



Sustainability Program Overview

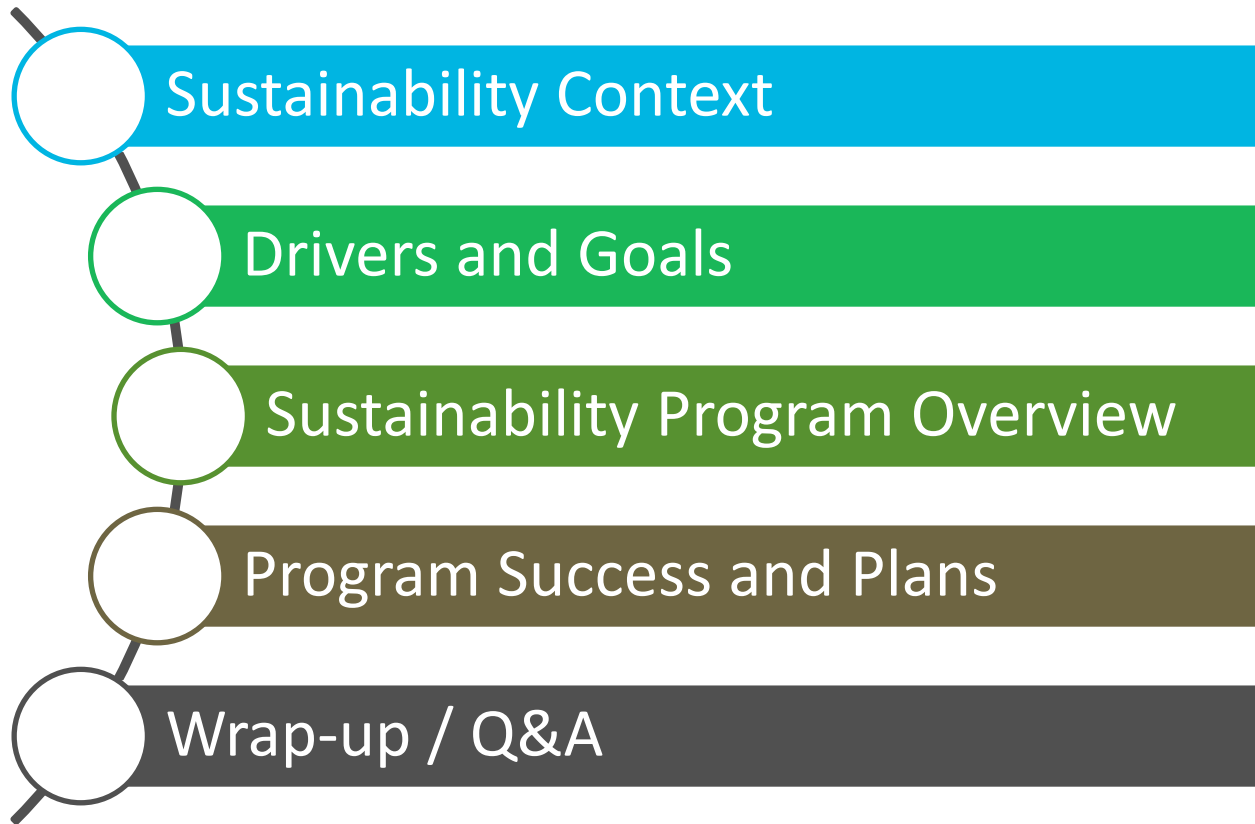
Catherine Hurley

Sustainability Manager

ISD-Engineering

November 16, 2023

Agenda



Sustainability Context



Global

Countries are increasingly making commitments and taking action to support sustainability but more work is needed.



United States

Federal Government leverages buying power and leads nation in advancing sustainability; Funding through BIL, IRA, Chips+Science Act deliver unprecedented resources.



Science Community

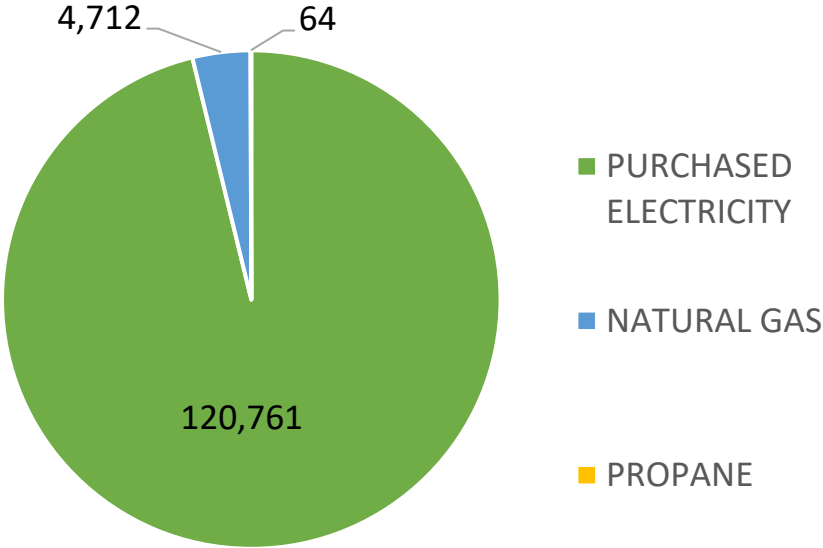
Increasing interest and discussion of sustainability in accelerator and particle physics: Snow Mass and SustainableHECAP+ Initiative report.

Fermilab FY 2023 Emissions: 131,169 MtCO2e*

Equivalent to the annual emissions from 11,500 average homes.

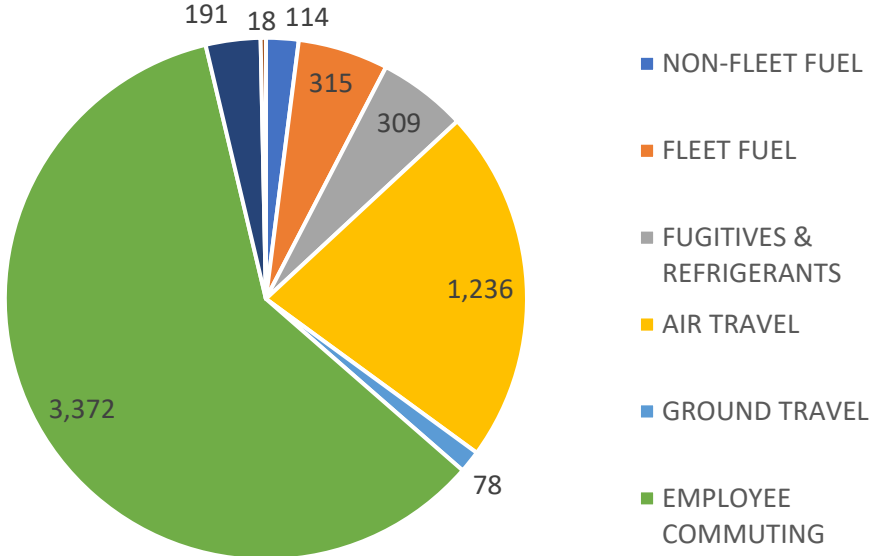
Total: 125,536 or 95%

Energy-Related GHG Emissions (MtCO2e) by Fuel Type
FY22



Total: 5,632 or 5%

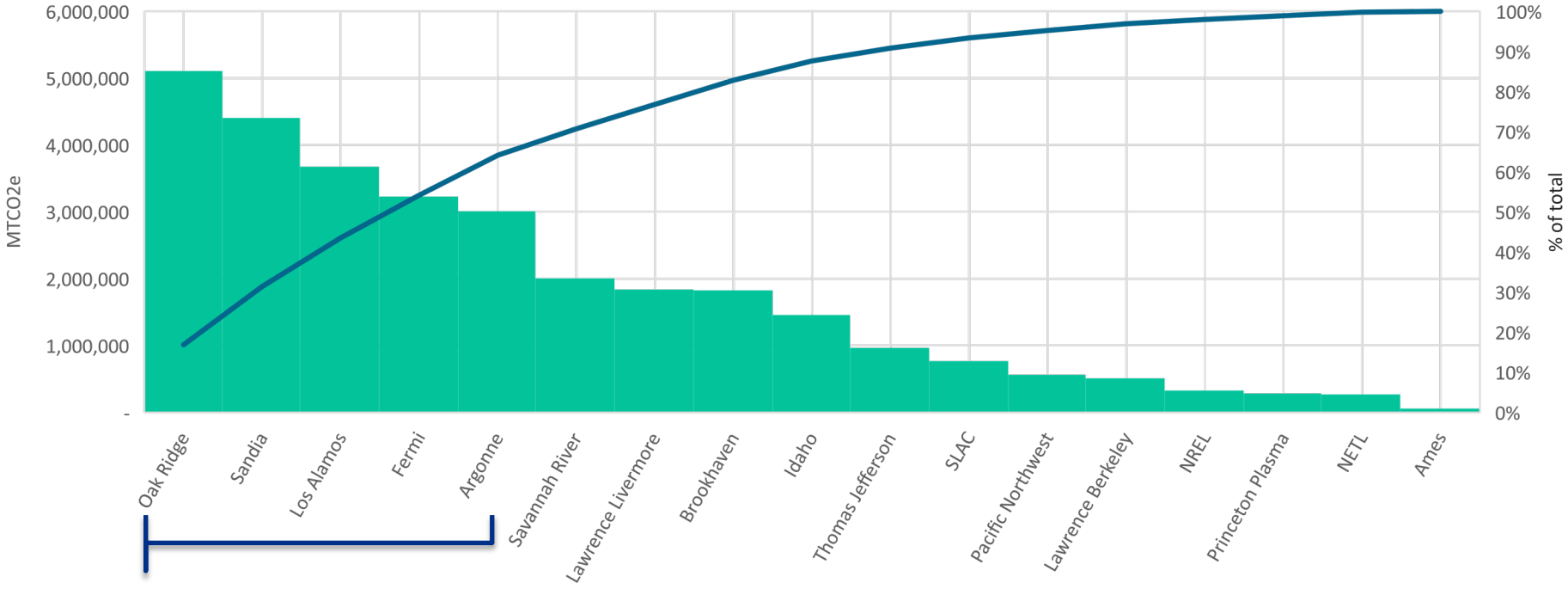
GHG Emissions (MtCO2e, Excluding Energy) by Category
FY22



*15,865 MtCO2e (not included in total) offset by renewable energy

Carbon Emissions for DOE National Laboratories

Overall GHG Emissions by National Lab
FY23



70% of carbon emissions from 5 labs

National Lab



Sustainability Drivers and Goals



DOE O 436.1A Departmental Sustainability

- Agency-wide integrated, performance-based approach to implement sustainability in DOE operations.
- Includes sustainability requirements for built and natural environment.
- Flows requirements to Fermilab through the prime contract.
- Updated April 2023

11/16/23

Sustainability Program Update

*Scope 1 resulting from burning fossil fuels on site

Fermilab Sustainability Program Strategy

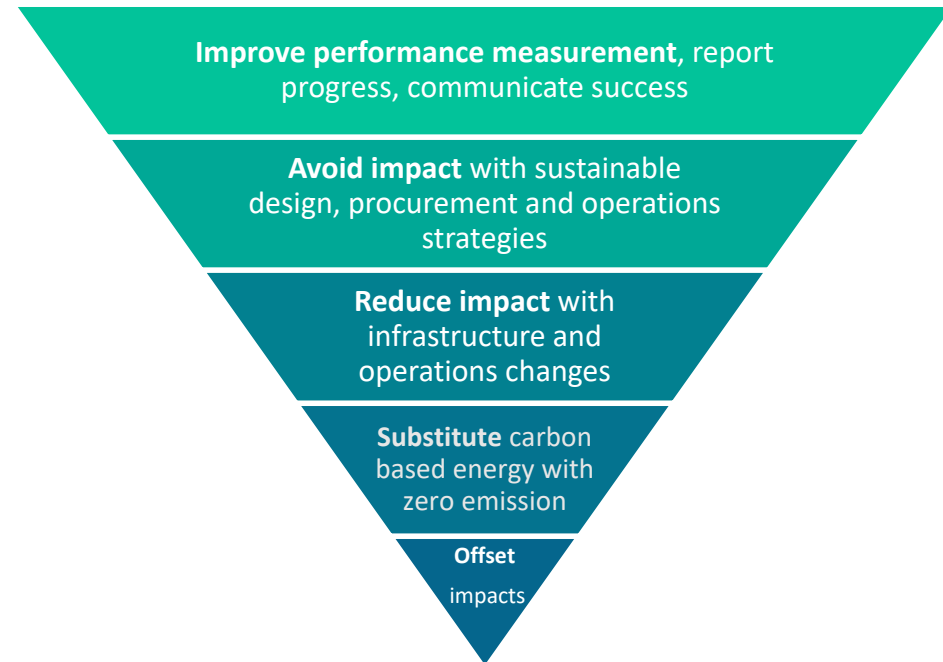
Sustainability Vision: Be a global leader for sustainability in particle and accelerator physics and technology innovation.

Key Strategies



Sustainability Program Update

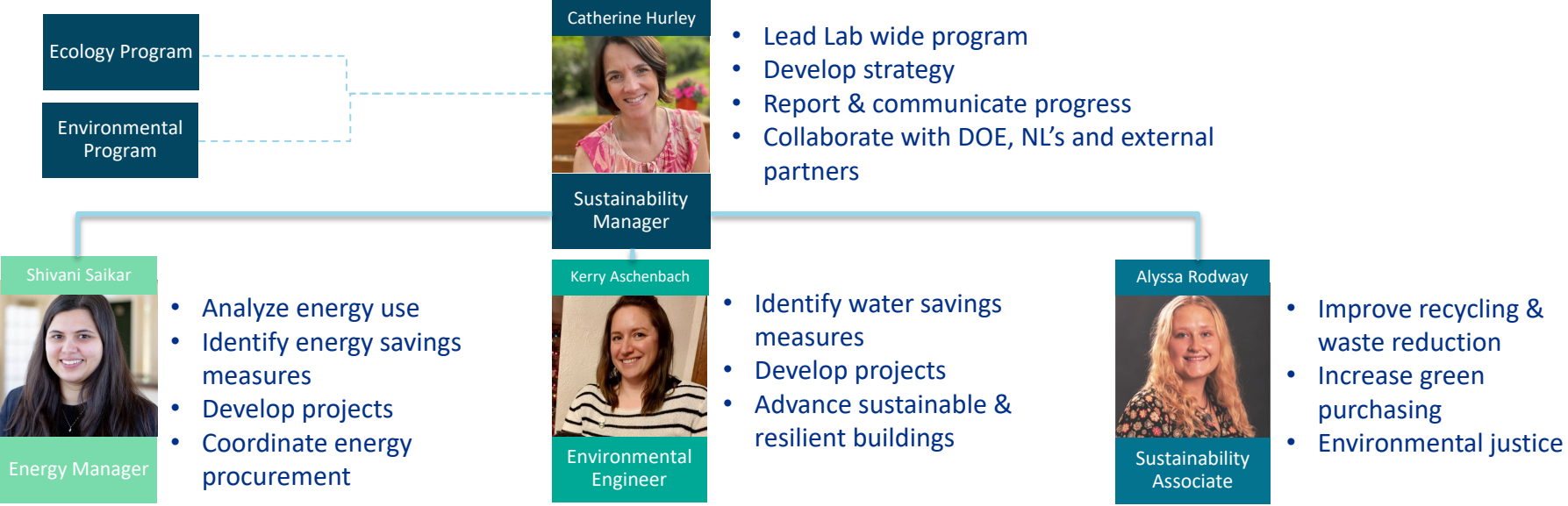
Key Objectives



Sustainability Program Team - Established January 2023



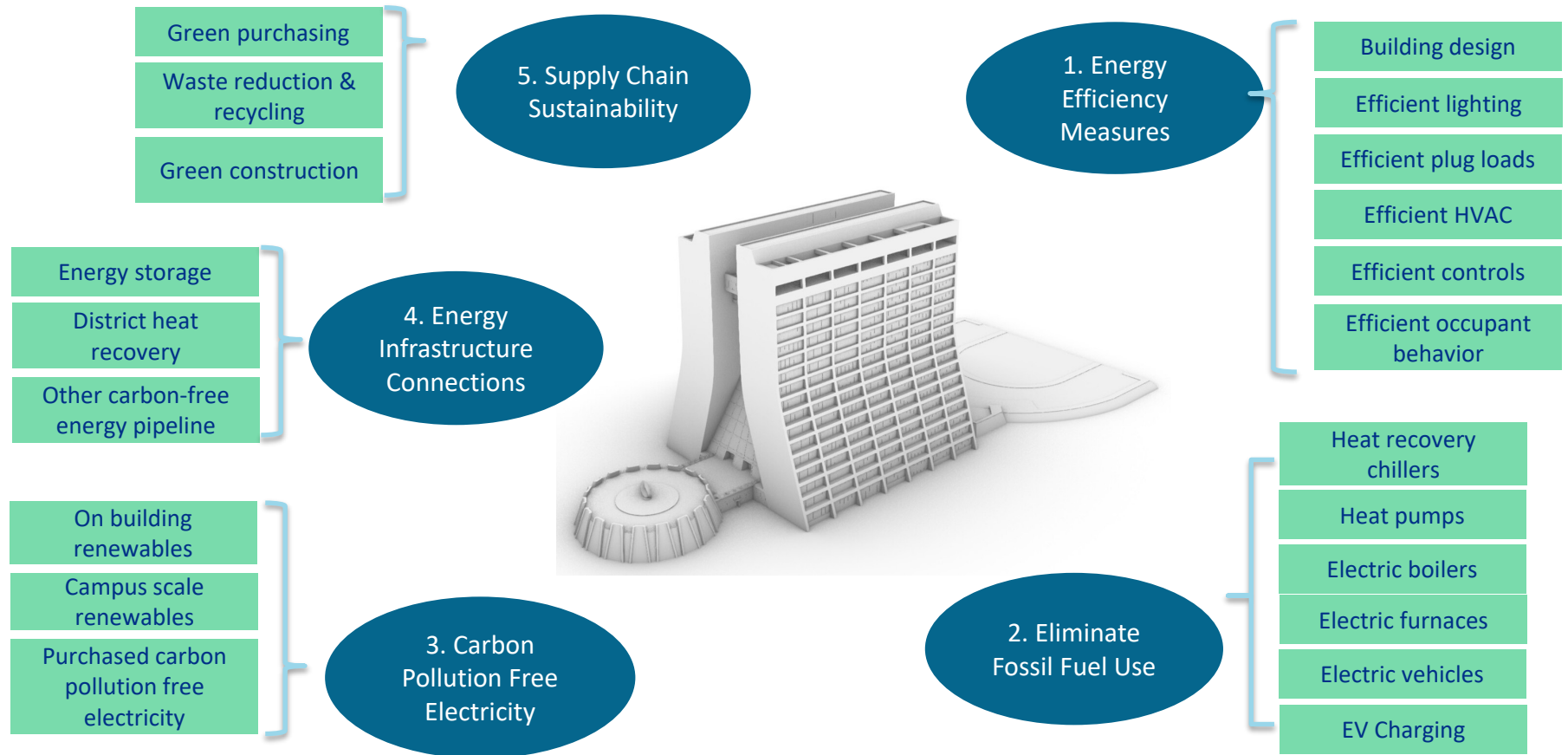
Sustainability Program Structure



Sub-teams			
Sustainability in Science	Water Management	Environmental Stewardship	Communications, Outreach & Reporting
Energy Management	Sustainable & Resilient Infrastructure	Sustainable Operations	Transportation

Sustainability Program Update

Sustainable, Net Zero Carbon Buildings Strategy



Sustainable Buildings Progress and Plans

Progress

- 8 buildings meeting Guiding Principles for Federal Sustainability Buildings
- Energy efficiency and decarbonization integrated into Central Utility Building improvement project

Plans

- Fermilab Resilience and Efficiency Project
- Electrification study
- Integrating sustainability into end of life equipment replacements and facilities maintenance projects



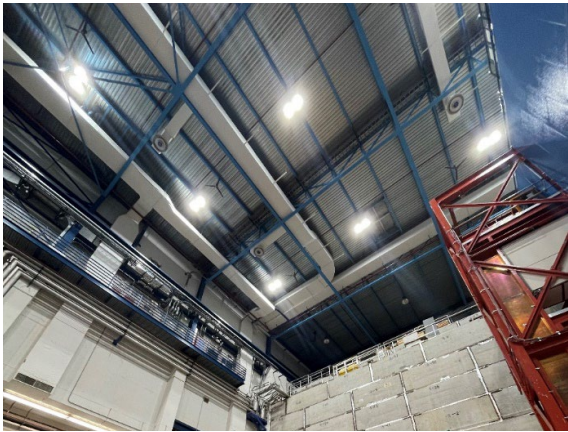
Integrated Engineering Research Center



Illinois Accelerator Research Center

Fermilab Resilience and Efficiency Project Overview and Status

Project Goal: Reduce energy consumption, increase clean energy and improve reliability in support of DOE's sustainability goals.

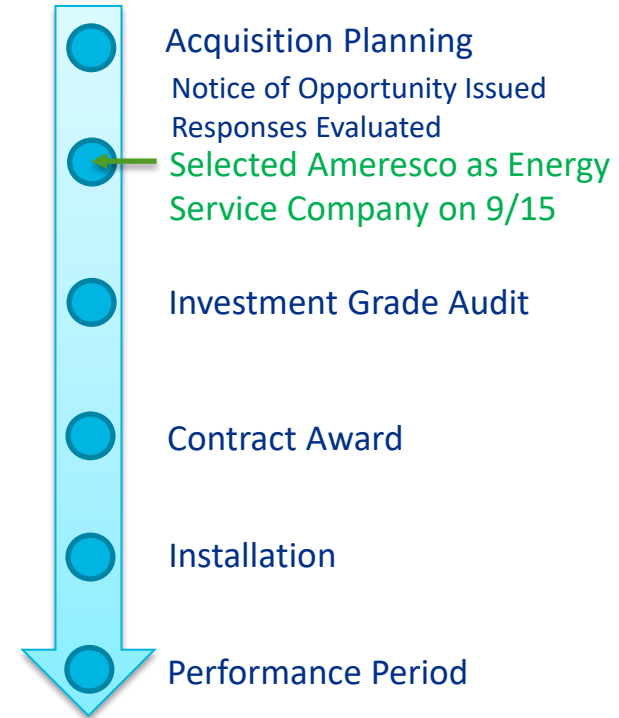


- Energy and water conservation measures at ~22 buildings.
- Address maintenance, modernization, electrification, and other sustainability goals.

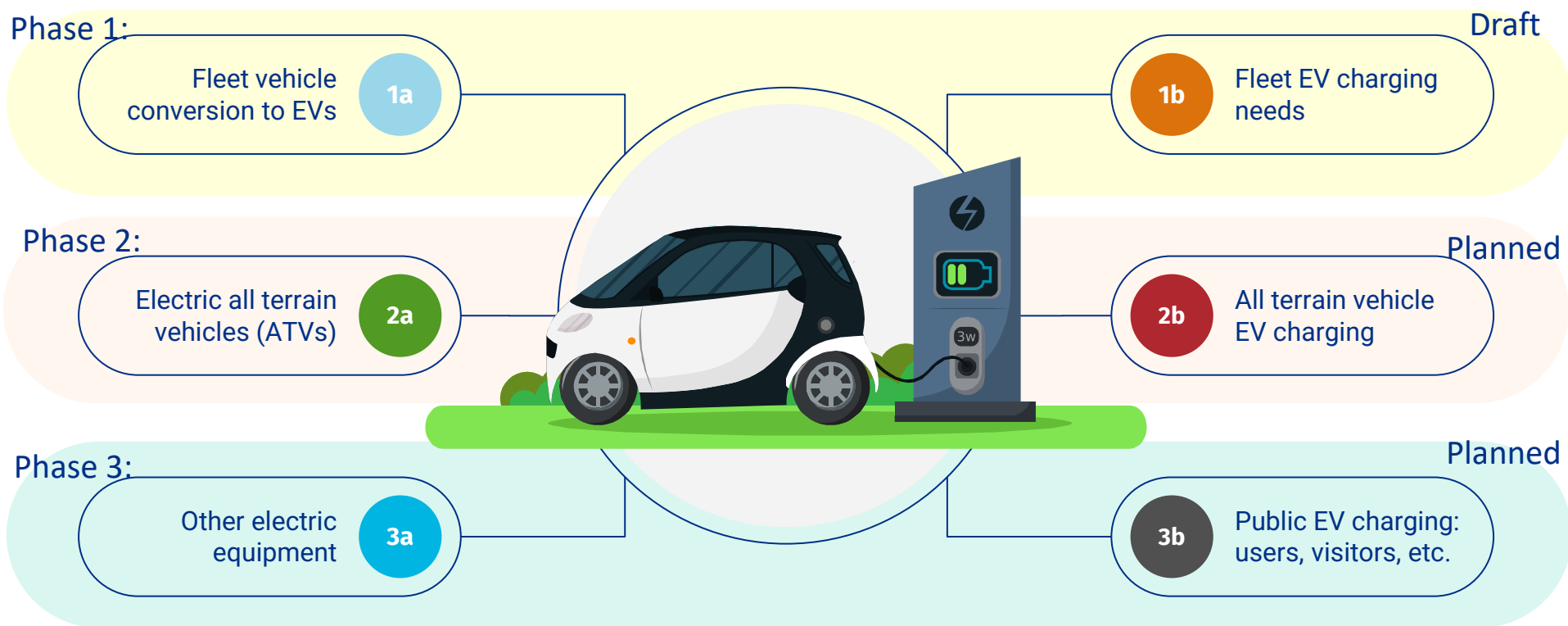


- Utility scale solar photovoltaic system - 2MW, 10 acres minimum.
- Energy storage and micro- or nanogrid.

PROJECT PHASES

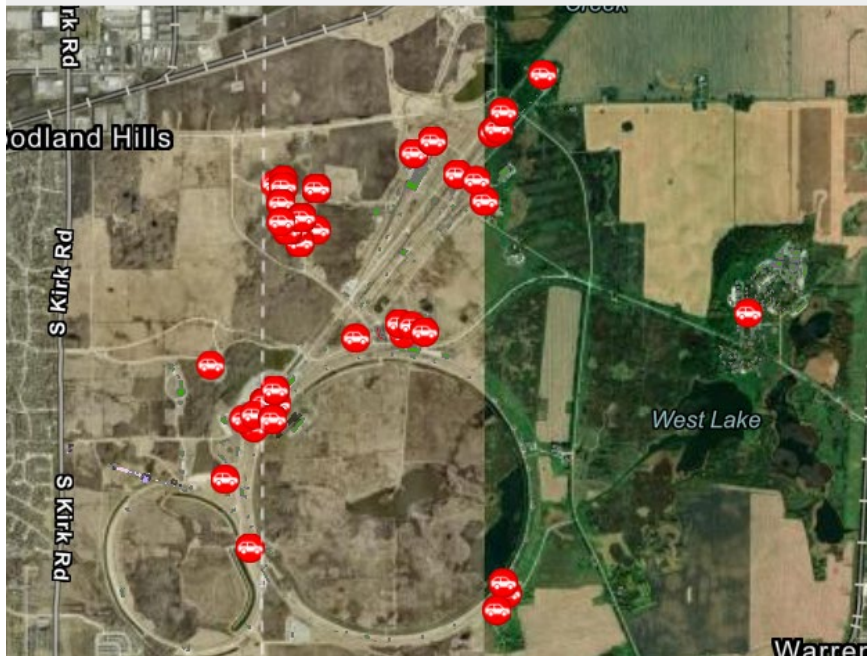


Vehicle Electrification and Charging Station Master Planning Effort



Zero Emission Vehicle Master Plan Overview

EV Charging Master Plan Phase 1



- 66 EV charging stations
- ~27 locations



Maximize ZEVs, seeking lowest emission replacement for every vehicle



~78% can be electrified now, 15% have a PHEV replacement, 7% do not have an adequate replacement



Electric vehicle charging master plan established with 2 vehicles to a charging port

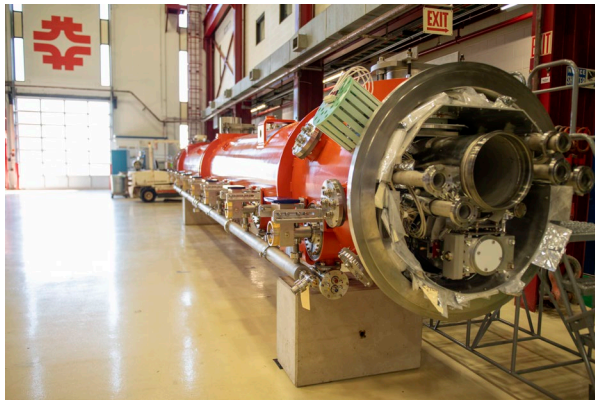


Procurement in progress to secure ~XX ZEV's and establish EV charging infrastructure

Sustainability In Science Focus Areas and Examples

Engaging the science and engineering community to achieve long-term sustainability goals

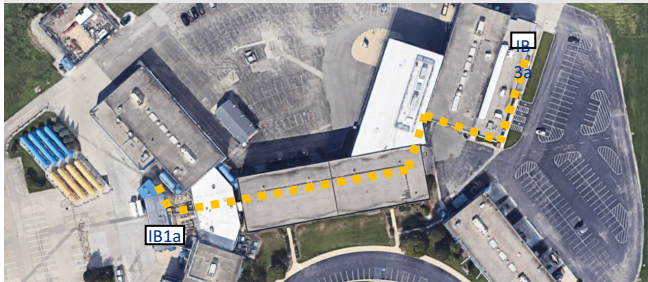
Incorporate sustainability in experiment design.



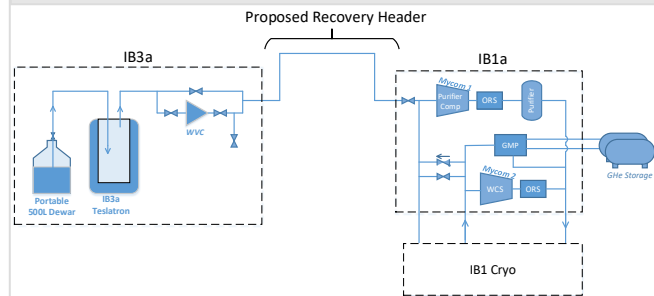
Nitrogen doped SRF cavities used in the LCLS-II accelerator will help cut the cryogenic losses of this machine by up to a factor of two

Innovate to operate experiments more sustainably.

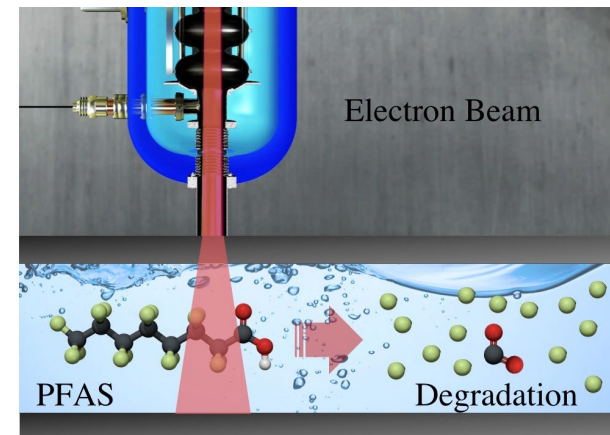
Conceptual over the roof recovery pipe routing from IB3a to IB1.



Simplified Schematic of IB3a to IB1a Recovery System.



Export capabilities to advance sustainability in the world.



Electronic beam applications at IARC destruction of PFAs, water treatment, destruction of toxins in soil

2023 DOE Sustainability Awards

Recognizing excellence in **energy, water, waste, fleet, sustainable acquisition, and resilience.**



Sustainability Champion – **Eric Mieland**



Strategic Partnership for Sustainability – **Fermilab & Fermilab Natural Areas**



Thank you.

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