A center for innovation unlike any other

Project Introduction

OSEP is proposing a new **Energy Advancement and Innovation Center** – an experiential hub for energy research and technology incubation at Ohio State – where innovation will flourish among interdisciplinary teams of collaborators, supported by a unique University–Industry partnership. Bringing together University faculty, students, ENGIE researchers, local entrepreneurs, and industry experts, the Center will engage the community with the next generation of smart energy systems, renewable energy and green mobility. With the support of ENGIE's network of 11 global research labs and industry partnerships, the Center will propel innovation beyond the R&D stage to incubate technologies developed here, providing them with the support and resources necessary to become commercially successful. Promising projects will find a "route to market" at the Center through unique channels provided by ENGIE, bridging the gap between a proof of concept or pilot project and a commercially viable product or process. See the video for 3D visualization of the project including the Innovation Center.[1]

Mission & Purpose

The Energy Advancement and Innovation Center will have 5 distinct purposes:

1. Nurture **collaboration** across disciplines in order to foster energy advancement and innovation in a holistic way, bringing together the people, technologies, services and data to discover novel methods for tackling the challenges of tomorrow.
2. Facilitate **collaborative research** between University faculty, students and ENGIE Labs with tools, lab space, funding and human resources.
3. **Incubate** energy and related digital technology startups in the Columbus area by providing a route to market for innovative ideas through various outlets including ENGIE and Axum businesses and subsidiaries.
4. Serve as a physical forum for learning, dialog and **public-private partnership** in energy innovation; a symbol of leadership and advancement in the field.
5. Connect the academic and professional work above to the public through active **community engagement**.

Facts & Figures

509 MWhrs
annual total energy consumption/ onsite zero-carbon generation

$15M contribution
from OSEP as seed money for initial projects

$35M
$20M for construction & $15M building energy technologies

400
occupancy

60,000 ft²
state-of-the-art facility

An all DC-current facility

$1.5M/year contribution
from OSEP for operating expenses[2]

Ohio State will be the 12th global R&D center for ENGIE
and the first in North America

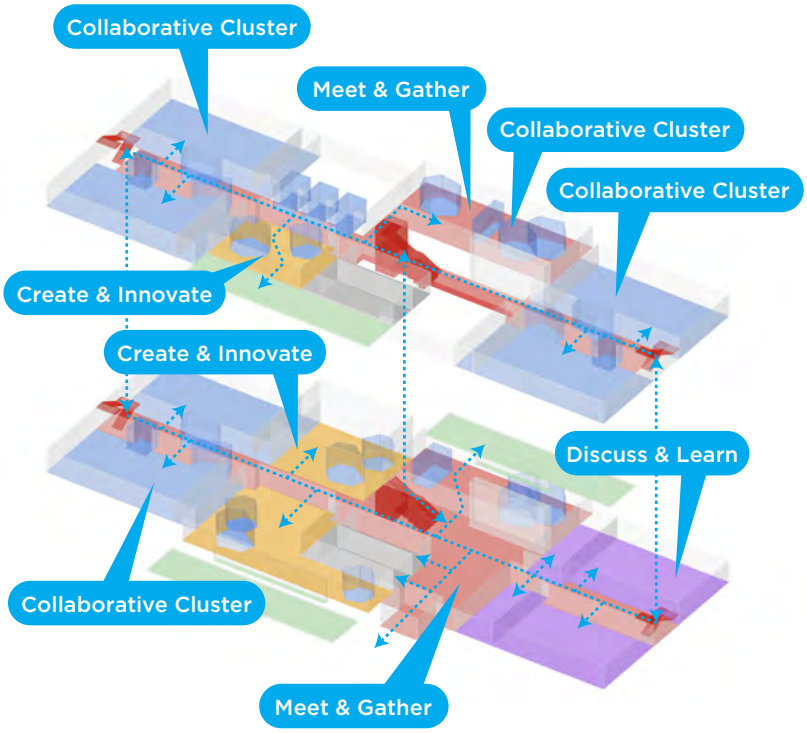
1: https://www.siradel.com/all_web/P.DT/colombus/finalOSUvideo.mp4
2: For the first five years.

Designing for collaboration

The Energy Advancement and Innovation Center is designed first and foremost to encourage the cross-pollination of people and ideas in spaces conducive to collaboration. Reconfigurable laboratories, networked workspaces, and beautiful public spaces throughout the Center promote equal parts spontaneous collaboration and focused, intentional investigation.

Architectural Program

Create & Innovate	
Dedicated Laboratories	6,500 sq. ft.
Collaborative Clusters	
Flexible Workspaces	14,000 sq. ft.
Modular Pods	3,500 sq. ft.
Meet & Gather	
Entry Vestibule & Lobby	3,500 sq. ft.
Café & Micro Kitchen	2,500 sq. ft.
Outdoor & Green Spaces	6,000 sq. ft.
Circulation	7,000 sq. ft.
Discuss & Learn	
Mission Control	1,000 sq. ft.
Interactive Showcase	2,500 sq. ft.
Ampitheater	2,500 sq. ft.
Other	
Building Support	11,000 sq. ft.
Total[3]	**60,000 sq. ft.**



3: Based on our preliminary discussions with local architects Design Group, we have identified a number of locations in and around OSU campus that would be suitable for the Center.

It's not just a building...

Nurturing Innovators

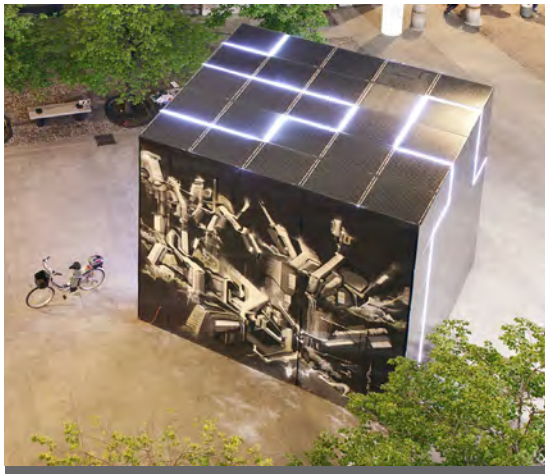
The outline for creating a research laboratory is straightforward: provide funding, construct a building, fill it with equipment for researchers. Though vital to the development of the building, these foundational elements do not, and in fact cannot, create innovation. For that, one must rely on a most rare and valuable resource: human creativity. Fostering creativity is a much more challenging prospect and this fact requires that the central focus of this project extend far beyond the creation of a building to the creation of a unique community, comprised of scientists, engineers, inventors, designers, artists, and thinkers. At the Center, they will discover that true innovation comes when diverse perspectives collide around shared challenges. A veritable playground for innovation, the Center is more than just a building; it is a place where diverse groups of people with various educational backgrounds can meet and gather, discuss and learn, create, innovate, and collaborate. The result is an inspiring, creative and cool place people want to be, attracting people from across campus and the city.

Making Local Connections

Participation from various stakeholders within the city of Columbus is central to this project and critical for the Center to be successful. To that end, the Center will promote local innovators by providing space, support, collaboration and testing opportunities of new developments within the Center's laboratories and building systems.

Engaging the Community

Engaging the community is essential to the mission of the Center. The innovations that will originate here are intended to better the world, and that process begins with community participation. Ohio State faculty, staff and students, researchers, entrepreneurs, artists and local industry leaders will make the Center Columbus' new home for public discourse around energy, with public events, TED Talk-style presentations, demonstrations, receptions, and conferences focusing on issues in the energy and digital technology sectors. In cooperation with the local community organizations, the Center will include a dedicated arts program to facilitate artistic design to seep into the innovative products of the designers and developers. The Center will stand apart from other research facilities and innovation centers by offering a public showcase that explores energy issues, active research projects and technology through public events as well as exhibit-style interactive experiences that promote understanding about the state of the industry and the future of innovation.



A striking structure creates an iconic entry to the building. The exterior surface of this entry vestibule is comprised of configurable digital walls to mimic the energy consumption, generation, flow, and KPIs of the **entire campus in a 3D model**, making a strong statement that the Center is not just a building, it is a building with a brain.

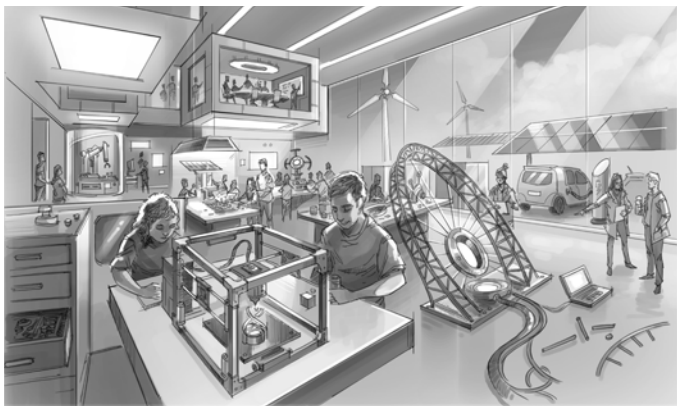
An Interactive Showcase highlights and demonstrates the of state-of-the-art technologies at work and under development in the Center. Through hands-on exhibits, visitors learn about energy and explore curated stories of real innovators and real technology.

Art installations created by Artists in Residence interpret energy technologies, simultaneously inspiring the viewer, connecting art with science and product development.

It's a living laboratory

A Living Laboratory

Unlike typical research facilities, the Center – with its **cutting edge infrastructure and built-in energy generation and management technologies** - will be a living laboratory, a constantly changing organism, evolving and adapting to meet the needs of its residents. A flexible configuration of laboratories, open-plan workspaces, and the opportunity to test technologies onsite will support faculty, students, **ENGIE Labs** and the Columbus community in their pursuit of innovative projects and unexpected collaborations. A section of the Center will be dedicated to collaborative applied research to be carried out by Ohio State and ENGIE Labs, integrated within the research and incubation functions of the Center. This section of the Center will be the **12th** global R&D facility for ENGIE Labs, and its first in North America. While the topics of research will naturally change and evolve with emerging technologies and developments, Engie Labs is committed to concentrate on developing solutions, products, and materials on **building energy systems utilizing IoT and 5G technologies** to kick-start the process in collaboration with OSU's Institute of Materials Research - IMR, the Dept. of Food, Agriculture & Biological Engineering, the Knowlton School of Architecture, the College of Engineering, the School of Medicine & Public Health, etc. An in-house ENGIE research group - expected to be 10 to 15 researchers initially - will perform applied research and development at the Center, providing opportunities for faculty and students to participate in this area. It is envisaged that as the Center grows, co-development between OSU and Engie Labs will also grow to include related topics such as **micro-grids, data analytics, renewable energy, and green mobility** with Dept of Electrical Engineering, Center for automotive research and Smart Columbus, IMR, etc. It is also envisaged that the other eleven global ENGIE labs facilities will collaborate with the University and ENGIE researchers at the Center, making it truly part of a global network.



A Platform for Real Technology

Cutting edge technology will be used on an ongoing basis in the building itself, some of which will be highly-visible from the common areas of the building to touch and inspire visitors with a look into the exciting work taking place. Furthermore, wherever possible, the implementation of technologies in the Center will be celebrated and on display. Rather than hiding the mechanical and building support functions, the real equipment is visible and accompanied by graphic panels interpreting the technology, its purpose and its impact throughout the building.

Technology in use and on display in the Center may include:

- A direct current electrical network and a digital ceiling IT network architecture to allow current and future devices, facility systems and power generators to be seamlessly connected to each other
- Net zero energy import, carbon neutral, & LEED platinum certification
- Innovative 5G network connectivity with other campus systems and devices fostering development for IoT
- State of the art building technology to maximize onsite energy generation and minimize energy consumption and loss such as:
  - Solar PV paneled roof
  - Organic PV paneled windows on the south facing façade
  - Regen-drive elevators to generate electricity when empty cars going up/full cars going down
  - Hydrogen fuel cells
  - Battery wall to manage supply/demand
  - Passive heat recovery system to capture building HVAC exhaust duct energy
  - Natural ventilation architecture and hydronic radiant heating/cooling systems to minimize forced air ventilation requirements
  - Onsite rainwater collection for reuse on green spaces
  - Grey water filtration for reuse on green spaces
  - Fully automated building energy management system

Planning for sustainability.

Public-Private Partnership

ENGIE is more than an expert in the business of electricity, natural gas and energy services; ENGIE is an eager partner uniquely positioned to connect the Center to the global energy market and bring together technology, services, data, and people to help tackle the world's energy challenges. With its subsidiaries and partners, ENGIE is committed to the success of the Energy Advancement and Innovation Center project. The Center will be home to the first laboratory in the ENGIE network to be designated a **"living laboratory"** and the in-house ENGIE research group will work alongside Ohio State researchers and faculty to research and evaluate new technologies as well as sponsor patents, inventions and creative works. The potential here is great, for the innovative ideas, processes, and products that will originate from the Center hold the promise of helping the University reach its sustainability targets, bring new solutions to market and help this public-private partnership lead the energy transition in North America.

Catalysts

A key element in converting innovative ideas into successful startups is the guidance and coaching of leaders from the industry as "catalysts." A catalyst program, where various **industry leaders** with experience in starting and running successful businesses, including some from ENGIE and Axium senior management, would **volunteer** to participate in the incubation teams.

Governance

The Center is suggested to be guided by an Advisory Committee consisting of three (3) members from the University faculty/staff, two (2) from ENGIE and two (2) from the Columbus community with no direct ties to Ohio State or Ohio State Energy Partners. Chairmanship of the Committee would permanently stay with the University. The Committee would meet monthly and vote on major decisions (such as granting access to tenants, research topic decisions, collaboration with other Columbus nonprofits and foundations, budgeting, etc.). The Committee would also take an active role in promoting and marketing the Center, bringing in funds, donations, and fostering collaboration with other public and private entities. Day to day operations would be managed by the Center's Director, appointed by the Committee, and his/her staff. In collaboration with the University, the O&M services may be contracted out to a third party.

Capital Expenditures and Funding

OSEP considers a capital outlay of approximately $35 million for the facility ($20 million for the construction of the building and $15 million for building energy and communications technologies), an incremental **$7.5 million as seed money** to fund the initial OSU/Engie Labs projects, and another $7.5 million as operating budget, totaling an investment of **$50 million**. OSEP also plans to reach out and invite other industry partnerships; non-profit organizations and foundations for their contribution to the Center.

Intellectual Property and Research

While the intellectual property rights decisions are likely to be guided by the Advisory Committee on a project by project basis, OSEP considers that the principle of maximizing value with proportionate rights for the inventor/developer, the Univeristy and the Center will be applied. OSEP and the Center will work in accordance with The Office of Responsible Research Practices which provides administrative services to facilitate research, improve review efficiency, and ensure regulatory compliance with research requirements. OSEP will not receive any portion of the proceeds that the Center will generate (except for ENGIE as "inventor/developer" for products that are developed by the ENGIE researchers).

Research

Incubation

Implementation