Labs2Zero

Decarbonizing the World's Laboratories

Program Update

Molecular Foundry building at Lawrence Berkeley National Laboratory; Source: Berkeley Lab—Roy Kaltschmidt

Laboratories have an outsized impact on carbon emissions due to their energy-intensive nature, so it is vital that lab owners, managers, designers, and engineers understand how their facilities perform in terms of energy and emissions and realize the measures they can take to improve them. To create a roadmap to help decarbonize the world's high-tech research facilities, the International Institute for Sustainable Laboratories (I2SL) is developing the Labs2Zero program, comprised of a variety of information and tools that address both the complexity of laboratories and the need to make them more efficient, while reducing the emissions associated with their buildings and operations.

I2SL's Labs2Zero program will include the following aspects, phased in over the next few years and available to those who input energy and facility data into I2SL's Laboratory Benchmarking Tool (LBT):

- An **Energy Score for lab buildings, and Emissions Scores** that encompass both operational and embodied emissions, as well as a way to set targets for new lab building scores
- An **Actionable Insights and Measures (AIM) Report** suggesting ways to improve a lab's Energy and Emissions Scores
- A **Design2Zero** tool suggesting ways to achieve energy and emissions goals in new lab construction
- A **certification program** to independently verify lab energy and emissions performance
- **Training and accreditation** to support the certification program

Alexandria Real Estate Equities, Cambridge, Massachusetts Photo courtesy of NBBJ

International Institute for Sustainable Laboratories

Why **Labs2Zero?**

Laboratories are extremely energy- and resource-intensive by nature, representing about 5 percent of U.S. commercial building emissions. However, by reducing U.S. lab building emissions by 50 percent by 2030, we could save an estimated 20 million metric tons of CO_2e annually, as well as 75 billion kilowatt hours of energy per year and $7.5 billion in lab energy costs per year. Labs2Zero is I2SL's most significant initiative to date, providing myriad benefits to labs across the United States and around the world:

- Addresses the complex nature of safely reducing laboratory energy use and emissions, while accelerating the decarbonization of the world's labs with needed metrics, analysis services, training, and recognition.
- Helps labs better understand their energy use and carbon footprint by providing comparisons to other labs of similar functional requirements.
- Provides a tangible report of customized and lab-specific actions and recommendations to help organizations reach their net-zero goals and meet their carbon emissions reduction targets.
- Aids organizational environmental, social, and governance (ESG) goals and climate risk analysis efforts with quantitative results demonstrating current and potential carbon footprints from laboratories.
- Allows designers and engineers to estimate energy use intensity (EUI) and greenhouse gas emissions and set targets based on planned design characteristics.

University of Washington Life Sciences Building, Seattle, Washington
Photo courtesy of Kevin Scott (@kscott)

Support Across the Labs Community

Over **100 experienced professionals** from the lab architecture, engineering, life science real estate, academic, lab supply, and pharmaceutical communities have volunteered their time and expertise to TACs supporting the development of the Labs2Zero Energy Score, Operational Emissions Score, Embodied Carbon Score, AIM Report, and LBT enhancement.

To help launch the program, more than 30 sponsors have contributed to help fund development of criteria and tools to support the Labs2Zero program components. These sponsors are recognized at the I2SL Annual Conference and on I2SL's social media, website, and network communications, as well as have the opportunity to submit case studies for the AIM Report and serve on several different Labs2Zero Technical Advisory Councils (TACs).

The first component of the program, the lab Energy Score, came online in pilot form in fall 2023. Using data from the LBT, the Energy Score is the first of its kind to provide a quantitative, normalized lab building score based on EUI compared to similar buildings. Lab designers and planners can also set a target Energy Score value and see what their corresponding EUI levels should be to achieve the score.

In spring 2024, I2SL launched a pilot Operational Emissions Score for lab buildings to rate their greenhouse gas emissions performance, based on EUI and location/electrical grid, compared to peers in the LBT database. In the future, Labs2Zero will offer a market-based score that takes purchases of green power, renewable energy certificates, and energy attribute certificates into account. An Embodied Carbon Benchmarking tool has also been launched in the LBT as the first step in comparing the emissions associated with lab structural system materials to similarly constructed facilities, using existing life cycle analysis data.

I2SL is working to provide a pilot AIM Report later in 2024 with customized energy and carbon reduction measures to achieve energy savings and emissions reductions, as well as estimated implementation costs and calculated return on investment.

If your organization would like to get involved with I2SL in these essential efforts, please email **President@i2sl.org**.

Thank you to the Labs2Zero Founding Sponsors!

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