



# Fermilab's Sustainability Program Update

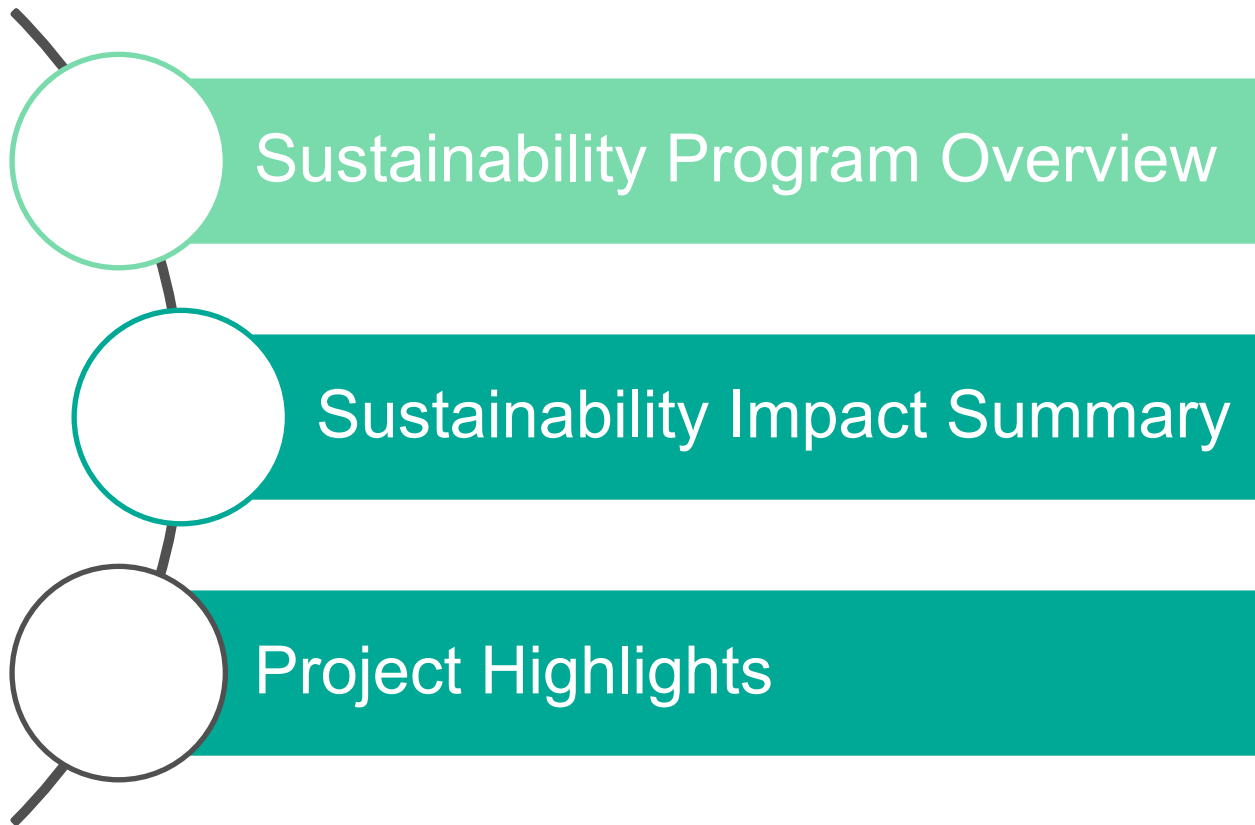
Catherine Hurley, Sustainability Manager

[churley@fnal.gov](mailto:churley@fnal.gov)

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# Agenda



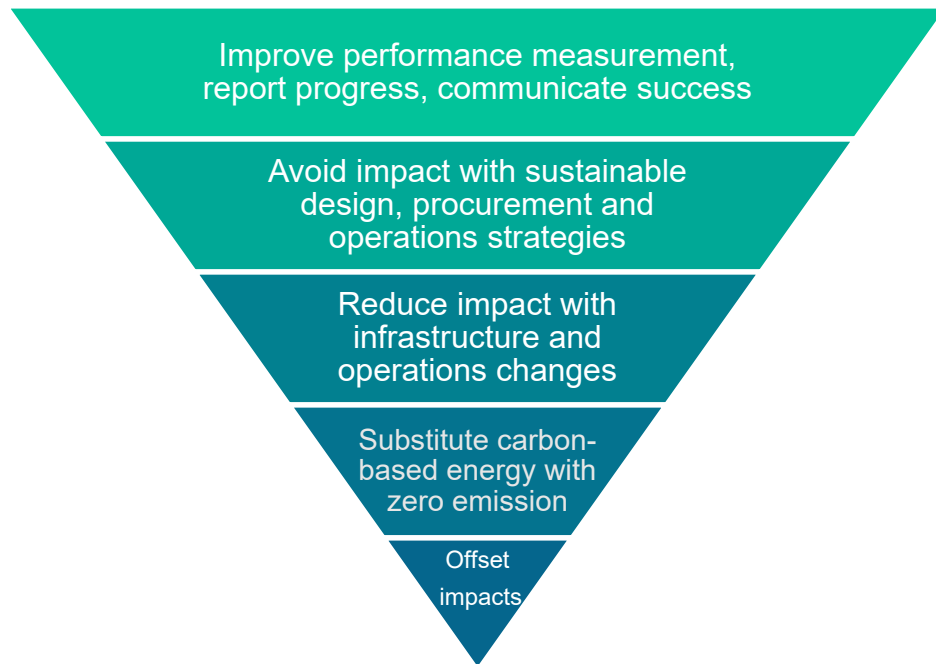
# Fermilab Sustainability Strategy

**Sustainability Vision:** Be a global leader for sustainability in particle and accelerator physics and technology innovation.

## Key Strategies



## Key Objectives



# Sustainability Management Team

Environmental Management System

Ecological Land Management  
Committee

Catherine Hurley



Sustainability  
Manager

- Lead Lab wide program
- Develop strategy
- Report & communicate progress
- Collaborate with DOE, NL's and external partners

- Chartered by COO
- Organizationally located in Infrastructure Services – Engineering
- 46 SMT members
- 14 groups / departments represented

Shivani Saikar



Energy  
Manager

- Analyze energy use
- Identify energy savings measures
- Develop projects
- Coordinate energy procurement

Kerry Aschenbach



Sustainability  
Engineer

- Identify water savings measures
- Develop projects
- Advance sustainable & resilient buildings

Alyssa Rodway



Sustainability  
Associate

- Improve recycling & waste reduction
- Increase green purchasing & resilient supply chain
- Environmental justice

## Sub-teams

Sustainability in Science	Water Management	Pollution Prevention & Waste Minimization	Environmental Justice	Communications, Outreach & Reporting
Energy Management	Sustainable & Resilient Infrastructure	Supply Chain Resilience	Sustainability Culture	Transportation



# Sustainable Infrastructure Strategy

Green Purchasing

Waste Reduction  
& Recycling

Green  
Construction

5. Supply  
Chain  
Sustainability

1. Energy  
Efficiency  
Measures

Building Design

Efficient Lighting

Efficient plug loads

Efficient HVAC

Efficient controls

Efficient occupant  
behavior

Energy Savings in  
Scientific  
Infrastructure

Energy Storage

District Heat  
Recovery

Other carbon-free  
energy pipeline

4. Energy  
Infrastructure  
Connections

On Building  
Renewables

Campus Scale  
Renewables

Purchased Carbon  
Pollution Free  
Electricity

3. Carbon  
Pollution Free  
Electricity

2. Eliminate  
Fossil Fuel  
Use

Heat Recovery  
Chillers

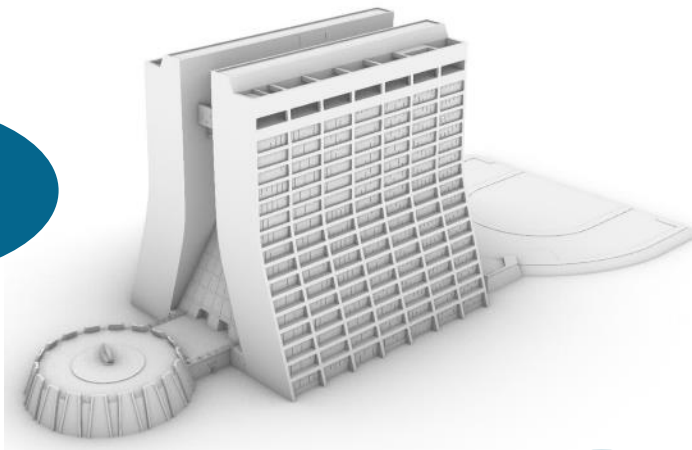
Heat Pumps

Electric Boilers

Electric Furnaces

Electric Vehicles

EV Charging



# Sustainability Highlights Brochure Issued

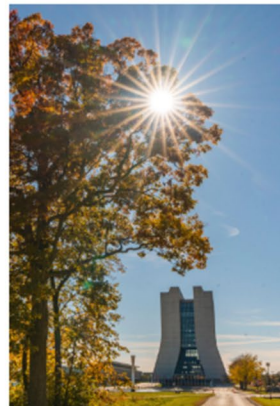


## INTRODUCTION

Fermi National Accelerator Laboratory is America's particle and accelerator physics laboratory, bringing the world together to solve the mysteries of matter, energy, space and time. As a Department of Energy National Laboratory, Fermilab is working on the world's most advanced particle accelerators and seeking out the nature of dark matter and dark energy. Ensuring that our activities in science and operations are executed in a sustainable manner and providing a model for sustainability to the high energy physics community is integral to delivering on Fermilab's mission.

Protecting, restoring and improving the natural environment are priorities. Fermilab is committed to long-term sustainability and resilience of its operations, which was demonstrated during the past year when we took big strides to build and improve our sustainability program.

This Fermilab Sustainability Highlights brochure summarizes our achievements from 2023.



## SUSTAINABILITY VISION

Fermilab's vision is to be a global leader for sustainability in particle and accelerator physics and technology innovation. As a large user of energy, water and other resources, Fermilab has the responsibility to incorporate sustainability into the execution of our mission. We join the global concern over the threat of climate change and environmental issues.

Fermilab broadly defines sustainability as creating and maintaining conditions under which humans and nature can exist in productive harmony, permitting the fulfillment of social, economic, and other requirements of present and future generations.

Sustainability at Fermilab is advanced through:

- taking actions that seek to minimize or eliminate emissions of greenhouse gases and other pollutants;
- reducing energy and water use;
- increasing adaptation and resilience to the impacts of climate change;
- protecting public and worker health;
- minimizing waste;
- addressing anticipated harm from emerging contaminants of concern;
- conserving and restoring ecosystems and preserving native landscapes, watersheds, and biodiversity;
- and delivering environmental justice.



FERMI NATIONAL ACCELERATOR LABORATORY

Fermilab strives to be a global leader in performing science sustainably. We are committed to setting sustainability goals as an integral part of new scientific infrastructure projects. We are also incorporating sustainability into all our operations so we can further establish Fermilab as a beacon of sustainability and progress. Many technologies developed and advanced in pursuit of discoveries in particle physics will contribute to a more sustainable future. Our discoveries demonstrate the ability of humanity to more fully understand the basic building blocks of energy and matter and with it, the inspiration to solve the intractable problems of our time.

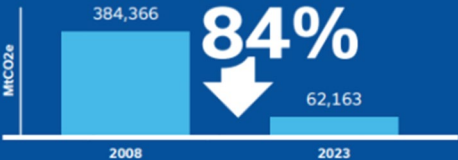
*Lia*

Lia Morreaga, Director of Fermilab



# Fermilab Key Sustainability Metrics 2023

## Carbon emissions



**GOAL:** Net-zero by 2050

## Education and planning

**16** staff trained on energy  
**121** staff trained on climate AND energy (Earth Day and training)  
**45** Sustainability Management Team members

## Resource conservation



**12X**

Cooling water is reused 12 times before being discharged from the site



**52%**

of waste diverted (municipal solid waste)



**81%**

of construction and demolition debris diverted from landfill

## Electrification



**35%**

carbon pollution-free electricity (FY23)

**GOAL:** 100% by 2030



**42%**

166/394 of Fermilab's buildings are electric (FY23)

**GOAL:** 100% by 2045



**52%**

zero emission vehicle acquisition  
87 total vehicles ordered, 45 are mix of plug-in hybrid electric vehicles and battery-electric vehicles

**GOAL:** 100% acquisitions by 2035

# Project Highlight – Fermilab Resilience and Efficiency Project

## Goals:

- To reduce energy consumption, increase clean energy and improve reliability in support of DOE's sustainability goals.

## Planned Elements include:

- Energy and water conservation measures (ECMS) at ~23 buildings.
- Utility scale solar photovoltaic system - 2MW, 10 acres minimum but system of ~20MW -95MW under consideration
- Energy Storage and MicroGrid

## Benefits:

- Address maintenance, modernization, electrification and other sustainability goals; reduce risk of rising electricity costs with on-site renewable energy



# Project Highlight – Fermilab Resilience and Efficiency Project

## Progress:

- Selected for a \$10M grant from the Federal Energy Management Program under the Assisting Federal Facilities with Energy Conservation Technologies
  - Funds to be used for reducing the cost of the project to the government
  - Enable additional ECM's that have longer-payback including HVAC, Transformers and Tunnel Lighting
- Project proposal in development
  - DOE selected Ameresco to complete an Investment Grade Audit and submit a proposal to DOE for ECM's and solar PV + battery storage system
  - Project planned to take 18-24 months to complete after a task order is awarded



HVAC



Transformers



Lighting

# Local Media Coverage of DOE Grant and Fermilab Sustainability



## Environmental

### How Argonne, Fermilab will use federal energy conservation grants



Wilson Hall, right, and the Integrated Engineering Research Center at Fermi National Accelerator Laboratory in Batavia. *Courtesy of Fermilab/Ryan Postel*



"We are building net-zero design into all aspects of the laboratory including major renovations, new construction projects and our operational processes," she said.



The Fermilab Welcome and Access Center will be located near Fermilab's main entrance on Pine Street in Batavia, as shown in this rendering. *Courtesy of Fermilab*

Construction on the Fermilab Welcome and Access Center is underway and will be the lab's first building designed to be all-electric, enabling net zero in the future, according to Hurley.

The center will have high-efficiency heating and cooling systems. An extensive green roof system and earthen berm will blend the building into the surrounding prairie landscape.

# Project Highlight – Fleet Electrification and EV Charging Stations

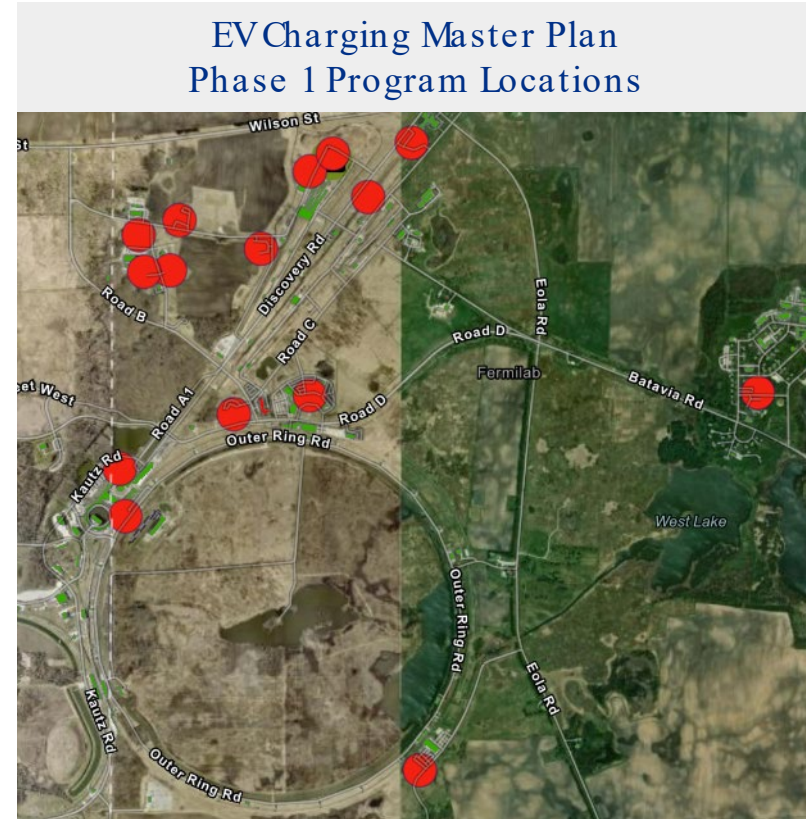
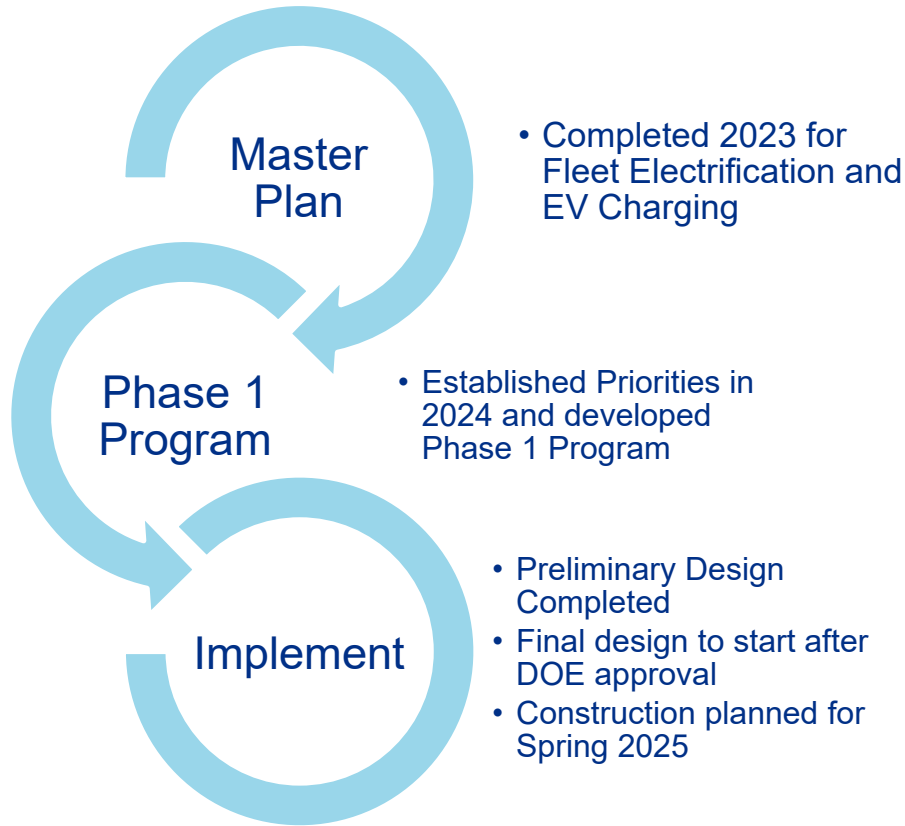


**64 Battery, Electric and Plug-in Hybrid Electric Vehicles Received**



**~78% can be electrified now,  
15% have a PHEV  
replacement**

# Project Highlight – Fleet Electrification and EV Charging Stations



# Fermilab Receives 2024 DOE Green Fleet Award

DOE recognized Fermilab for selecting zero emission vehicles for 94% of Fermilab's light-duty vehicle acquisitions, more than any other site with similar size fleets.

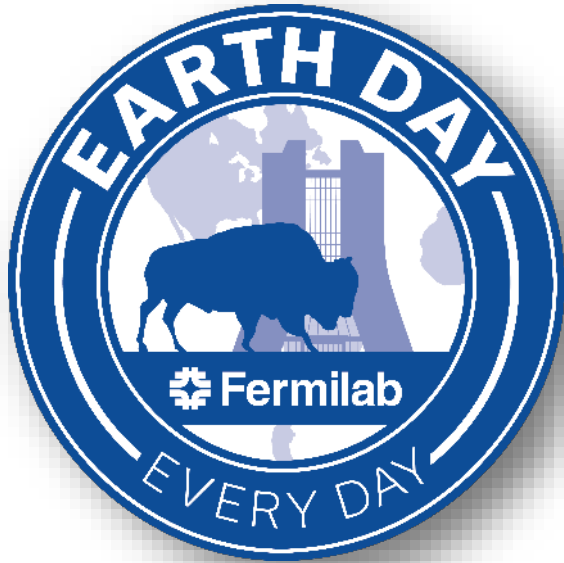


# IERC Received 2024 DOE Sustainability Awards

- Outstanding Sustainability Program / Project category
  - Award celebrates IERC's eco-friendly design, which incorporates numerous features to achieve reductions in greenhouse gas emissions, waste and pollution and increase water efficiency.
- High-Performance Sustainable Building Award
  - Award recognizes IERC's effort to design, construct and operate the building in a sustainable manner — leading to improved energy efficiency, water conservation, enhanced indoor air quality and cost-savings.



# Education and Engagement



Annual Earth  
Day Fair  
April 24, 2024



Monthly Fireside  
Chats with  
Sustainability  
11 held to date



Sustainability  
Training  
1683 Employees  
Trained



Thank you.

