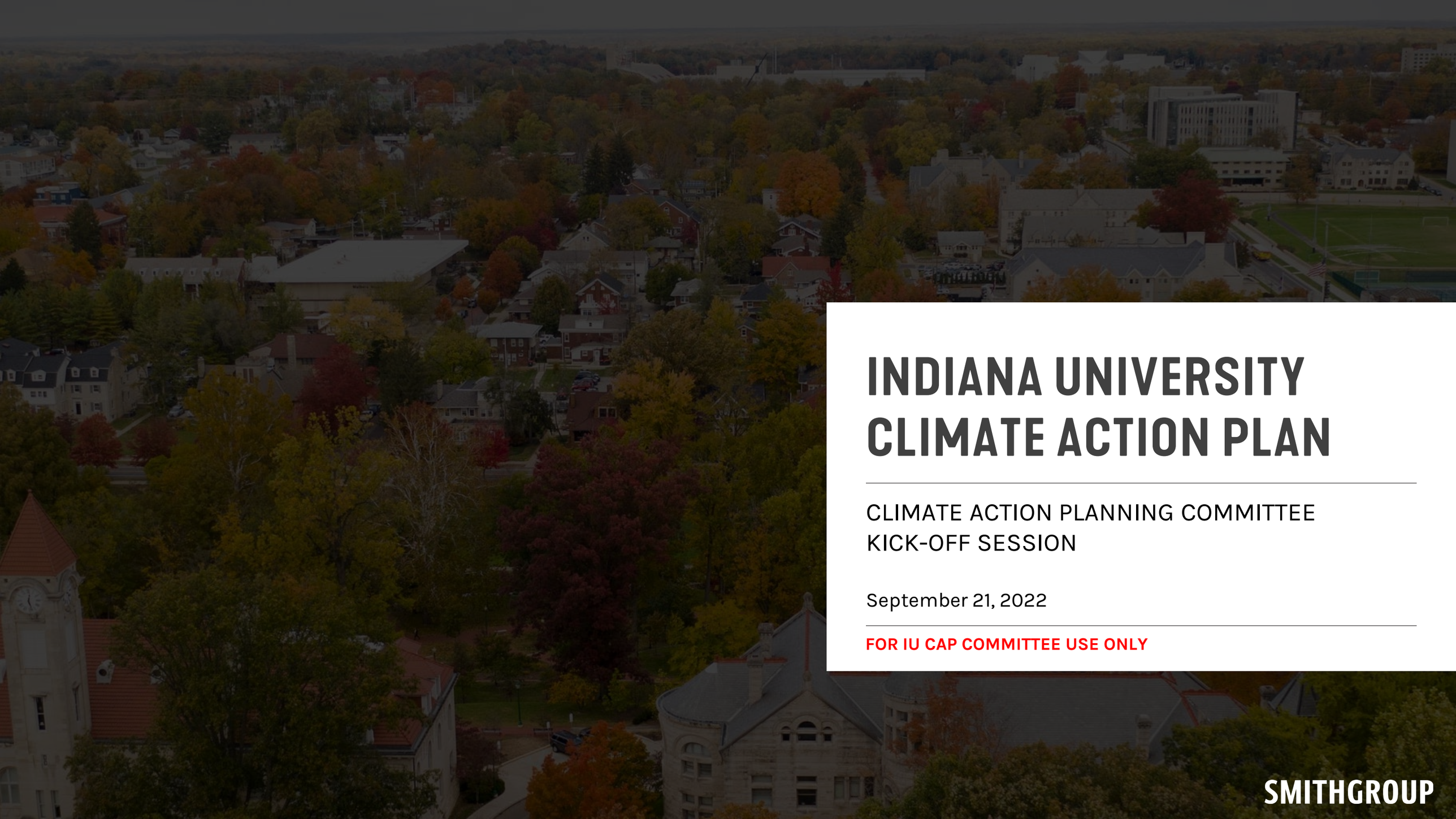


INDIANA UNIVERSITY CLIMATE ACTION PLAN

CLIMATE ACTION PLANNING COMMITTEE
KICK-OFF SESSION

September 21, 2022

FOR IU CAP COMMITTEE USE ONLY

SMITHGROUP

AGENDA

Project & Team Overview

- Introductions
- IU CAP Timeline
- Project Approach

Discussion

- IU progress to-date
- Defining Success
- Vision & Goals

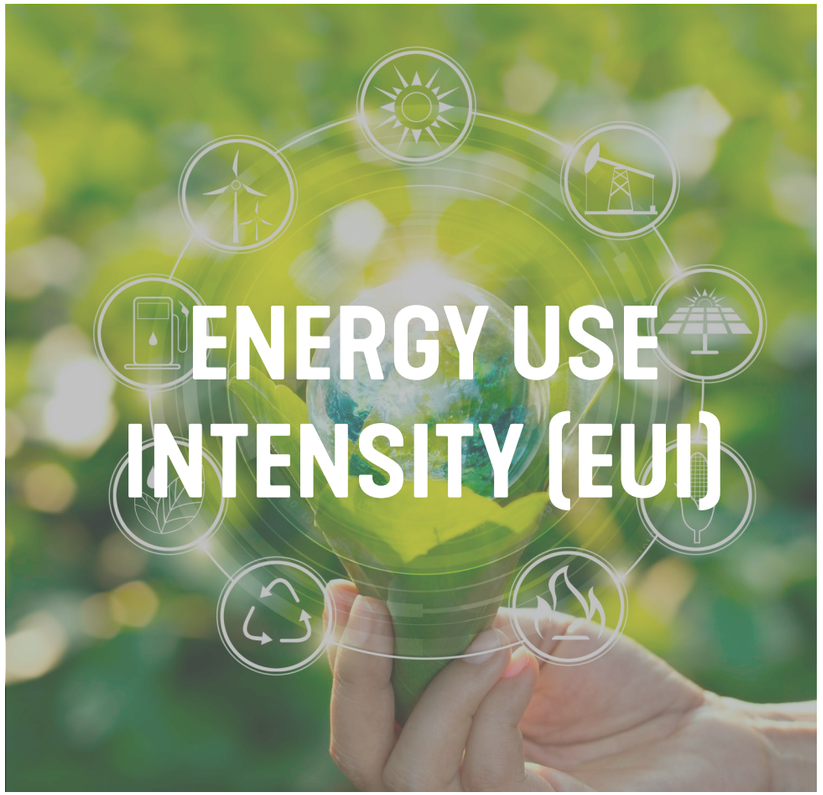
On-campus Engagement

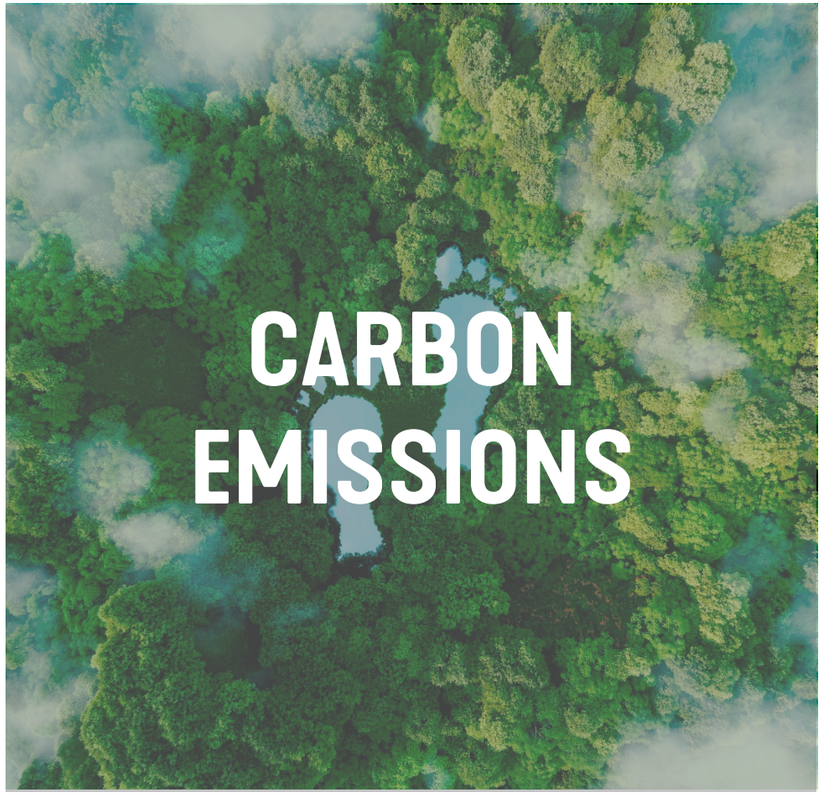
- Public Forums

Next Steps

- Public Forum prep
- Data and resource request

WHAT ARE WE DOING HERE?





OUR TEAM

STET SANBORN
PRINCIPAL IN CHARGE

ALICIA ADAMS
PROJECT MANAGER

LING ALMOUBAYYED
RESILIENCE PLANNER

KEVIN KING
SENIOR URBAN PLANNER

JAKE CHEVRIER
SUSTAINABILITY STRATEGIST

ALEC BARNES
ENVIRONMENTAL ENGINEER

LAUREN LEIGHTY
CAMPUS PLANNER

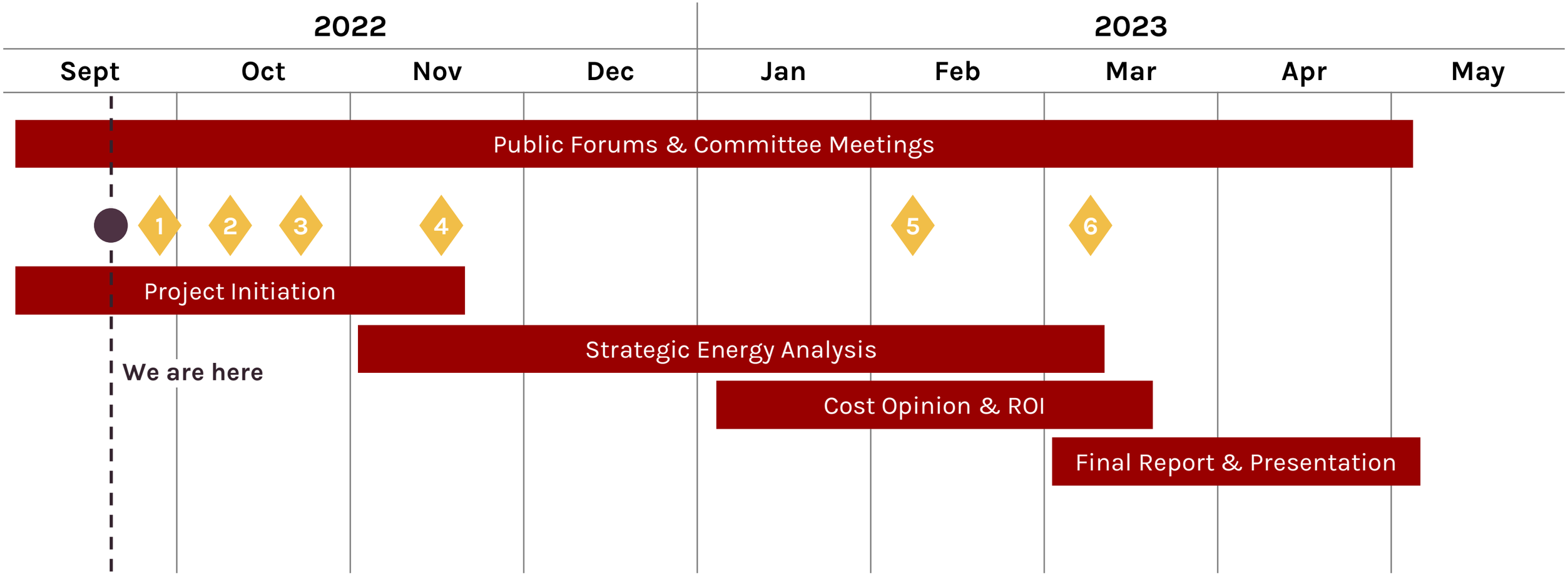
KATRINA KELLY-PITOU
ENERGY ECONOMIST

CLIMATE COMMITMENT

ADDRESSING THE CLIMATE EMERGENCY

SmithGroup is committed to designing a carbon-free future that embraces conservation, maximizes renewable energy, decarbonizes systems, adapts existing buildings and sites, incorporates low-carbon construction materials, and goes beyond offsets as much as possible.

PROJECT SCHEDULE



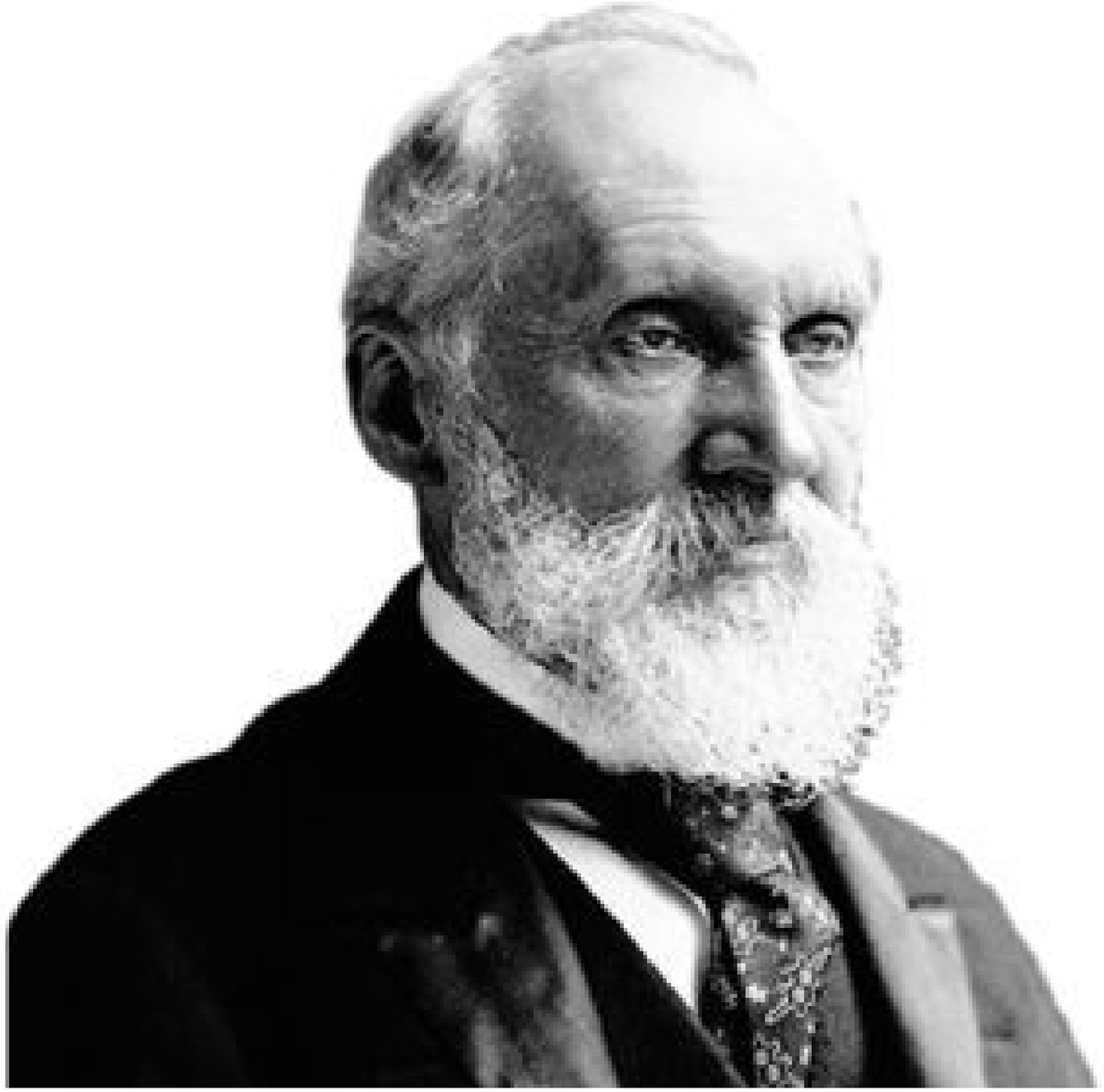
Project Initiation
- Project Kick-off
- Data Gathering and Review

Strategic Energy Analysis
- Energy and Emissions Baseline
- Projected Energy Use and GHG Emissions
- GHG Emissions Reduction Strategies

Cost Estimating and Return on Investment
- Conceptual Cost Estimate Coordination
- Strategy Prioritization and Phasing

Task 6: Final Report and Presentation
- Final Presentation
- Final Report

PROJECT APPROACH



“To measure is to know.

If you cannot measure it, you cannot ***improve*** it.”

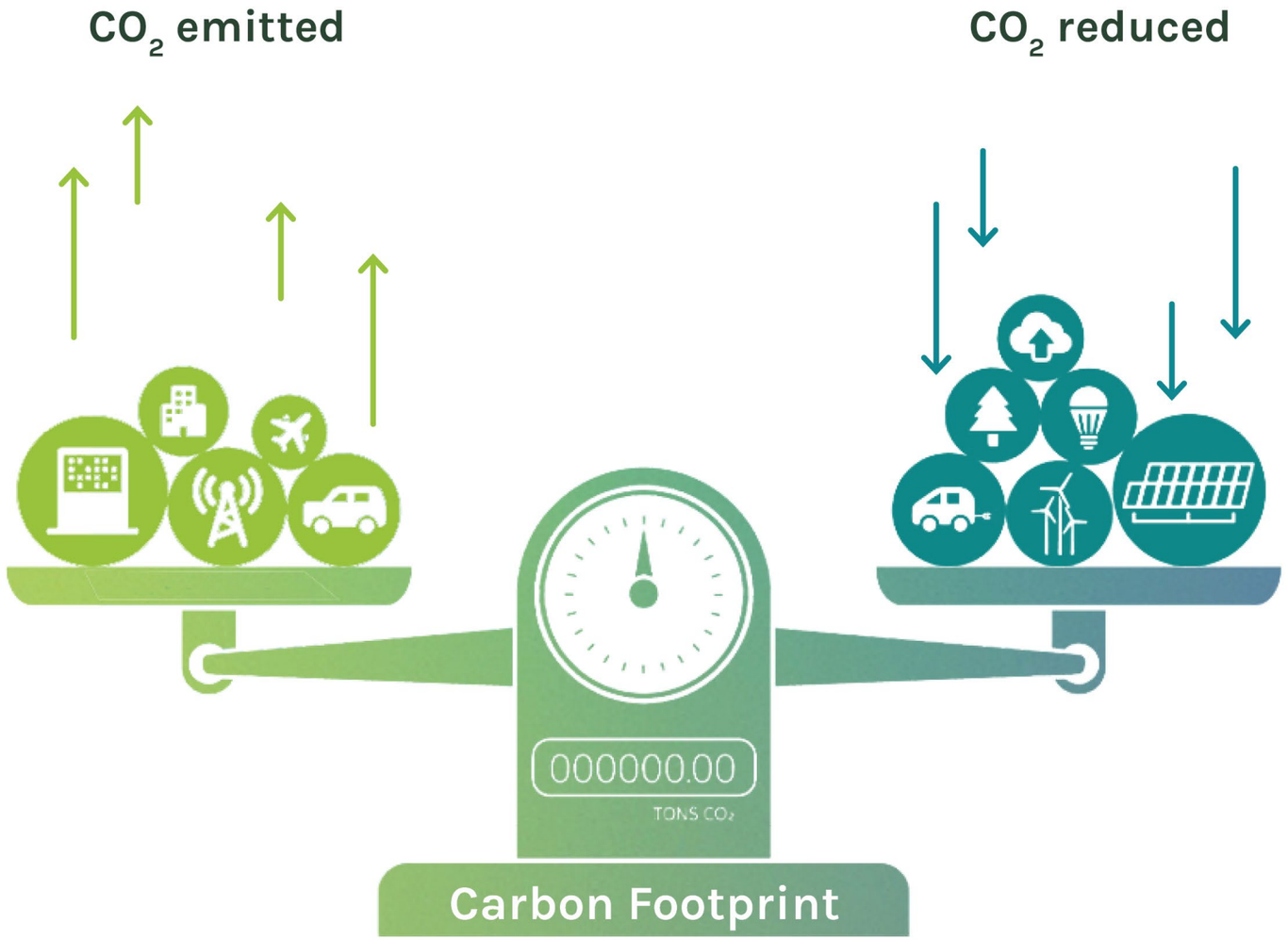
Lord Kelvin (1824 – 1907)

WHAT WILL BE MEASURING?

We will be measuring the following based on historic trends, current state, and future projections:

- Energy Use
- Energy Use Intensity (EUI)
- Carbon emissions

These findings – and associated assumptions – will inform recommendations and guide future policy decisions.



RESEARCHING FOR INNOVATION & DECARBONIZATION

THE Sustainable SITES Initiative®

2030 DISTRICTS® NETWORK

ICLEI
Local Governments for Sustainability

Better Buildings® CHALLENGE
U.S. DEPARTMENT OF ENERGY

Better Climate™ CHALLENGE
U.S. DEPARTMENT OF ENERGY

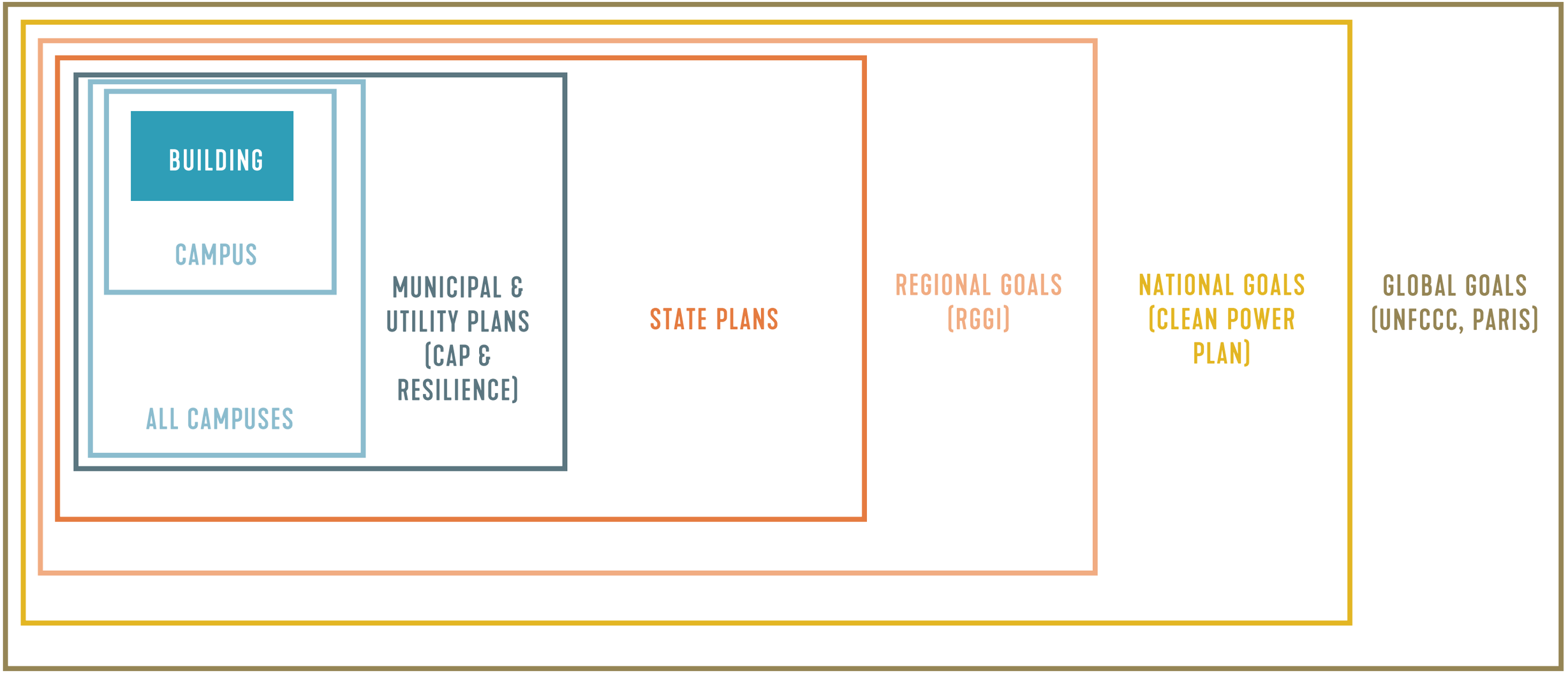
Better Plants® CHALLENGE
U.S. DEPARTMENT OF ENERGY

WE WORK ACROSS SCALES OF SUSTAINABILITY…

	Performance or Design	Metric	Boundary	Combustion Allowed?	Efficiency Required?	Offsite RE Allowed?	Other Reqs.
LIVING BUILDING CHALLENGE					NC: 70% EBB* EB: 50% EBB (both w PV) Highest efficiency NC: 25% < 90.1-2010 EB: 30% < CBECS	Yes. Using the offsite RE exception. Yes, must be local. 75% of roof for solar. Yes. Must be *Additional.*	Must include on-site storage; 20% embodied carbon reduction.
ZERO ENERGY CERTIFICATION							
ZERO CARBON CERTIFICATION							10% Embodied Carbon Reduction + Carbon offsets for the remainder
LEED Zero ENERGY					No, but LEED Certified	Yes. See tiered structure for on- and offsite RE	Must be LEED-NC or EBOM certified. Performance in Arc. TOU Option for LZC.
LEED Zero CARBON							

= Transportation = Embodied Carbon = Site Energy Use = CO2e = Source Energy Use

...AND NESTED SCALES OF INFLUENCE



UNDERSTANDING CARBON EMISSIONS

SCOPE 1 EMISSIONS

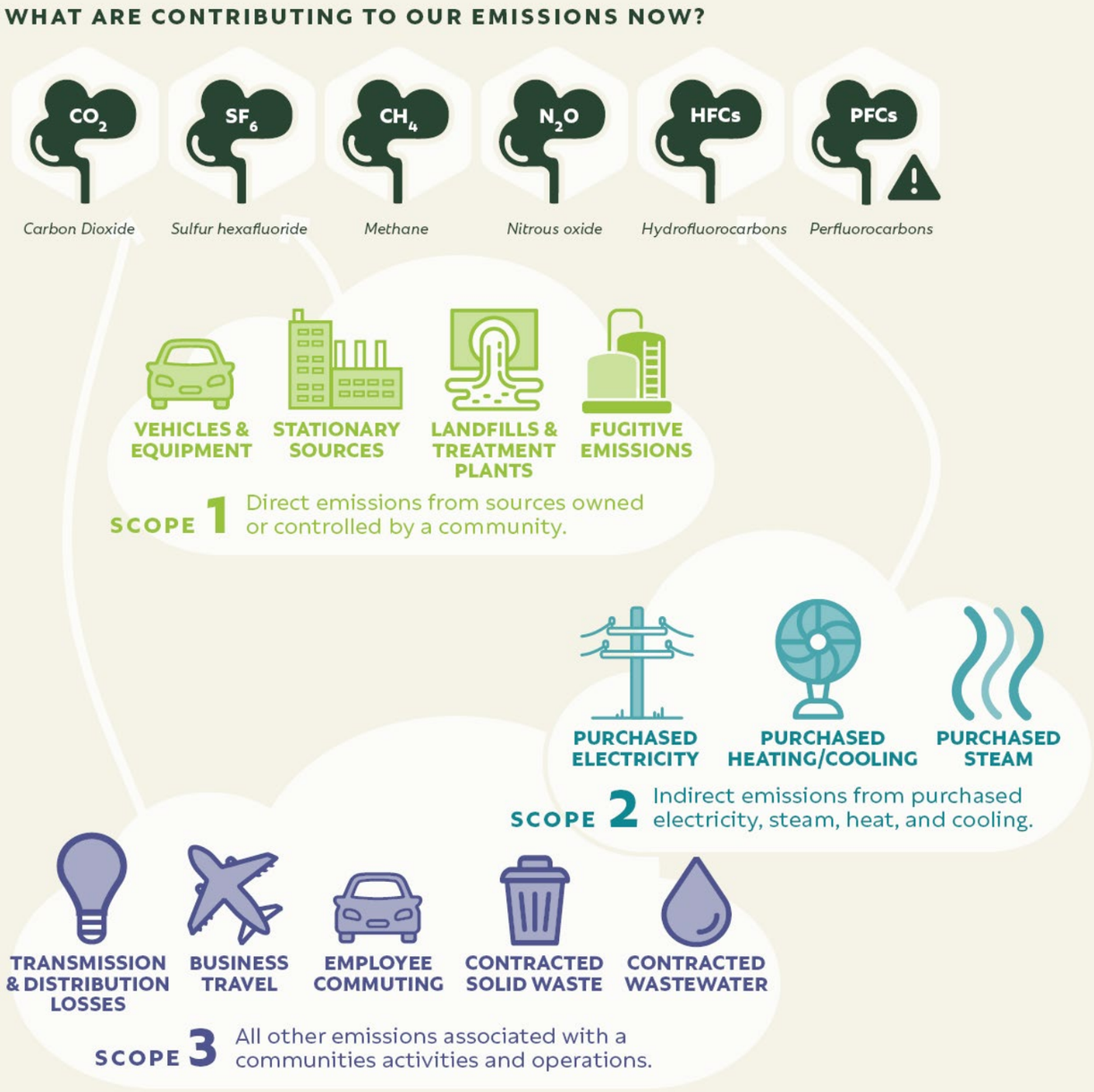
Direct emissions from fuel burned in owned or controlled assets including buildings, vehicles, and equipment. Also includes accidental or fugitive emissions like chemical and refrigerant leaks and spills.

SCOPE 2 EMISSIONS

Indirect emissions from purchased electricity, steam, heat, and cooling.

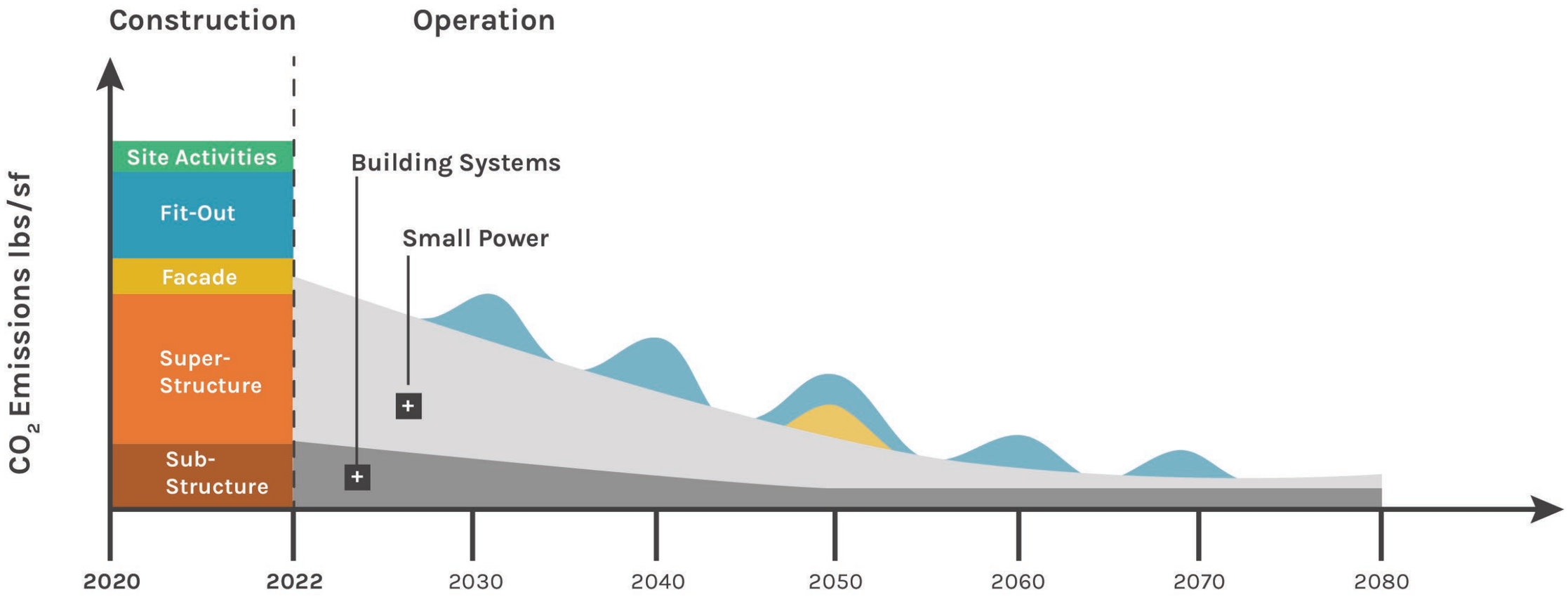
SCOPE 3 EMISSIONS

All **other indirect emissions** associated with a community's upstream and downstream operations. Scope 3 typically represents the most significant contributor to a community's carbon footprint because it includes things like: commuting and business travel; waste generated; purchased goods and services; supplier & customer transportation and distribution; capital goods, investments, and franchises; leased assets; product end of life

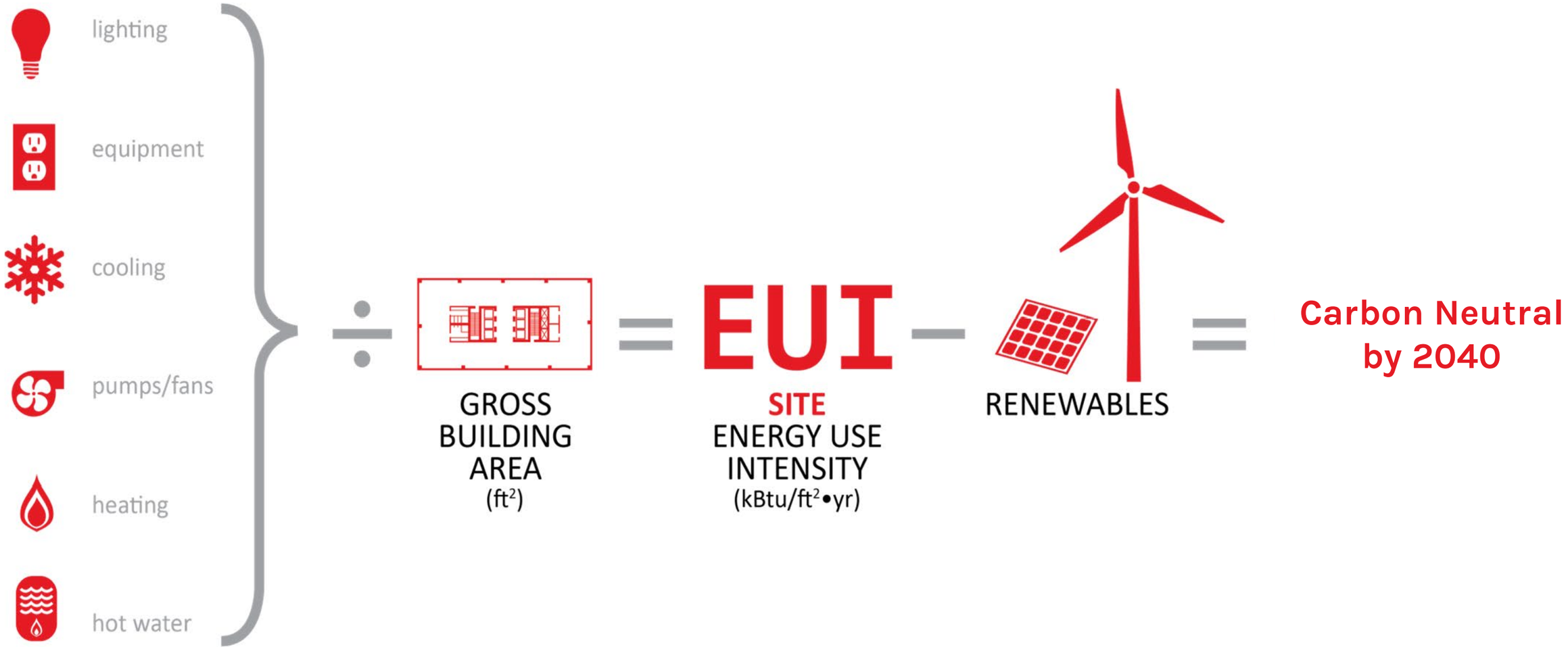


Source: Diagram based on Greenhouse Gases Diagram from EPA.
Created by SmithGroup for Ferndale, Michigan Climate Action Plan.

CARBON EMISSIONS COME FROM MORE THAN ENERGY

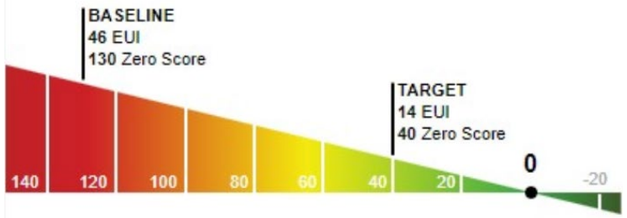


WE NEED TO START WITH AN AGGRESSIVE EUI REDUCTION



DEVELOPING SUSTAINABILITY TARGETS UTILIZING ZERO TOOL FROM AIA

Target EUI is 14 based on a 70% reduction

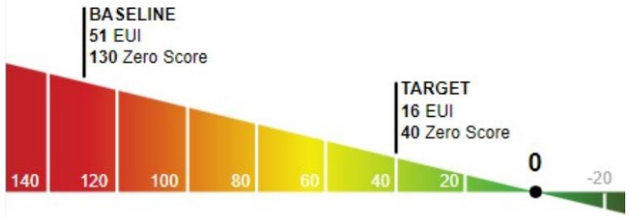


BUILDING SUMMARY

LOCATION	Pittsburgh, PA	15222
USES	Single Family - Detached	2,500 sq.ft (100.0%)

RESULTS	BASELINE	TARGET	YOUR BUILDING
EUI % Reduction from Baseline	0%	70%	N/A
Zero Score	130	40	N/A
Site EUI (kBtu/ft²/yr)	46	14	N/A
Source EUI (kBtu/ft²/yr)	68	21	N/A
Total GHG Emissions (metric tons CO_2e/yr)	13	4	N/A

Target EUI is 16 based on a 70% reduction

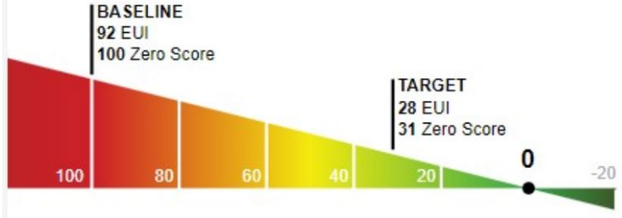


BUILDING SUMMARY

LOCATION	Pittsburgh, PA	15222
USES	Single Family - Attached	1,500 sq.ft (100.0%)

RESULTS	BASELINE	TARGET	YOUR BUILDING
EUI % Reduction from Baseline	0%	70%	N/A
Zero Score	130	40	N/A
Site EUI (kBtu/ft²/yr)	51	16	N/A
Source EUI (kBtu/ft²/yr)	69	21	N/A
Total GHG Emissions (metric tons CO_2e/yr)	9	3	N/A

Target EUI is 28 based on a 70% reduction



BUILDING SUMMARY

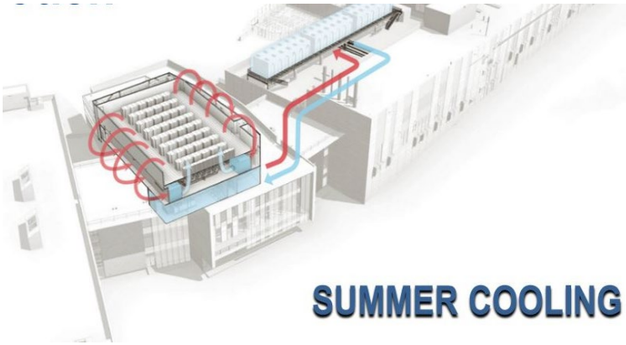
LOCATION	Pittsburgh, PA	15222
USES	Office	36,000 sq.ft (85.7%)
	Retail Store	6,000 sq.ft (14.3%)

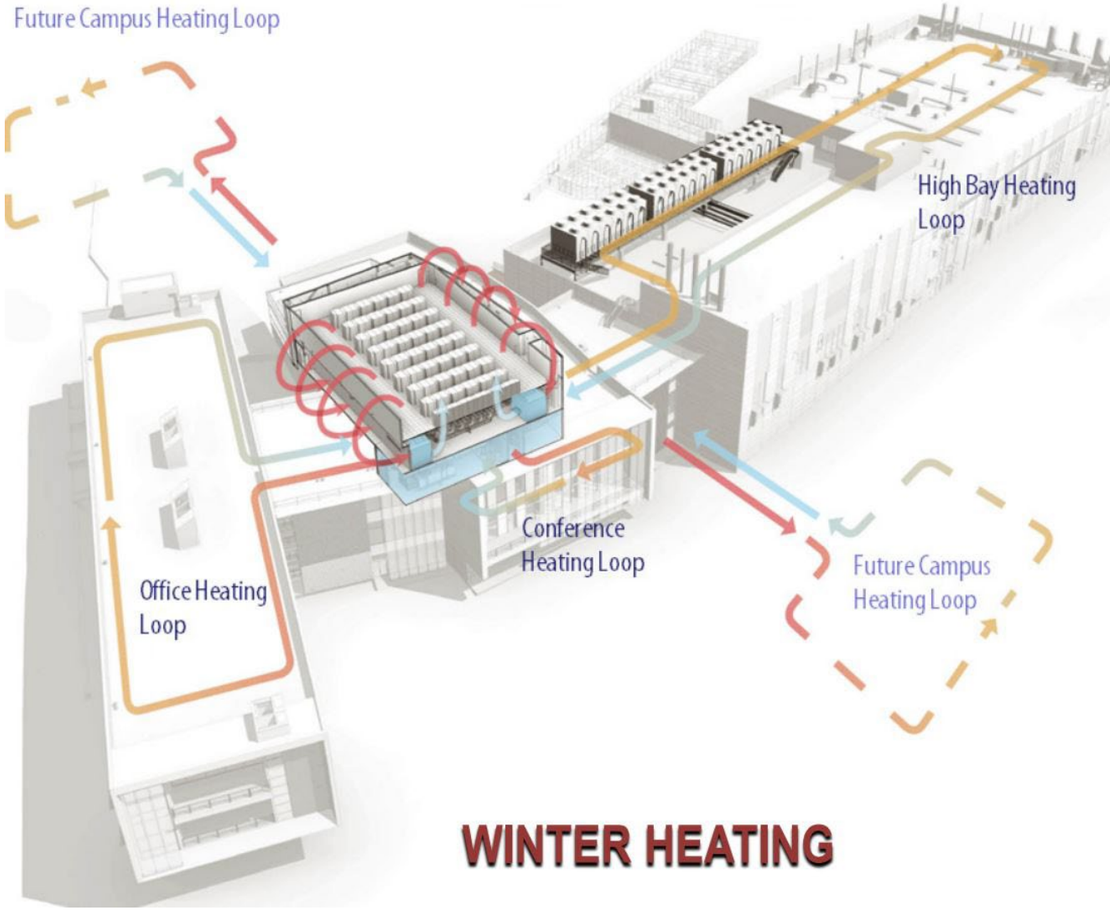
RESULTS	BASELINE	TARGET	YOUR BUILDING
EUI % Reduction from Baseline	0%	70%	N/A
Zero Score	100	31	N/A
Site EUI (kBtu/ft²/yr)	92	28	N/A
Source EUI (kBtu/ft²/yr)	203	61	N/A
Total GHG Emissions (metric tons CO_2e/yr)	520	156	N/A

Source: AIA Zero Tool

INTEGRATE ENERGY STREAMS

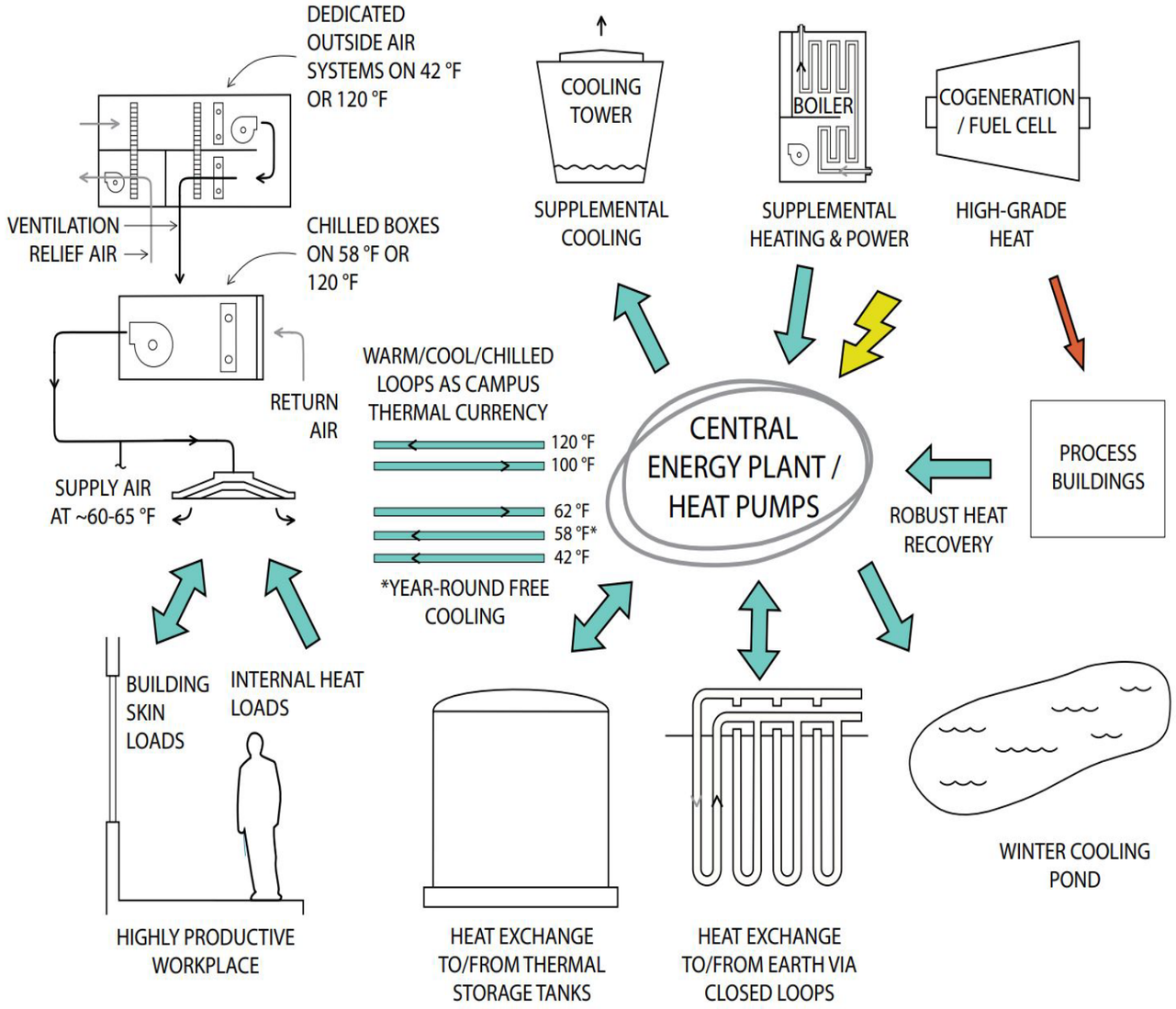
- Data center as campus heater
- 1.05 PUE, under 0.8 with reuse
- Summer cooling without chillers
- Office wing: 23 EUI, Net-Zero-ready



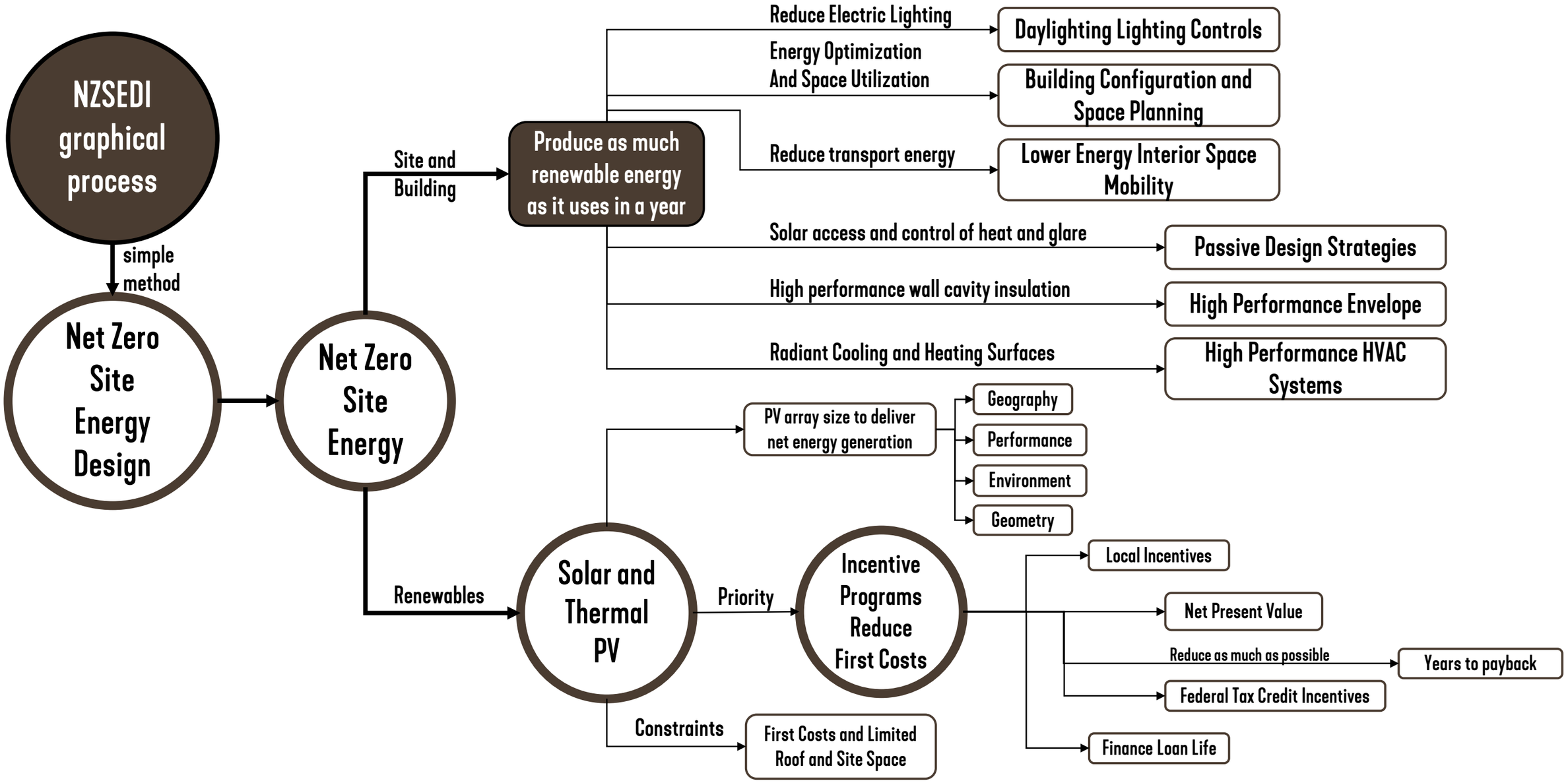


LOWER CAMPUS ENTROPY

- Central heat pumps link campus energy silos with 120F & 42F loops as thermal currency
- Low Delta-T's cut entropy vs. fossil-fired steam and cooling towers wasting heat, water
- Cogen in lieu of process boilers



NET ZERO SITE ENERGY DESIGN AND INCENTIVES (NZSEDI)

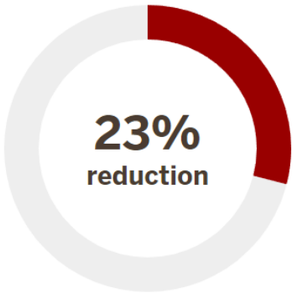


DISCUSSION

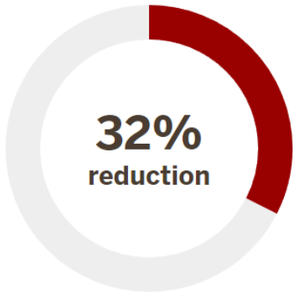
ENERGY CHALLENGE

ENERGY + THE BUILT ENVIRONMENT

Progress Indicators



Percent reduction of overall campus greenhouse gas emissions from 2010 figures. (for clearer depiction of progress, placed on an 80% scale)



Percent reduction of source energy consumption in campus buildings per square foot from 2010 figures.

Percent of eligible newly constructed or renovated building spaces that are LEED certified

What you can do to conserve resources

- Take the stairs whenever possible!
- Unplug your devices.
- Turn off the lights whenever you leave the room—including bathrooms, classrooms and meeting spaces!
- Wash your laundry with cold water
- Take short and cooler showers
- Post pictures of how you are saving in the Energy Challenge on social media and use the hashtag #TakeActionSeeImpact!

Since the beginning of the Energy Challenge, nearly 6,400,000 kilowatt-hours of electricity and over 16.7 million gallons of water have been saved. The equivalent of powering more than 5,000 homes and filling 27 Olympic-sized swimming pools!

Not only that, but IU has saved nearly $1 million in utility bills and has avoided emitting 10,000+ metric tons of carbon dioxide.

Source: Sustain IU Energy Commitment
https://sustain.iu.edu/programs/energy-challenge/index.html#pledge

STARS REPORTING

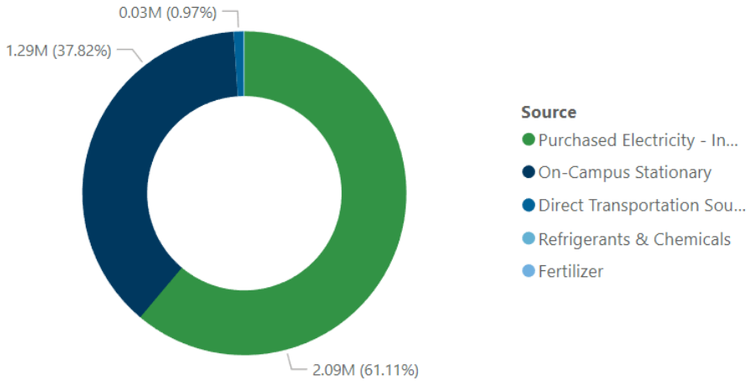
IU Campus	Rating	Score	Valid Through	Operations - Energy	Operations – Air & Climate
IU Bloomington	Gold	67.61	Feb. 2023	• Building Energy Efficiency – 4.26/6.00 • Clean and Renewable Energy – 0.05/4.00	• Emissions Inventory and Disclosure – 2.15/3.00 • Greenhouse Gas Emissions –1.53/8.00
IU South Bend	Bronze	37.54	Feb. 2024	• Building Energy Efficiency – 2.88/6.00 • Clean and Renewable Energy – Not pursuing	• Emissions Inventory and Disclosure – Not Pursuing • Greenhouse Gas Emissions – Not Pursuing
IUPUI	Gold	70.57	May. 2024	• Building Energy Efficiency – 2.90/6.00 • Clean and Renewable Energy – 0.14/4.00	• Emissions Inventory and Disclosure – 2.29/3.00 • Greenhouse Gas Emissions – 1.95/8.00
IU Southeast	Silver	45.94	Aug. 2025	• Building Energy Efficiency – 2.47/6.00 • Clean and Renewable Energy – Not pursuing	• Emissions Inventory and Disclosure – 1.98/3.00 • Greenhouse Gas Emissions – 1.53/8.00

- Bloomington Campus
- South Bend Campus
- IUPUI
- New Albany (IU SE)
- STARS: Resources: Climate Action Planning: Capital Planning & Facilities: Indiana University (iu.edu)

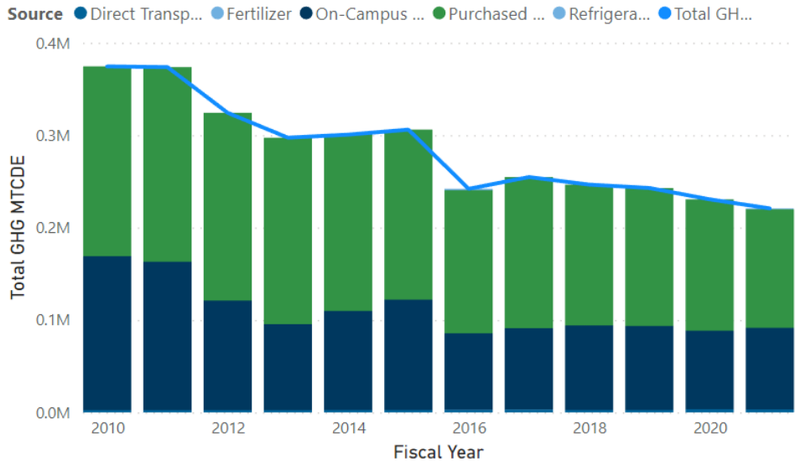
GHG EMISSIONS TRACKING

IU BLOOMINGTON

GHG EMISSIONS BY SOURCE

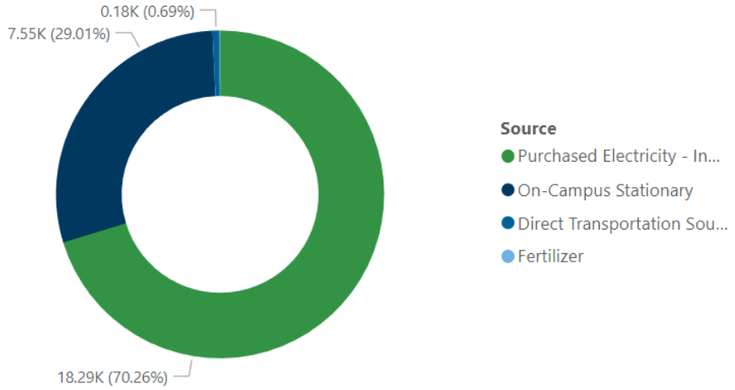


GHG EMISSIONS OVER TIME

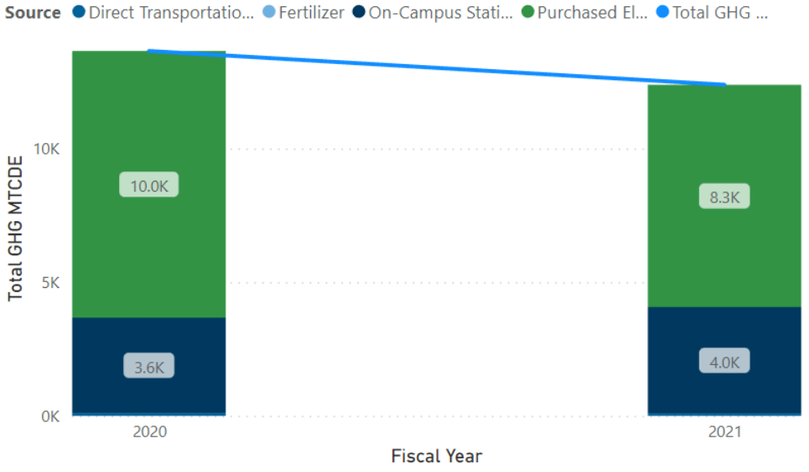


IU SOUTH BEND

GHG EMISSIONS BY SOURCE



GHG EMISSIONS OVER TIME



Goals & Progress: Climate Action Planning: Capital Planning & Facilities: Indiana University (iu.edu)

COMMITTEE GOAL AND GUIDING PRINCIPLES

GOAL

Develop recommendations for short- and long-term opportunities to reduce greenhouse gas emissions on all IU campuses

GUIDING PRINCIPLES

- Complete, comprehensive and scientifically sound
- Immediate implementation where possible
- Financial resources required
- Funding sources and savings identified
- Broad input from students, faculty and staff on all campuses
- Benchmarks, dashboards and transparency of process and progress
- Carbon neutrality by 2040

PUBLIC FORUMS

PUBLIC FORUM SCHEDULE

Source: SmithGroup

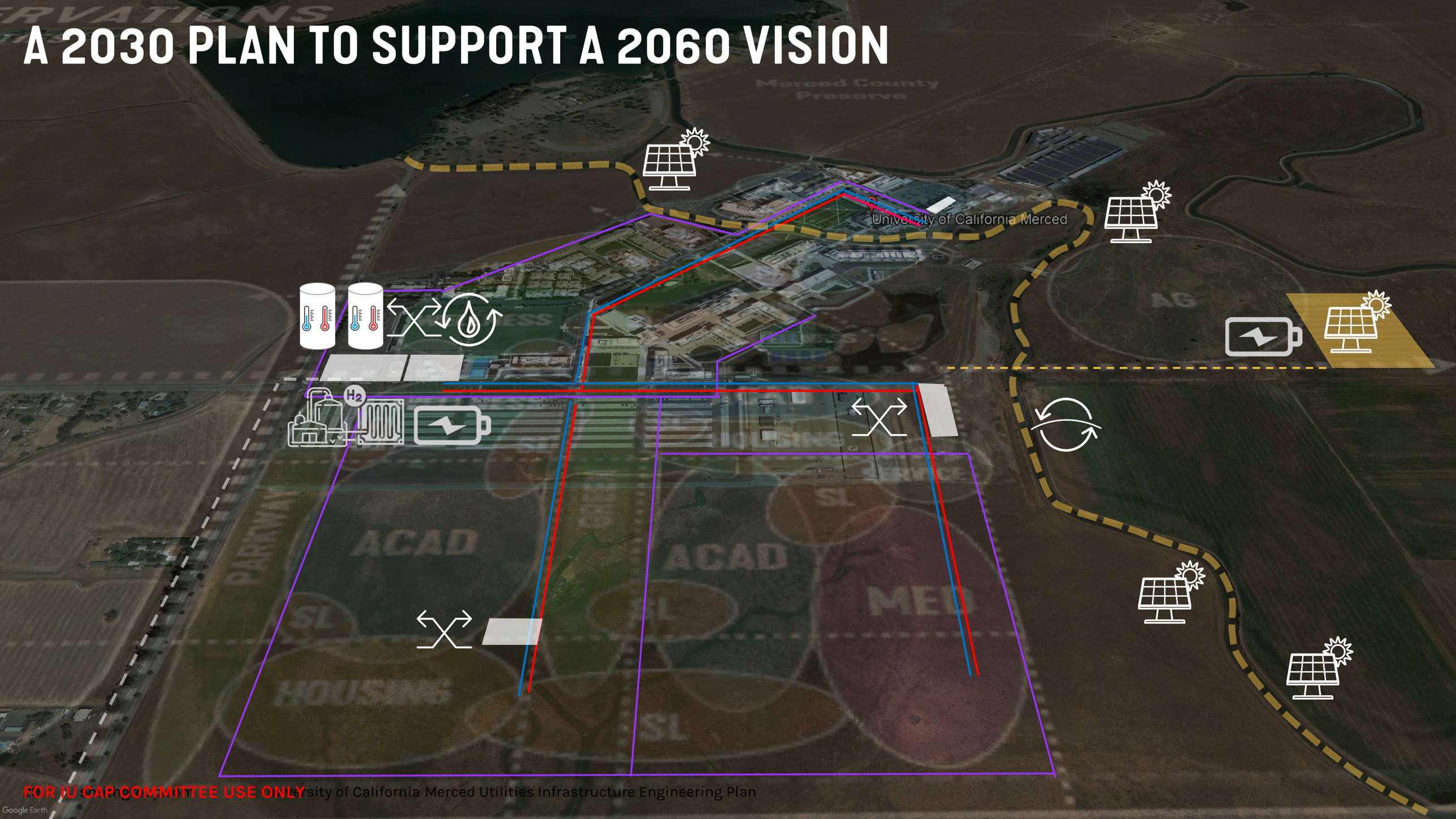
Date	Time	Campus	Building & Room
Tue., Sept. 27	2:00-4:00 pm CDT (3:00-5:00 pm Eastern)	Gary (IU Northwest)	Anderson Library Conference Center Room 105 100-196 W 35th Ave, Gary, IN 46408
Wed., Sept. 28	9:00-11:00 am	Indianapolis (IUPUI)	Hine Hall Auditorium 875 W. North St, Indianapolis, IN 46202
Wed., Sept. 28	3:00-5:00 pm	Kokomo (IU Kokomo)	Kelley Student Center Room 130AC 2450 S. Washington Street, Kokomo, IN 46902
Wed., Oct. 12	9:00-11:00 am	South Bend (IU South Bend)	Education & Arts Building Room 1011 1002 S Esther St, South Bend, IN 46615
Tue., Oct. 25	Noon-2:00 pm	New Albany (IU Southeast)	University Center North Room 127 4201 Grant Line Rd, New Albany, IN 47150
Week of Oct. 31	3:00-5:00 pm	Virtual only	Virtual only public forum; date tbd
Tue., Nov. 15	Noon-2:00 pm	Richmond (IU East)	Whitewater Hall Room 144 2325 Chester Blvd, Richmond, IN 47374 (Some online maps will put a pin at the intersection of Chester and Horizon Pkwy – you will take Horizon Pkwy onto campus; or search for Whitewater Hall at IU East and sometimes it will put a pin on the actual building)
Wed., Nov. 16	3:00-5:00 pm	Bloomington (IU Bloomington)	Location being finalized

DELIVERABLES

WHAT TO EXPECT AT THE END OF THE PROJECT

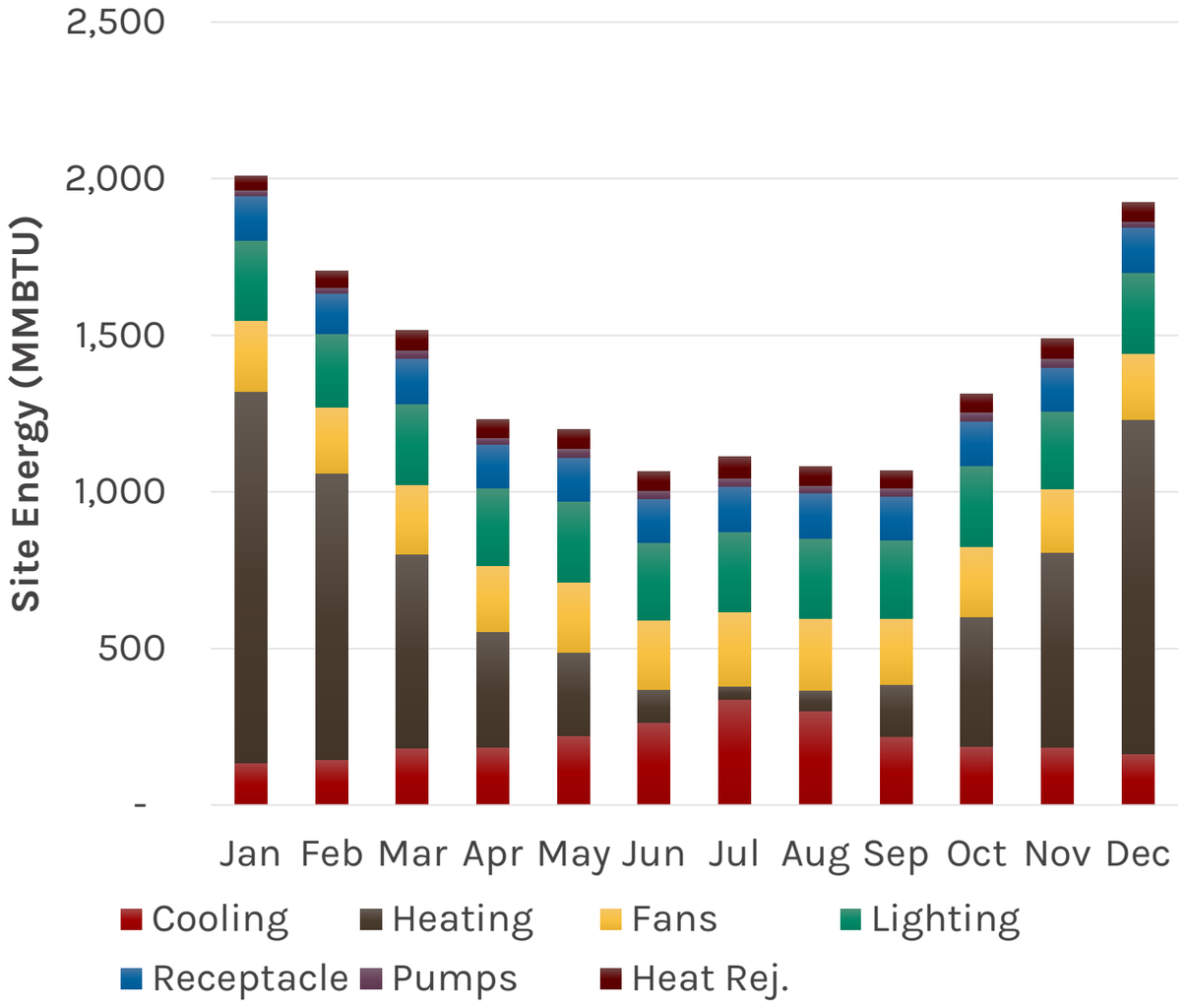
To bring all campuses up to the same level over time

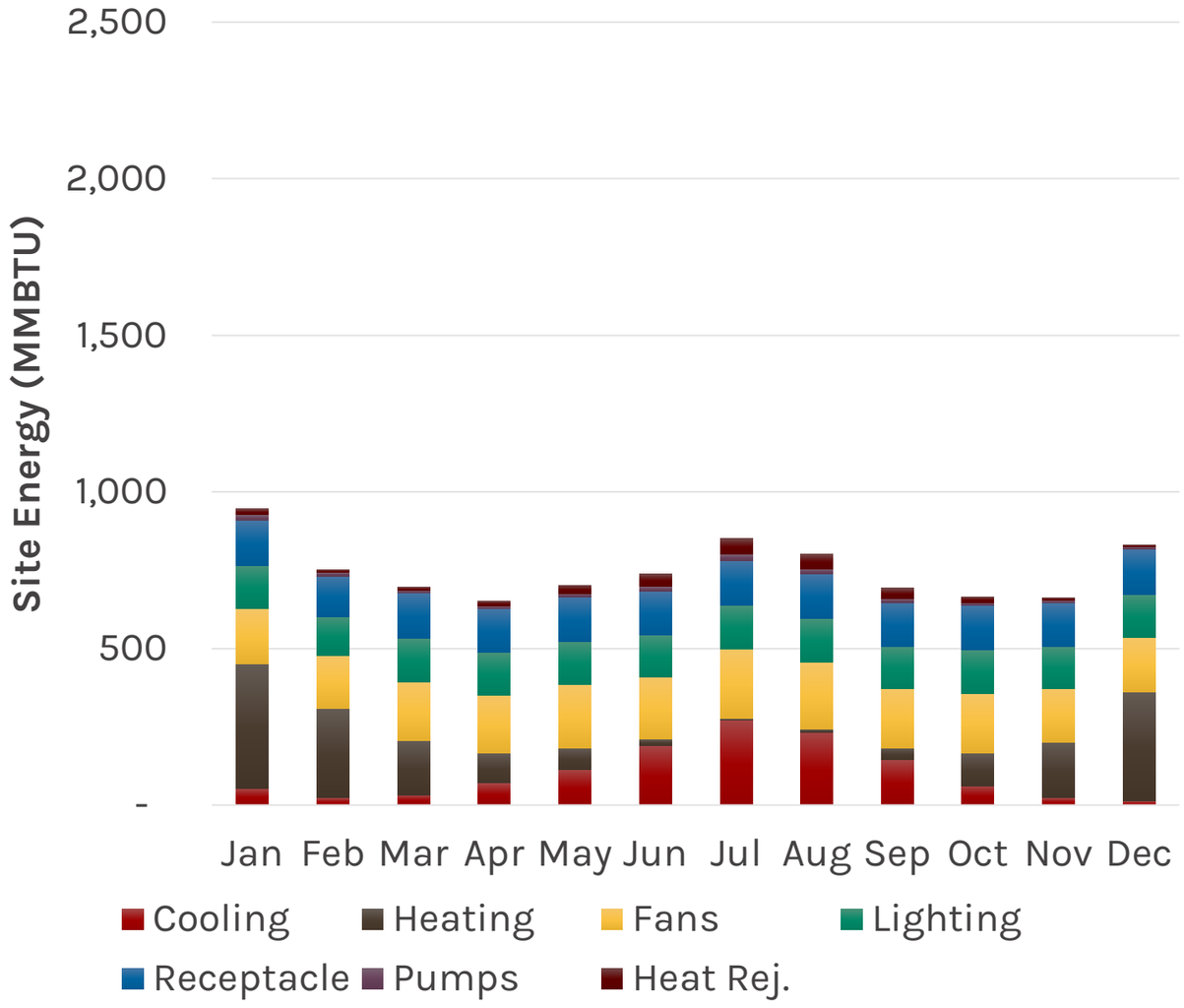
A 2030 PLAN TO SUPPORT A 2060 VISION



ENERGY MODEL: DEEP-DIVE

SEFARI ENERGY MODELLING SOFTWARE WAS USED FOR EACH BUILDING TO UNDERSTAND BUILDING ENERGY DEMAND





NEXT STEPS

NEXT STEPS

- Campus Visits & Public Forums
- Data & Information Request
- Project Initiation