

Building Resilient and Efficient Communities

Integrated Design Lab Steers Communities Toward Energy Efficiency in Buildings

When the city of Murtaugh planned to have a more energy-efficient city hall, the [University of Idaho College of Art and Architecture Integrated Design Lab \(IDL\)](#) became a key player in presenting ideas to the city on how to save energy and money.

“The IDL is helping Idaho’s communities design and operate buildings that are resilient and efficient,” said Damon Woods, IDL director, who is overseeing the assessment. “We provide technical support on energy modeling and investigate new technologies in lighting and ventilation to keep building occupants comfortable and healthy while using less electricity.”

The collaboration between the IDL and the city of Murtaugh was possible thanks to the [Government Leading by Example Program](#), which provides free energy audits to rural municipal buildings, in this case through the expertise of the IDL team. Through partnerships like this, the Integrated Design Lab is showing students how to use their architecture and engineering degrees to help their communities grow toward a sustainable future.

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While Woods worked on the on-site audit, Tyler Schram, a College of Art and Architecture master's student and research assistant at the IDL, looked at the data and prepared the 13-page assessment that will guide Murtaugh's efforts in improving their city hall and its operations. The evaluation includes recommendations on retrofit options to reduce their annual energy bills while maintaining comfort.

The assessment has a breakdown of the status of the building and its energy usage, and it included several recommendations like changing old halogen and compact fluorescent lights to LED, which will save energy consumption and money.

"They also could reduce the number of fixtures in the city hall; they'll have fewer lights but better quality and illumination," Schram explained.

The IDL team also noted that the city hall used a fair amount of energy on heating.



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— Damon Woods, IDL Director

"Our recommendations on that area may revolve around suggesting a whole new furnace system resized for the building and its use, replacing windows, and/or installing mini-split HVAC systems – in adjacency to lighting replacement," Schram said.

Schram said working on these assessments at the IDL have helped him understand the difference between capital improvements – like changing windows or insulations – and operational changes that can be easier to implement while still improving energy efficiency in a building – like switching to energy-efficient lightbulbs.

"We have a wonderful team of architecture and engineering students that help with the IDL projects, including Tyler," Woods said. "Our hope is that after graduation, many of our students will stay in Idaho and bring the skills they've

developed here at IDL to influence and transform practice at local firms.”



Tyler Schram working with other grad students at the Integrated Design Lab.

Damon Woods

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Collaborative and Creative Work

The graduate students and faculty at the IDL come from architecture and engineering backgrounds. Their work at the IDL is creative and collaborative in nature; all of the graduate students work alongside their colleagues on several projects simultaneously.

The IDL's strong focus on sustainability reflects the type of projects they pursue – from performing energy efficiency audits and studying alternative building materials to developing new equipment and tools for the design and construction industry.

Hands-on research on new technology is also part of the everyday life of faculty and students at the IDL. This semester, Isabelle Boicourt was hired as a research assistant and is working with the [Hempitecture](#) firm on a new hemp product for use as building insulation. Boicourt is graduating in May 2022 from Boise State University with a degree in civil engineering and has been accepted at the U of I to complete her master's in architecture at the IDL.

Hempitecture, an Idaho-based company based in Ketchum, is working to develop an industry standard insulation material composed of hemp fibers. A College of Natural Resources team is testing the fire resistance of the product while the IDL determines the thermal properties of the insulation material.



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— Tyler Schram '20, '22

Schram lent his expertise to the hemp insulation material project; he's been assisting Boicourt's research by testing the material for thermal conductivity and creating a 3D physical model to show builders what the material looks like once it's inside walls.

“Working at the IDL has really given me the opportunity to learn and work on different aspects of energy efficiency in buildings,” Schram said. “The experiences helped me understand how to better support builders to meet sustainability goals as well as incorporate this knowledge in my future work as an architect. Definitively the work students do here will impact the communities of tomorrow.”

The Hempitecture project is an example of the IDL keeping pace with technologies, materials and methods of construction that best meet the needs of building owners, professional design and construction teams and society in

general.

The lab shares its research and knowledge in energy efficiency with the design and building community through their consulting and outreach efforts, lectures and newsletters.

“The IDL’s commitment to educating architects and engineers has been an invaluable resource throughout the years,” said Ian B. Hoffman of Cole Architects, who last year attended an IDL lecture on the effects of COVID-19 in buildings. “Their commitment to providing the design community with up-to-date resources and guidance has helped to elevate our built environment as well as keep Idaho at the forefront of design and innovation.”

The IDL is entirely grant supported. In 2021, it received over \$750,000 in funding, including grants from Idaho Power, Idaho Global Entrepreneurial Mission (IGEM), Center for Advanced Energy Studies (CAES), Northwest Energy Efficiency Alliance and the Murdock Foundation. The IDL also collaborated on a \$4M grant from the National Science Foundation (NSF). This funding supports the staff and graduate students at the IDL, providing tuition coverage and a stipend. Their work is making our buildings more energy efficient and helping build a more resilient Idaho for future generations.

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