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Energy Institute at the Powerhouse Energy Campus

ENERGY INSTITUTE AT THE POWERHOUSE ENERGY CAMPUS

Continued access to clean, reliable and abundant energy is central to almost every major global challenge today. CSU has pioneered distinctive research in this area – from developing better combustion engines that emit fewer pollutants to testing new smart grid technologies. CSU created [the Energy Institute](#) in 2013 to consolidate its vast energy research under one virtual organization, employing a unique interdisciplinary approach to global problem-solving. It was designed programmatically with an emphasis on agility and entrepreneurship to position CSU at the forefront of energy research and technology.



The Institute aims to increase university collaboration with industry and governmental partners, create new research and educational opportunities for CSU faculty and students, and accelerate the dissemination of large-scale solutions to the global marketplace. Operated under the Office of the Vice President for Research, it unites 12 affiliated centers and all eight colleges at CSU under a single mission, extending to a global network of public and private partners. Today, over 160 faculty members across CSU are developing new technologies, exploring the economic, environmental, and sociological impacts of energy use, and proposing policy solutions.

The Institute was inspired by the success of its parent entity, CSU's Engines and Energy Conversion Laboratory (EECL), founded in 1992 by faculty member Bryan Willson and named one of the top university research labs in the nation in 2012 by Popular Science magazine. Housed in a dilapidated municipal power plant acquired by Willson through a creative partnership with the city, the EECL built unique facilities capable of conducting largescale experimental research for industry. Its earliest work with natural gas pipeline engines produced a series of market-driven environmental solutions that have revolutionized the industry and spawned many new products for participating companies. Its InteGrid Lab is one of a few capable of distributed power and microgrid development and testing.

The creation of the Energy Institute was prompted by the need for additional resources to support EECL's rapid growth. The Powerhouse Energy Campus soon followed as the physical headquarters for the Institute, envisioned as a grand social experiment aspiring to accelerate the creative process via interdisciplinary colocation of university and community partners. Completed in April 2014, [the Powerhouse is a showcase of clean energy research and technology](#) and a leading model of collaborative space, green construction and integrated design.

The LEED Platinum-certified expansion to the EECL facility offers 100,000 total ft² of innovative laboratory, office, meeting, classroom and business incubator space, distributed over four stories and five acres. Over one-third of the \$18.5M in construction costs was contributed by private donors with a shared interest in fostering innovation in Colorado.

The campus features intentional shared spaces and co-located offices for interdisciplinary teams, accommodating 250 people including 60 faculty. A shared computer lab and work area houses up to 147 undergraduate and graduate students. 20 office spaces on the fourth floor are fully occupied by clean tech and clean energy companies – all have formalized research agreements with CSU and benefit from close relationships with university and regional incubators. Designed in partnership with Fort Collins Utilities, the facility utilizes alternative energy sources and efficiency measures unique for a project of this scale, [expected to save CSU more than \\$40,000 annually in electricity and gas](#). Wilson describes the Powerhouse as a “playground for operators of commercial buildings” and invites partner experimentation with different operating systems to optimize financial results.



For students and researchers, the campus is distinguished from its peers as a “place to build stuff” with the primary goal of commercialization. Institute projects emphasize student-centered experiential learning through regular interaction with industry sponsors, design competitions, and hands-on research. Talented mid-level faculty with a practical mindset have attracted like-minded students who expect entrepreneurial opportunities. EnviroFit International (featured in its own case study) is an exemplary model of a student-founded social enterprise that has brought transformative energy solutions to the developing world. Over 1,000 students have been trained to date across the Institute’s affiliated centers, with 98% of those placed at the Powerhouse Campus securing jobs upon graduation (see footnote 1), many with companies on the fourth floor.

Impact

The collective impact of the Energy Institute and its affiliated centers is vast and diverse, encompassing job and business creation, commercialization of groundbreaking technologies, and the delivery of energy savings and health benefits to local and global communities. Representative achievements in environmental impact over its history include:

- The prevention of 100M pounds of Nitrogen Oxide pollution and 2.5B cubic feet of natural gas savings from [EECL’s High Pressure Fuel Injection technology](#)
- \$10M in annual energy savings [from student-run industrial audits since 1984](#)
- 11,007 tons of waste diverted by [service learning projects in 2014](#)

Additionally, the Institute has become a valued trust broker between industry and environmental agencies. Partnerships with the U.S. Environmental Protection Agency and Environmental Defense Fund have resulted in the development of joint recommendations for natural gas and methane emissions targets. Its longstanding Natural Gas Symposium has facilitated dialogue in the rational middle, establishing Colorado as a thought leader in this space.

The Institute is an active partner in state initiatives to drive job creation and technology commercialization, including the Colorado Clean Energy Education and Empowerment (C3E)

Initiative for advancing women in clean energy and the Colorado Renewable Energy Collaboratory, a consortium of state research institutions. The Powerhouse has also been a major catalyst for economic development in once-distressed North Fort Collins - global aerospace and energy leader Woodward Governor, incubator Rocky Mountain Innosphere, and the city's Museum of Discovery have all built LEED-Certified facilities in close proximity to the campus. Additionally, locally-based spinoffs EnviroFit and Solix Algreidents have attracted \$50M in outside investment to the region (see footnote 2).

Scientists, engineers, businesses and municipalities from all over the world frequently visit the campus to learn both the theory and practice of clean energy innovation at CSU, characterized by visionary leadership, an entrepreneurial spirit, and shared commitment to developing solutions for a better world.

Footnotes:

1. Mac McGoldRich, Director of Operations, Powerhouse Energy Campus
2. Bryan Willson, Executive Director, Powerhouse Energy Campus