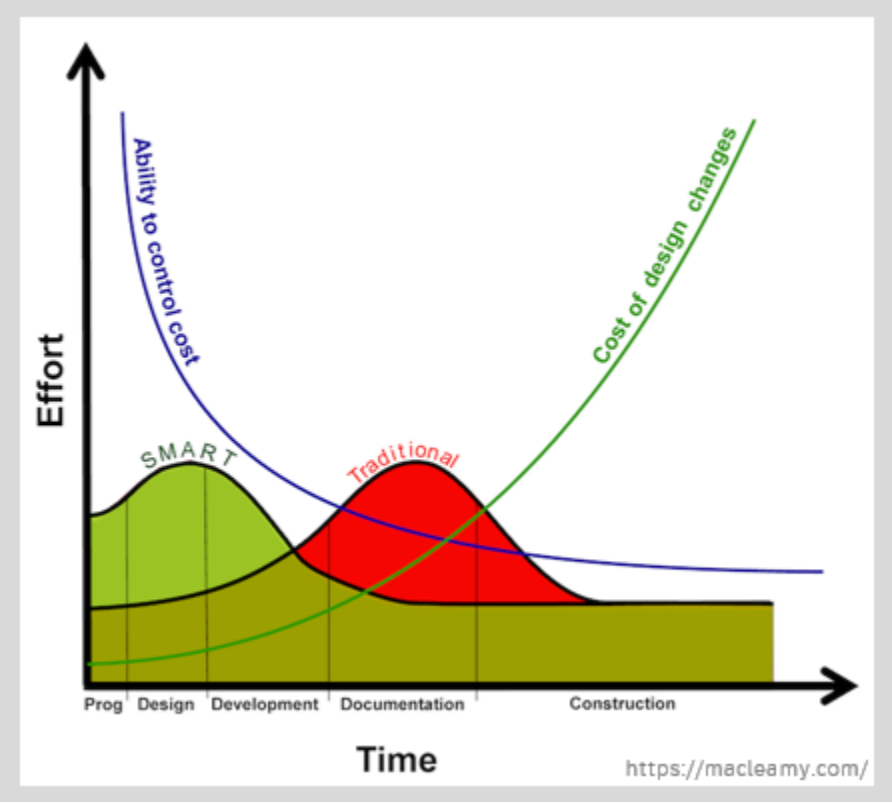
Speaker

Heather Lech has been working for Autodesk since 2005 where she's been involved in designing, developing and testing products for the AEC industry. She is also a licensed architect, practicing in the field for eight years before joining Autodesk. Her current role is Product Manager for FormIt, which is part of the AEC Generative Design Group. As a Product Manager, she delivers value to AEC customers and the Autodesk business by researching, designing, prioritizing and planning releasable work.

Why Is Early Stage Design Important?

Decisions made in early stage design greatly influence the cost and environmental impact of buildings throughout their lifecycle. That means that the decisions you make in early stage design – during feasibility studies, programming, and schematic and conceptual design need to be based on thorough data, resulting in informed decisions.

The MacCleamy curve shows how the cost of design changes grows exponentially when made later in the process, and how the ability to control cost and make changes is considerably greater earlier on in design. Architects and designers know that it costs less to make decisions earlier and that data-backed decisions made earlier provide more value to the client.



The MacCleamy Curve (https://macleamy.com/)

We know that the stakes are high.
Global warming is affecting all of us.

- NASA concluded that the years 2016 and 2020 were tied for the hottest years on record (since recording started in the late 19th century).
- The annual CO2 emission rate has gone up exponentially. In 1950 the world emitted 6 billion metric tonnes of CO2. And as of 2019 that number had gone up 6 times- to 36 billion metric tonnes of Co2 emissions annually. (source: ourworldindata.org/co2-emissions)

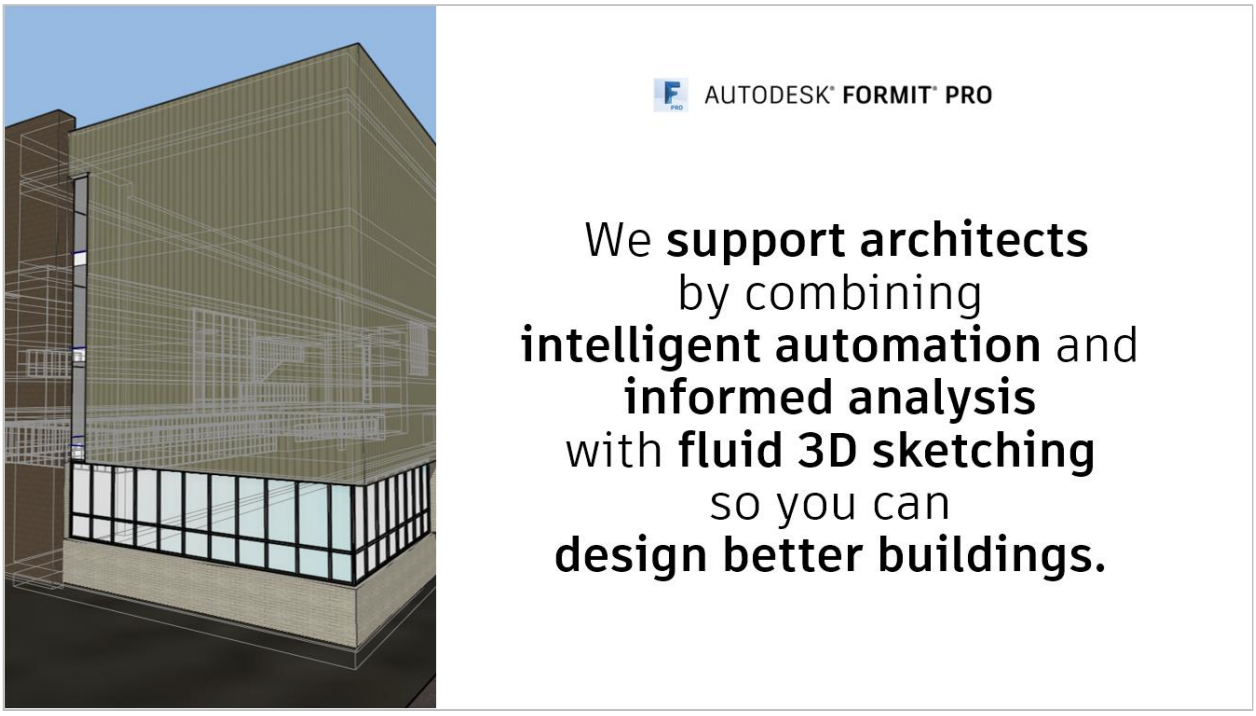
- Moreover, according to Architecture 2030, buildings account for nearly 40% of all greenhouse gas emissions (GHGs). All of this is leading us to a climate crisis.

Population Growth is rising.

- More than 1/2 of the current global population is concentrated in cities. And by 2060 its predicted that 2/3 of the total population, which will be about 10 billion, will be living in cities.
- To account for the population growth and move to cities, we need to build an average of 13,000 buildings per day for the next 30 years.

In addition to global factors, we know the building industry is under additional pressure with smaller budgets and accelerated timelines, which means its critical to make decisions faster and with fewer errors and costly late-changes.

While we know buildings are a major cause of climate change, it's not realistic to stop designing and constructing buildings given the rise in population; causing a need for more housing and more infrastructure.
At Autodesk, we believe that our software is a tool whose primary purpose is to help you design better buildings.



FormIt Pro mission statement

How Does FormIt Pro Support Architects?

FormIt Pro is a fluid 3D sketching environment that provides:

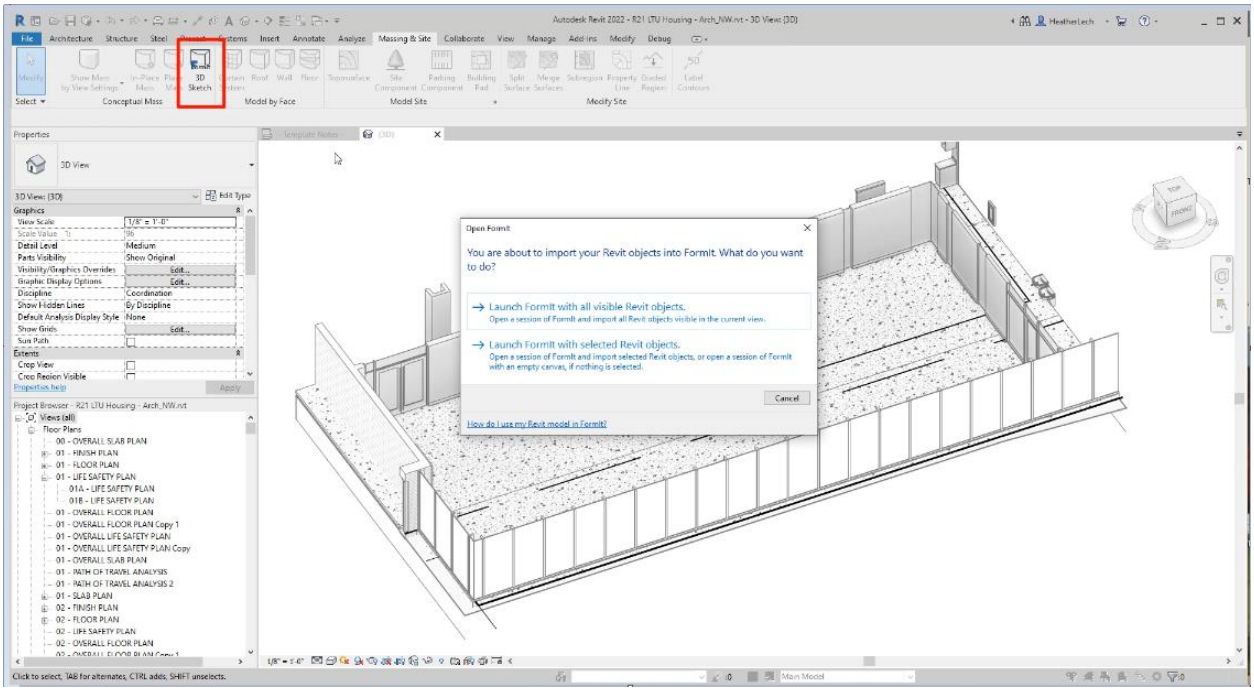
- A seamless connection from concept design to BIM for less rework.
- Data and analysis for informed design exploration
- A collaborative work environment, so the project team can share data with ease.

FormIt Pro Current Capabilities

Seamless Connection from Concept to BIM

FormIt Pro enables you to move from conceptual design to BIM with less rework, saving time and money.

New in the 2022.0 release is the ability to launch FormIt directly from Revit with the 3D Sketch button on Revit's Massing and site tab. Use FormIt to model in an intuitive, fluid sketching environment, then click the Send to Revit button to bring the new design into Revit.
This workflow allows a designer to move seamlessly between Revit and FormIt with one-click. Along with FormIt geometry, FormIt materials, including texture maps, and any material scaling or rotation, will transfer to Revit and are accessible from Revit's Materials dialog box.



3DSketch button in Revit launches FormIt Pro

Suggested Workflows for 3DSketch:

- Given a previously modeled urban context on Revit, use 3DSketch and FormIt Pro to explore massing of a new building on an empty lot.
- Explore a specific design element, like signage on the top of the building. When the design is ready to share, select just the relevant model elements and click Send to Revit, and only the selected elements will transfer to Revit.
- Start with a small section of an existing building modeled in Revit and explore an interior modification to the reception area. Use a Section Box in Revit to define the portion of the model that is relevant for the new design. Then click on the 3D sketch button to bring the model into FormIt. Once in FormIt, the designer can explore forms, like a custom reception desk or ceiling panels.

  With all three workflows a designer in FormIt can make rapid design changes, add materials, and then send the geometry back to Revit for further evaluation in the larger building context. In Revit, continue to explore the design, navigate in context, and use realistic views to study materials, sunlight and shadows.

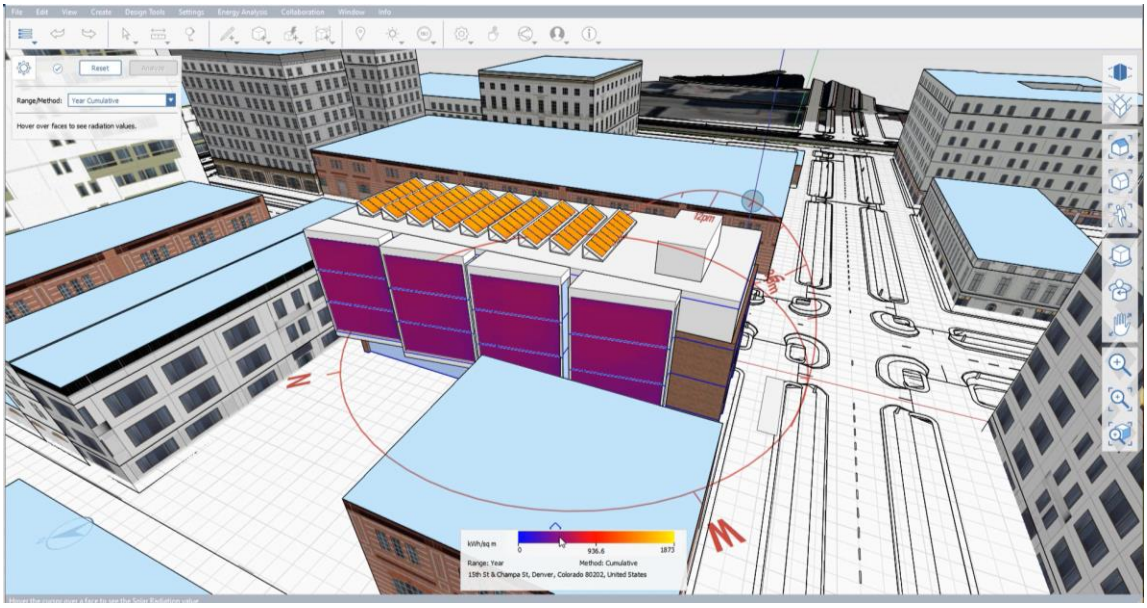
Also new in 2022.0 is the ability to import a FormIt. (.axm) file into Revit using the standard Import CAD workflow from Revit's insert Tab. Use this workflow to share FormIt models with colleagues or use the Import workflow to bring FormIt geometry into a Revit Massing family to access by By Face tools and Mass Floors for element mapping. FormIt layers transfer to Revit and their visibility can be controlled from the Visibility Graphics dialog for each view.

Informed Design

FormIt has built-in Analysis tools so that right from the start, you can assess the environmental impact of your design and create custom design analyses using Dynamo computation.

Environmental Analysis

FormIt is a data-rich modeling environment. Setting the location allows you to get real time weather data which can be used for shadow studies, solar heat gain analysis and for energy optimization through Insight Energy analysis.



Solar Analysis is a built-in capability in FormIt Pro

Once a location is set, you can use the **Sun Editor** to evaluate shadows and study the impact of existing building shadows on your site. Either use the in-canvas widget to move the sun location or enter a specific date and time from the pull-down menu.

Start a **Solar Analysis** study to evaluate solar radiation. Start by selecting relevant faces you want to study in more detail. You can choose to look at solar heat gain as a Year Cumulative value or as a Monthly Peak. Year Cumulative can help determine if Photovoltaic panels would be a good addition to the roof. Monthly Peak can evaluate the need for sun shading devices on large glazed areas. By hovering over a spot, you can get a specific read out of solar heat gain.

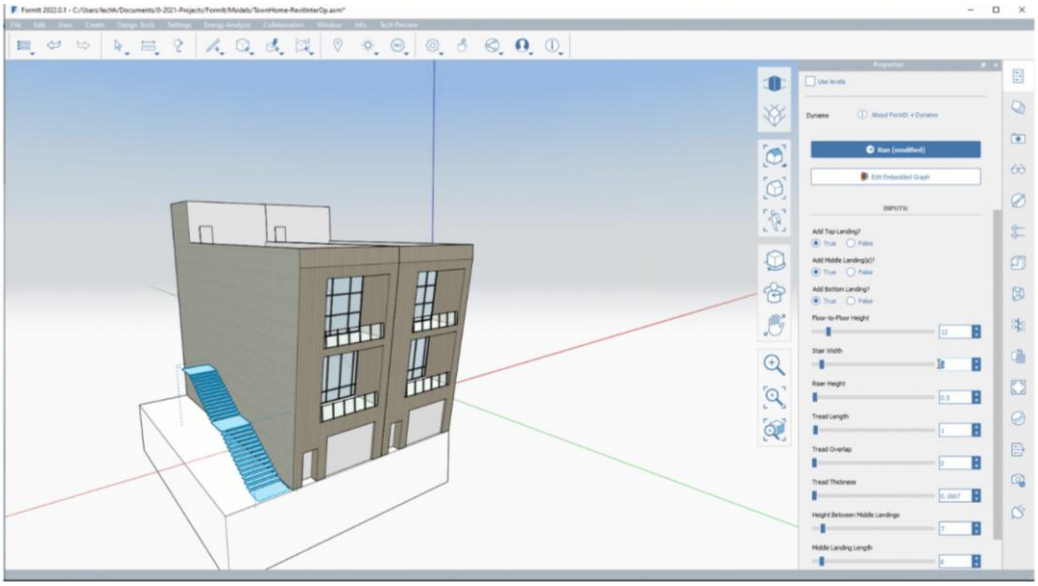
Send a FormIt massing study to **Insight Energy Analysis** to study Energy Use Intensity and provide benchmarks against standards like ASHRAE 90.1 and the 2030 Challenge goals. After generating an Insight, you can access the Insight website directly from FormIt and explore how various factors affect the energy use of the building. Choose to explore the HVAC system, window to wall ratio, roof construction, operating schedule, and more, by adjusting each factor and reviewing the change to EUI or cost per area.

FormIt's built-in environmental analysis means more data at your fingertips for design exploration and informed decision-making.

Computational Analysis

Analysis in early stage design can also take the shape of rapid design exploration with the help of automation and customization.

Dynamo graphs ship as out-of-the-box samples in FormIt Pro. They are fully controlled from inside the FormIt interface- there's no need to open or learn Dynamo to take advantage of the power of basic computational design in FormIt. You can run a graph by placing it in the model then select the resulting geometry and adjusting parameters that are already set up in the Dynamo graph. Edit the parameters, then click RUN to generate the new design. All the Dynamo-generated forms can have materials applied, can convert from meshes to objects, and will translate to Revit as solid geometry. Using the Dynamo samples allows designers to take advantage of the power of computation to generate designs quickly. The designer in FormIt can rely on Dynamo for modeling efficiency while remaining fully in control of the design.

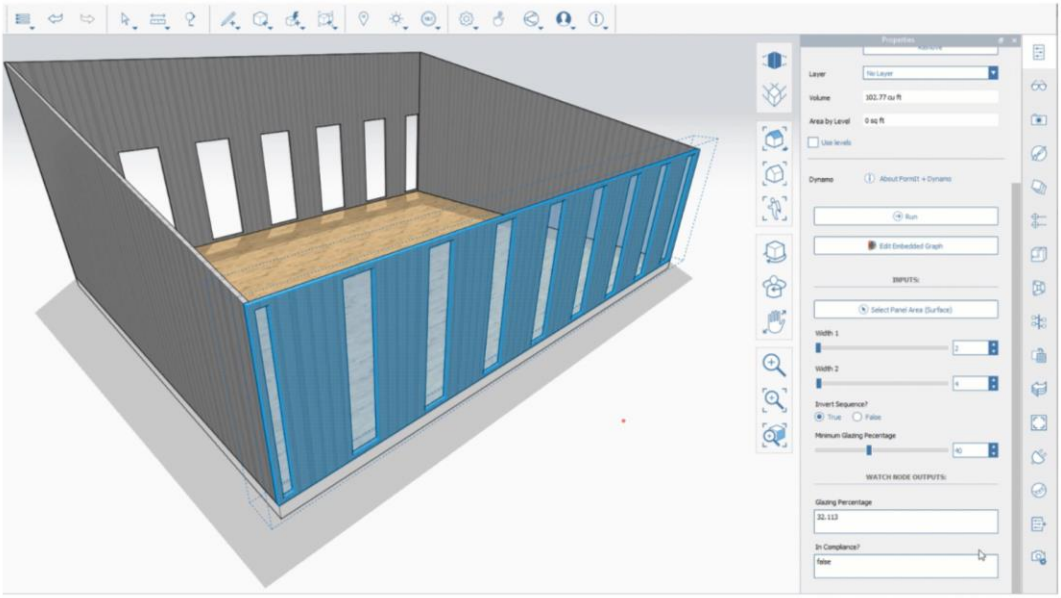


FormIt Pro ships with Dynamo sample scripts

For more advanced computational workflows, use FormIt's Dynamo integration, as well as its JavaScript API, to customize design exploration and analysis.

For example, create a custom Dynamo graph to calculate Percent Glazing of a face. The Designer can set the target percent glazing, and immediately see if the current design is in compliance with the goal. In Dynamo, make sure the output nodes are set to "Is

Output" and the data will display in FormIt's Properties palette. Explore design options by editing the window sizes and rerunning the graph to evaluate the new design.



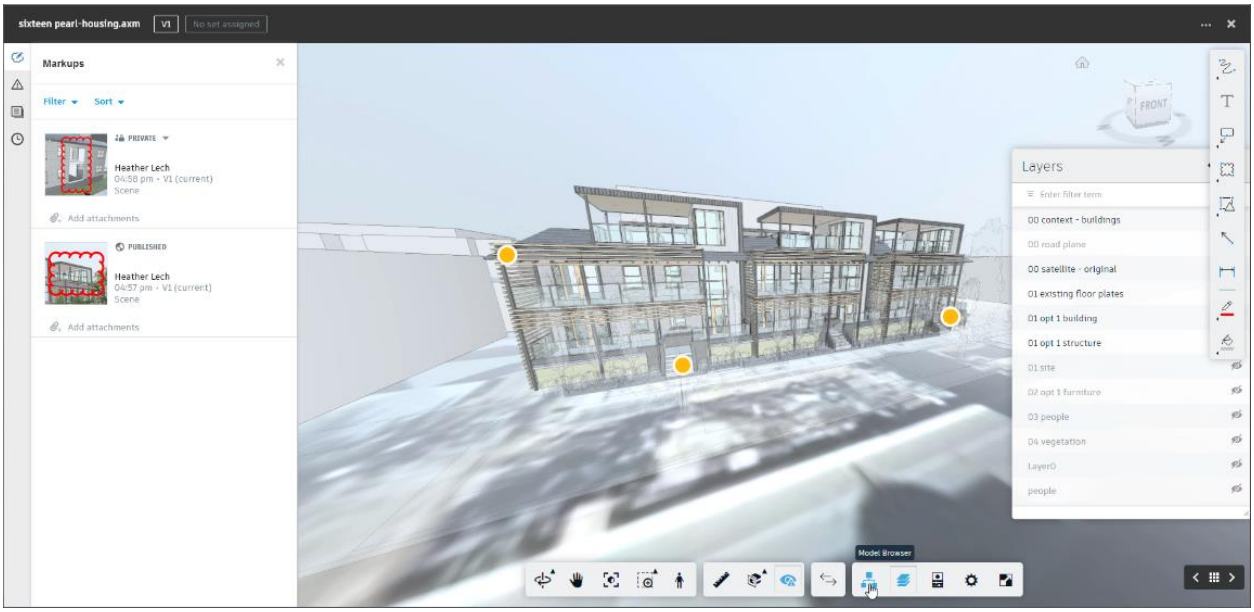
Custom Dynamo script to analyze glazing percentage

Informed design with both environmental analysis and computational analysis provides more data points earlier on in the design process. These capabilities are available now with the latest FormIt 2022.

Collaborative Data Sharing

FormIt is part of the ADSK ecosystem, and FormIt models can be saved and shared in projects on the Autodesk Construction Cloud along with the rest of the project information, so its accessible by the whole team from any location. FormIt models can be directly saved and opened from Autodesk Docs and you can use the Docs Viewer for Mark Ups and Issue-tracking. Assigning issues allows you to set and track deadlines, assign owners, fill in a description and add a site photo. FormIt Layers can be accessed on Autodesk Docs Viewer for additional visibility control. You can also share a link with a client or consultant, so they can view, explore, and mark up the design model.

Additionally, FormIt has a built-in collaboration environment that allows multiple people to work in the same FormIt Pro model at once. One person could be at the site working on the model from an iPad of from FormIt Web, while another person is working in FormIt on her desktop in the office. They can all access the same model through Autodesk Docs.



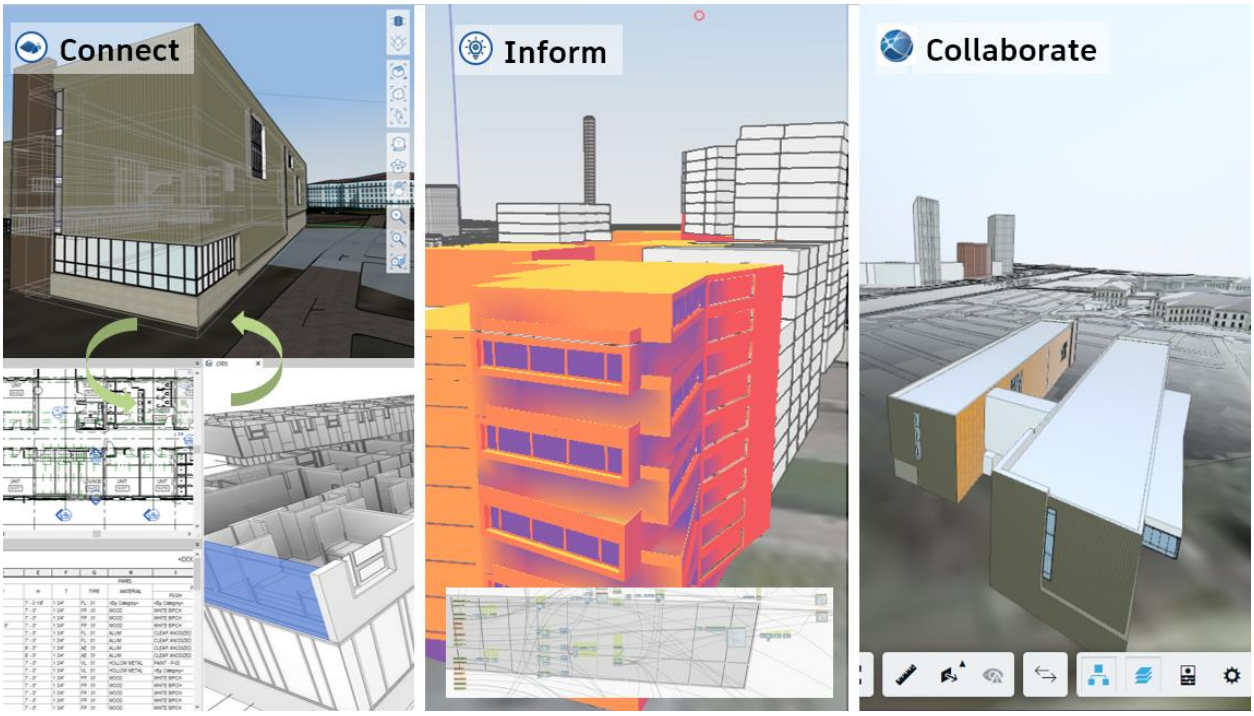
Share FormIt models on Autodesk Docs

What's Next for Early Stage Design?

We have 3 key areas of investment, which the team has worked on over the last few years and will continue to focus on this coming year.

1. Continue to **Connect** workflows across the Autodesk portfolio.
2. Further **Inform** design with analysis and compute.
3. Continue to **Collaborate** with shared data on the Autodesk Cloud.

Throughout all three of the investment areas, we will concentrate on providing the best capabilities for early stage design by advancing workflows and shared services throughout the portfolio.

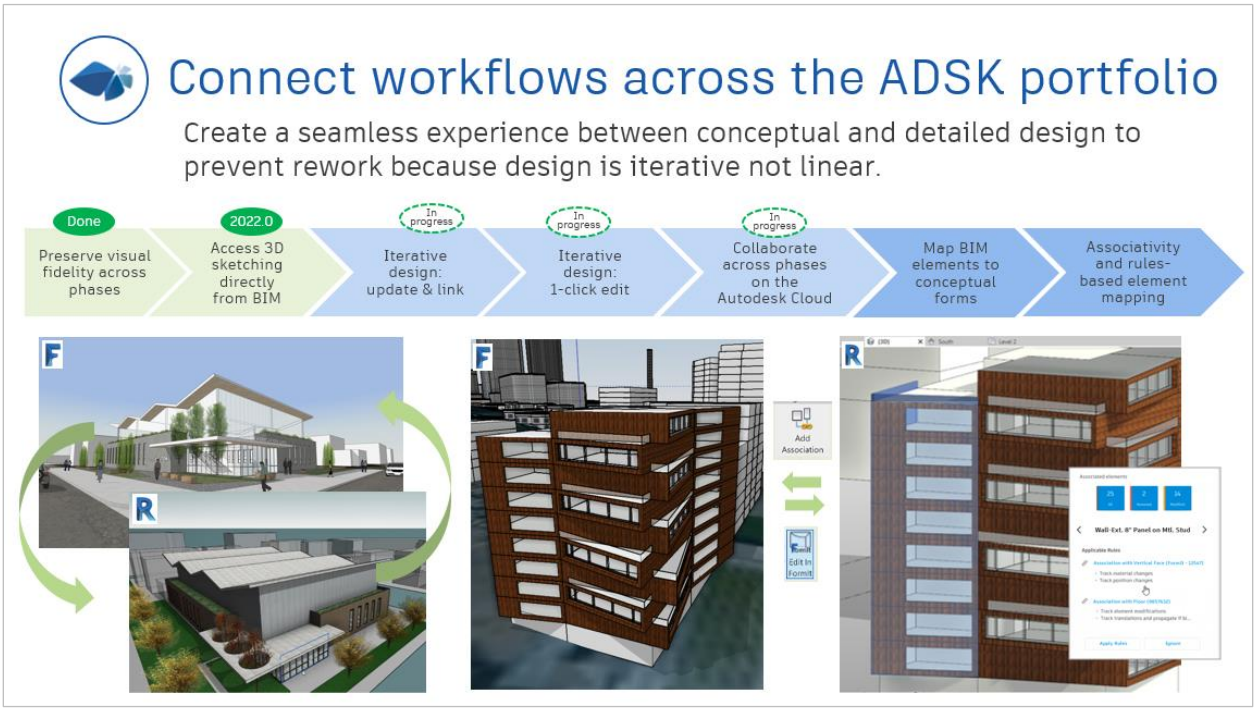


Investment Areas: Connect, Inform, Collaborate

Connect workflows across the Autodesk portfolio

As part of the Autodesk ecosystem, we recognize the importance of a seamless exchange of data between project phases. This saves time, money, and means more design exploration faster, leading to better outcomes.
We are working to create a seamless experience between early stage design (in FormIt) and Detailed Design and Construction (in Revit) to prevent rework when moving between project phases.

We plan to expand iterative design capabilities with a link and update workflow so that any modeling changes you make in FormIt will update in Revit. You will continue to move between an early stage design model and a detailed model in Revit with one-click.
Additionally, we plan to enhance element mapping between FormIt and Revit so that, for example, a vertical surface in FormIt's concept model, automatically maps to a Revit Wall System Family. This may initially take the form of an enhanced-By Face tool that maps many elements at once and tracks changes and eventually we will explore how we can get smarter at element mapping with rules-based association between elements, which can be customized for each project.

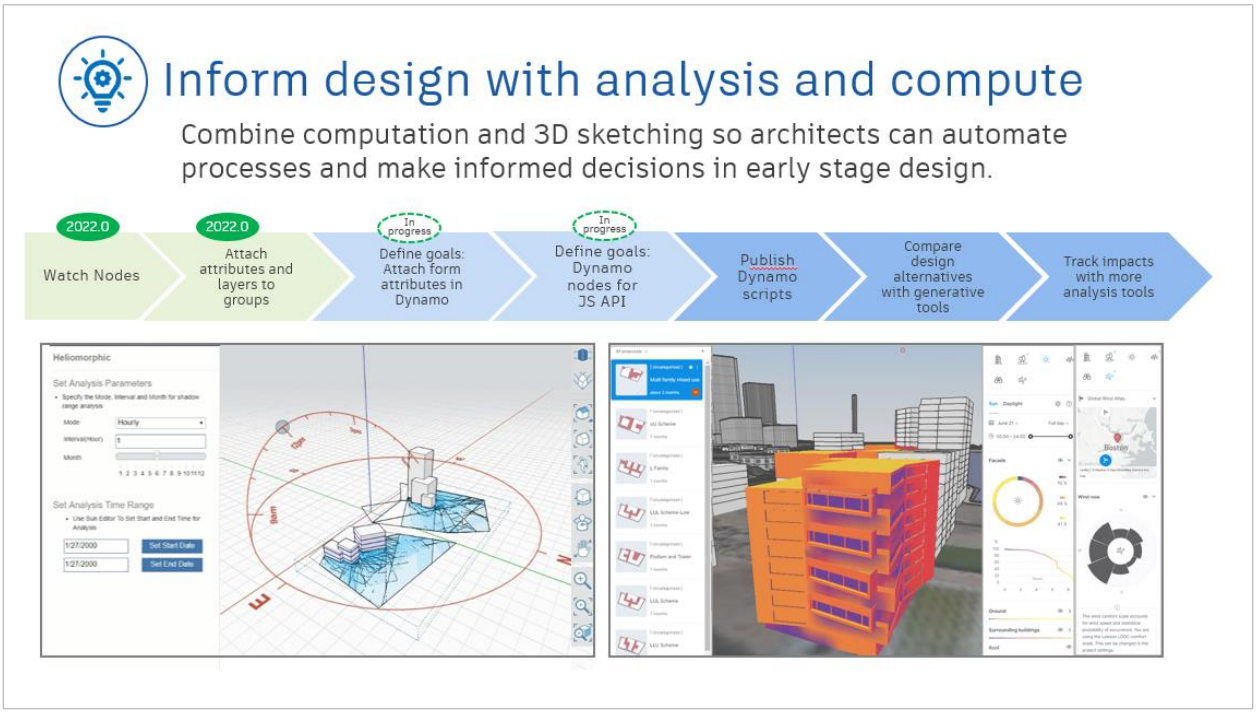


. FormIt and Revit connected workflows

Inform design with analysis and compute

The Dynamo integration with FormIt has come a long way in the last year. We have introduced a selection node, a live connection, faster re-runs of graphs and the ability to place multiple bake nodes in one graph.
Recently, we've made improvements to the FormIt-Dynamo integration to enhance the use of computation to drive early stage design. We continue to focus on this initiative with an emphasis on customization. We will do this by exposing more of FormIt's JavaScript API as Dynamo nodes so that design technologists can create custom graphs for project-specific needs.

We will continue to emphasize analysis capabilities in early stage design like what you see in FormIt now and what you see in the recently acquired Spacemaker. We plan to build on the analysis web services in Spacemaker to provide persistent, out of the box, analysis feedback at the speed of design. These analysis services solve common problems and will also be customizable to project specific needs. With these tools, designers and architects will be able to define goals up front, compare alternative scenarios, and track impacts to find the best design solutions in less time.

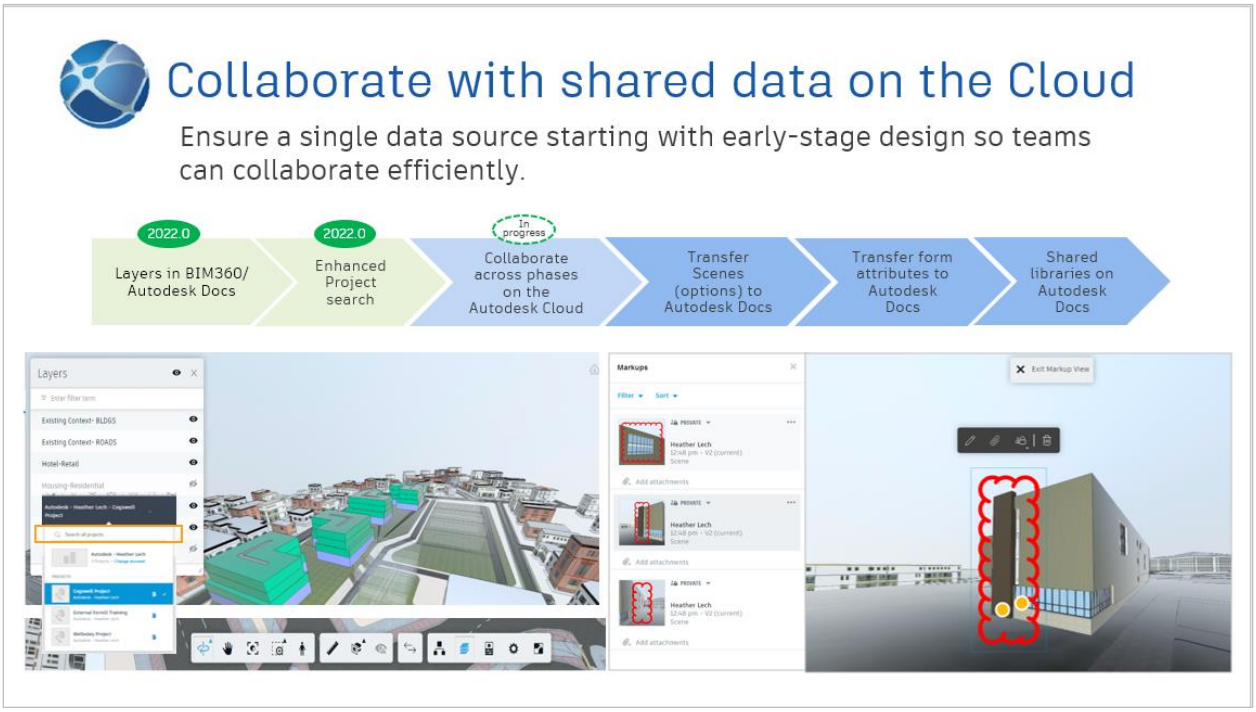


Inform design with more analysis services

Collaborate with shared data in the cloud

At Autodesk, we want to ensure a single source of truth starting with early stage design work and including all project data, so that teams work efficiently, consistently, and securely. Recent work in this area has been the ability to host FormIt's Content Library or your own content for FormIt, on the Autodesk Cloud. We ensure permissions keep your data secure and accessible. We've also made FormIt Layers accessible in the Autodesk Viewer and made it easier to search for projects on your Autodesk Cloud hub.

Our next steps are to share and access more FormIt data on the Autodesk Cloud and to support better collaboration. We are currently working on ensuring the one-click workflow that uses the 3D Sketch button in Revit to launch FormIt directly from Revit works with BIM Collaborate, Revit Cloud worksharing. Additionally, we want more FormIt data accessible in the Autodesk Cloud: things like FormIt scenes to control design options, and attributes of FormIt groups and individual objects. More data in the Autodesk Cloud (accessed through one digital model) means more services can extract data for workflows like feasibility studies, estimating, phasing, and work break-down. The whole project team can collaborate on one model in one centralized cloud database.

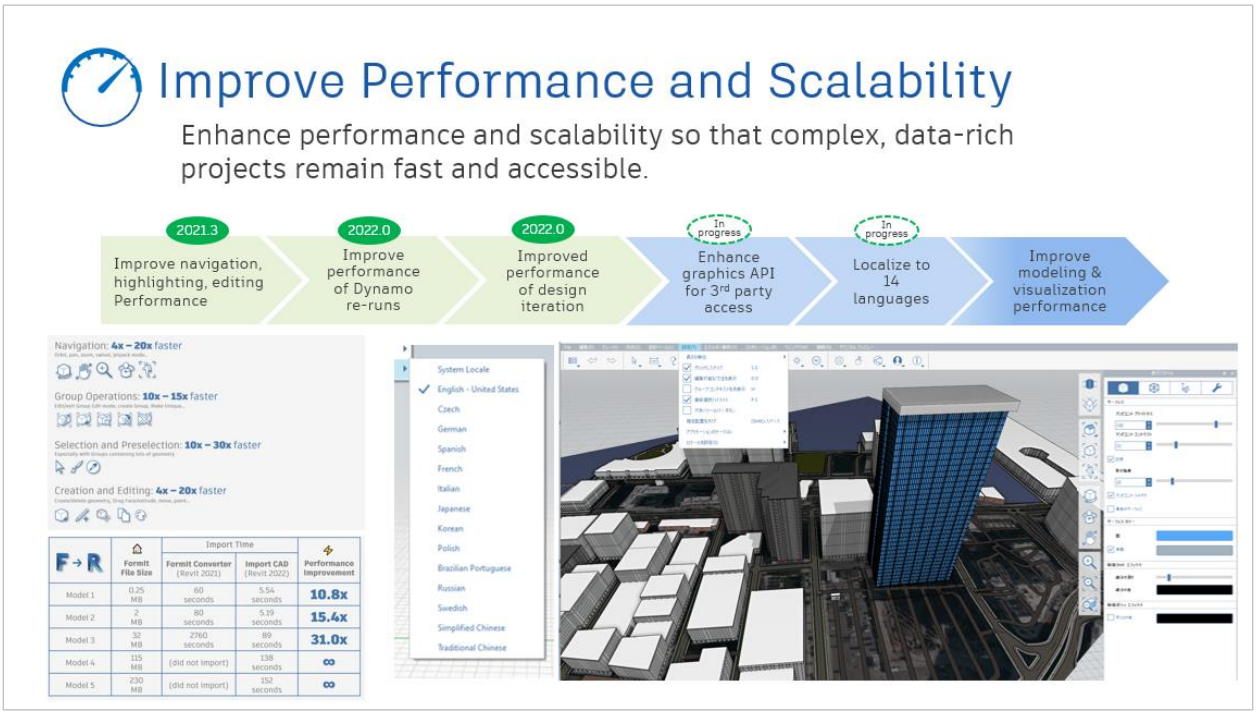


Enhanced collaboration on the Autodesk Cloud

Improve performance and scalability

We continue to prioritize performance and scalability. In past releases, we significantly improved model performance for navigation, selection, and editing, making those actions up to 20 and 30 times faster! In FormIt 2022.0 we significantly sped up the time it takes to import a FormIt mode into Revit, while also improving quality and reliability. We also improved the performance of re-running Dynamo graphs in FormIt.

Next, we plan to scale FormIt by shipping it in fourteen languages. Along with localization of the product we will also localize the documentation and tutorials. We are also working on improving the performance of shadows and will continue to work on modeling performance both on FormIt for Windows and FormIt for Web.



Performance and scalability remain a priority.

Conclusion

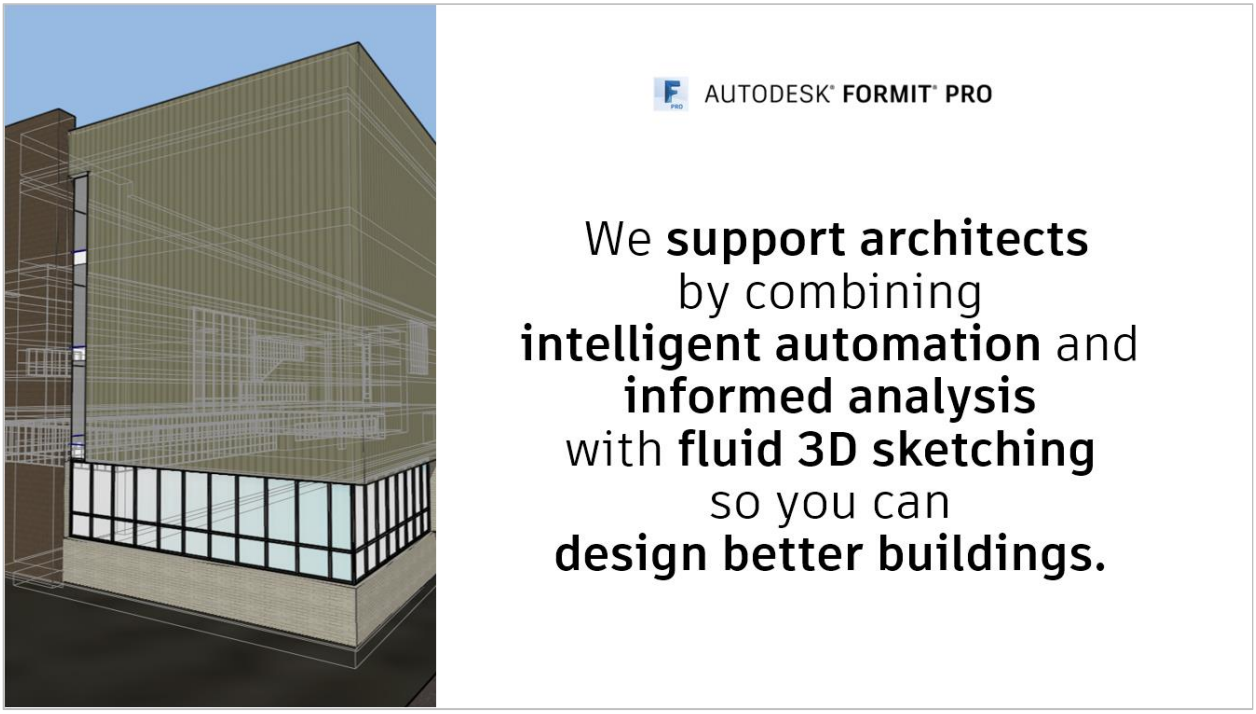
With our three areas of investment, we continue to support architects and designers with the tools that help address high stakes, like global warming and population growth.

- By connecting workflows across the ADSK portfolio and by using computational design, we hope to make design exploration more efficient and iterative so you can design better buildings in less time.
- Informing design with analysis and compute will help you and your client make better choices around energy use and the environmental impact of your design.
- Collaborating and sharing data on the Autodesk Cloud will open up more services and better access to your data so you make smarter decisions earlier on in the design process.

While the challenges ahead can feel daunting at times, each of us can make positive impacts in small ways to reduce the effects of global warming and provide for population growth. By using the tools we have available to us that help inform our designs, we can make smarter decisions about the buildings we design. We can reduce energy use intensity and reduce greenhouse gas emissions while we build faster and more efficiently, and we have the environmental analysis tools and data available to us right now through Autodesk software.

Learn more about FormIt Pro at ***formit.autodesk.com***

Learn more about Autodesk's sustainability initiatives at ***autodesk.com/sustainability/overview***



FormIt Pro mission statement