

COMPANY

Mills Group

LOCATION

Wheeling, West Virginia

PRODUCTS

**Autodesk Revit
Autodesk Insight
AEC Collection**

A commitment to sustainable building design

With Autodesk Revit, architecture firm works to achieve energy efficiency

Revit and Insight helped us anticipate cost and physical space challenges early in the design process. We gained trust with the client because we could explain all of the variables of designing the home.

— **Ryan Hess, LEED AP**
Principal
Mills Group



The Wheeling building includes several green features, such as greenspace, daylight harvesting with views, and a large shade canopy on the southern face with a rooftop terrace.

Project summary

Mills Group, a West Virginia architecture firm, is committed to designing buildings that honor the past. Sustainability also plays a key role in design decisions: from both an environmental and economic standpoint, Mills Group architects work with clients to ensure the optimization of energy savings.

Showing proof of sustainability in each design decision has been a challenge—for example, explaining how incremental changes can impact energy efficiency. Using **Autodesk Revit** building design software and Autodesk Insight building performance analysis software, Mills Group architects can test design options, quickly iterate, and share findings with clients using easy-to-understand visuals.

A search for energy simulation tools

“Education was a challenge,” says Mills Group principal Ryan Hess. Clients react to the look and feel of design changes, he says, and it’s difficult to explain sustainability effects without tools that simulate design choices. Additionally, changing designs to achieve sustainability goals while also addressing client preferences took a lot of time. Hess adds, “We needed the ability to be inquisitive about designs,” without the constraints of time and technology.

To gauge energy efficiency, Hess and his colleagues created 2D drawings in **Autodesk AutoCAD** design and documentation software, and they used Trimble SketchUp for 3D modeling. The process required the time-consuming creation of 2 separate designs—the architects couldn’t geolocate the 3D model, so energy-impact estimates were imprecise. The team used energy modeling software to test outcomes. “If we wanted to test multiple scenarios, we had to use several

Choosing materials and orientation based on energy consumption

software solutions,” Hess says. “If we didn’t like the results, we had to change the model and test again, using the same software.”

Mills Group architects then switched to Revit for 3D modeling, since the software’s collaborative capabilities better suited Mills Group’s multioffice teams. Soon after, Hess learned about Insight, which is free to Revit subscribers. Insight models the energy, heating, and cooling impacts of design and building options. Since Insight is integrated with Revit, it allows architects to analyze 3D models and obtain real-time environmental-performance indicators.

Analysis tools have previously been used almost exclusively by building energy specialists. Now, the ability to do energy analysis, early in the design phase, is available to architects with tools like Insight.

“Insight helps us most when we’re making decisions that affect sustainability—things like orientation and square footage,” Hess says. “We can change variables and show clients the cause and effect right away.”

For Wheeling office building, dynamic glazing saves on energy costs

Equipped with Revit and Insight, Mills Group designed an office building in downtown Wheeling, West Virginia. The vacant site was located near old building stock, so architects had to consider neighboring building styles alongside client and sustainability goals. Additionally, the site was near the Ohio River, and the client wanted views of the surrounding area. However, extra



The Frederick, Maryland, residence’s east-west orientation maximizes solar exposure; building materials provide thermal mass.

windows would cause winter heat loss and summer heat gain. Mills Group used Revit and Insight to geolocate the design and assess the impacts that large overhangs and exaggerated cornices would have on the cooling and heating systems.

“Glass was the huge variable,” Hess says. “We used Insight to determine where it would be better to use expensive reflective glass for cooling, compared to other parts of the building where we wanted to let heat in.”

By simulating design and materials options with Insight, Hess and his team decided that windows with dynamic glazing would provide the best combination of energy and cost savings. Hess also used Insight to determine reduced utility consumption through better-performing glass.

Creating a net-zero design for Frederick home

Once again, the firm’s architects used Revit and Insight when designing a large private home in Frederick, Maryland. The client wanted a net-zero structure, requiring architects to test many assumptions about building techniques, materials, and lighting. “It’s a site with a lot of southern exposure—with more heating than cooling days, we could use that free light and heat from passive solar energy gain, and reflect it into the rest of the house,” Hess explains.

Insight software’s simulation engines helped the design team orient the building so that light entering at the southern exposure would spread to the northern end of the house. In addition, the design called for the building to be recessed into the site’s hillside to take advantage of the year-round earth temperature of 52° F, reducing cooling and heating costs.

“Revit helped us anticipate utility cost and physical space challenges early in the design process,” Hess says. “We could explain all of the variables of designing the home and assure the client that we could validate our choices.”

We’ve shown that a market exists for sustainable design in our market—and we’re strengthening our services.

– **Ryan Hess, LEED AP**
Principal
Mills Group



The Wheeling lobby includes a live greenwall as well as stonework reminiscent of nearby banks of the Ohio River.

Sustainable design wins new clients

Adopting Revit and Insight solved 2 key challenges that Mills Group faced when designing for sustainability: working collaboratively with teams in the firm’s 2 offices, and reducing the time needed to simulate environmental and energy performance. The combination of tools gives Mills Group architects and clients the confidence to proceed with sustainable design choices, knowing that they’ll deliver the desired outcomes.

For Mills Group, solutions that drive sustainable design projects will help the firm expand its client base. “These 2 projects, using Revit and Insight, have already helped us win new clients,” Hess says. “We’ve shown that a market exists for sustainable design—and we’re strengthening our services.”

Learn more

Autodesk is helping designers create **sustainable solutions through design**, offering tools and education for forward-thinking business practices. Access all the benefits and features of **Insight**, free with your subscription to Revit.

Images courtesy of Mills Group.

Autodesk, the Autodesk logo, AutoCAD, Insight, and Revit are registered trademarks or trademarks of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. Autodesk reserves the right to alter product and services offerings, and specifications and pricing at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document.

© 2017 Autodesk, Inc. All rights reserved.