

DECARBONIZING CAMPUSES

Midwest Energy Efficiency Alliance

February 2, 2022

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AGENDA

- ▶ Introduction to APTIM
- ▶ Key Elements of Decarbonization on Campuses
 - > Buildings
 - > Central Plants
 - > Transportation



APTIM IS A KEY UTILITY PARTNER



EPC/CONSULTING

- Power Maintenance
- Plant Decommissioning
- Construction Management
- Environmental Consulting / Permitting
- Emergency Planning/Disaster Response

DSM/DR/RE PROGRAMS

- Program Administration
- Program Implementation
- Design/Consulting Services
- Community Engagement
- Strategic Energy Management

GRID INFRASTRUCTURE

- Asset Management/inventory
- Smart Meters/AMI
- Resiliency Services
- Grid Infrastructure



BUILDING DECARBONIZATION ACROSS CAMPUSES

- ▶ What makes them unique?
- ▶ How can we better serve them?
- ▶ What opportunities do they present?

“The university should **lead by example**. We should be one of the first and best customers to demonstrate to the community that **implementing energy efficiency programs is the right thing to do for our community and planet.**”

Gregg Lassen
Vice President of Business Affairs
University of New Orleans



WHY ARE THESE CAMPUSES DIFFERENT?

- ▶ Opportunity for savings is greater – often among the largest energy users
- ▶ More diverse set of buildings – labs, data centers, dorms, retail, parking
- ▶ Level of innovation is far greater – e.g. I²SL (International Institute for Sustainable Laboratories)
- ▶ May value incentives less

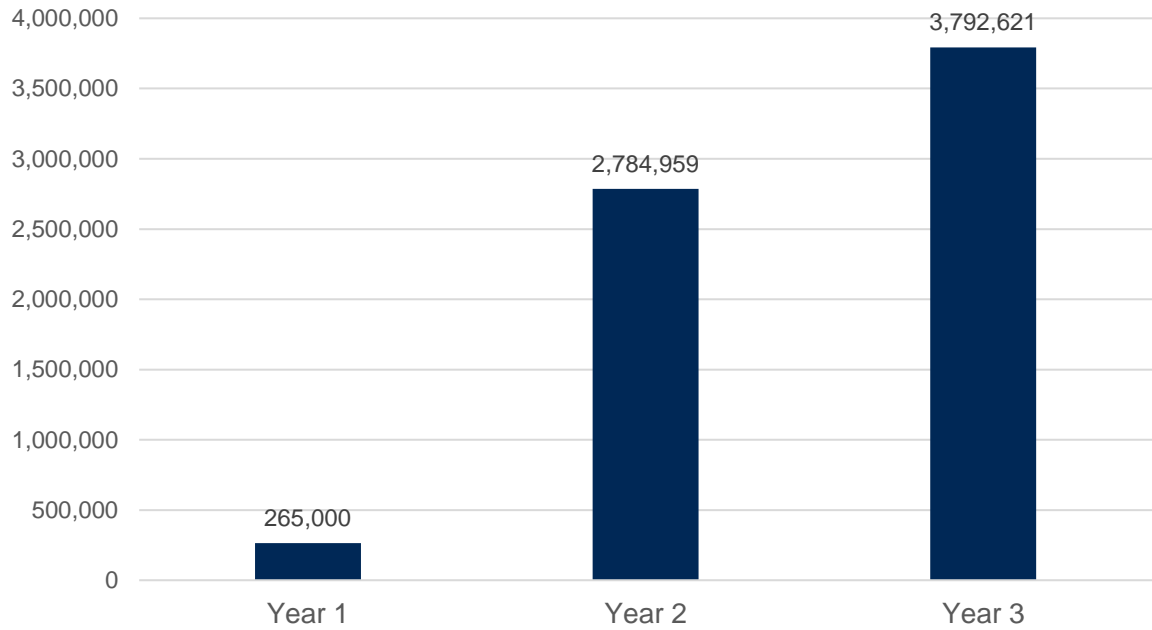


DEDICATED PROGRAMS CAN BOOST SAVINGS

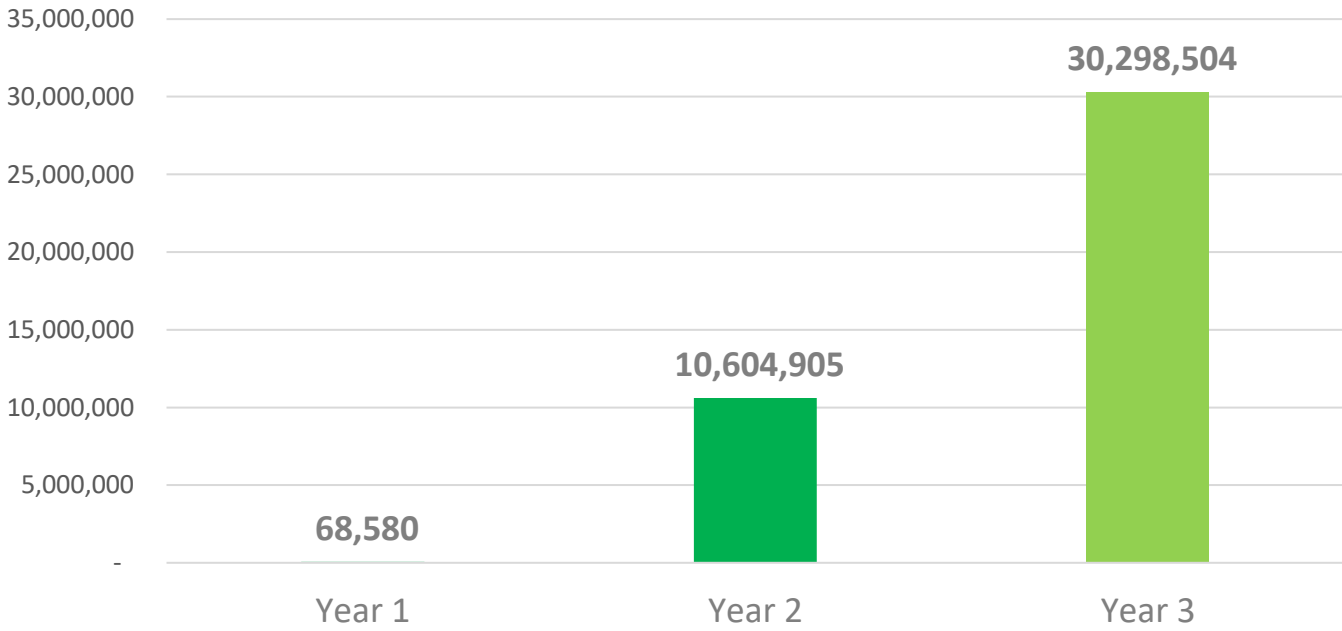


**2017 AESP
Award Winner**

Entergy New Orleans HEI Savings (kWh)



Focus on Energy HEI Savings (kWh)



UNIQUE PLACES TO INVEST FOR RESILIENCY

- ▶ Large loads mean that redundancy can be used and managed
- ▶ Sophisticated operations staff
- ▶ Often embedded in urban communities
- ▶ Focused on innovation

Case study: Microgrid at Princeton University

Microgrids can lower cost and raise reliability for the owner, and for surrounding communities.

BY PAUL BARTER, PE, ESD; AND EDWARD T. BORER, PE, PRINCETON UNIVERSITY JUNE 8, 2015

The most advanced microgrids use multiple fuel sources, multiple power-generating assets, energy storage, CHP production, and modern digital controls. They operate with an awareness of the real-time commodity costs of fuel and electricity.

An example is the microgrid at Princeton University (see Figure 1). Recognized among the best-in-class microgrids, Princeton's gas-fueled CHP plant produced the heating, cooling, and electricity for the campus during Hurricane Sandy, keeping the university up and running when much of the state was dark.



CENTRAL PLANTS

- ▶ May be the most difficult issue campuses face
- ▶ Unlikely to move away from them without significant motivation
- ▶ One reason renewable natural gas maybe needed to meet decarbonization goals



WHERE ARE CENTRAL PLANTS HEADED

- ▶ Most campus owners exploring geothermal
- ▶ Some will move towards third party ownership models to modernize
- ▶ Others will explore renewable natural gas
- ▶ The rest..



This system will heat and cool Vancouver Airport using the earth's energy

The Vancouver Airport Authority is building a geexchange system and a new central utilities building.

Maria Rantanen
Mar 23, 2019 12:50 PM

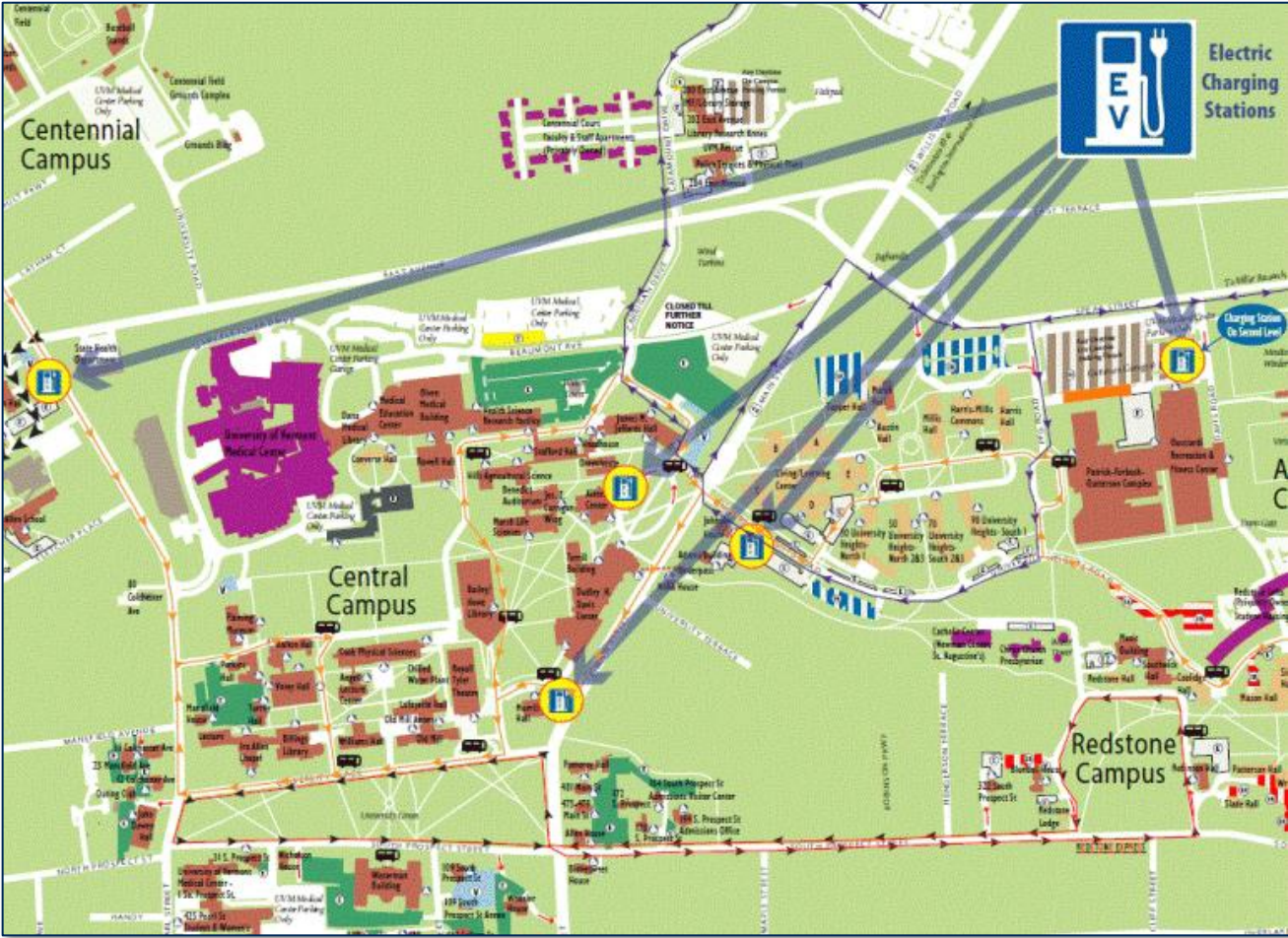


The biggest building in the province, YVR in Richmond, will get a new heating and cooling system that will include one of the largest geexchange systems in the country.



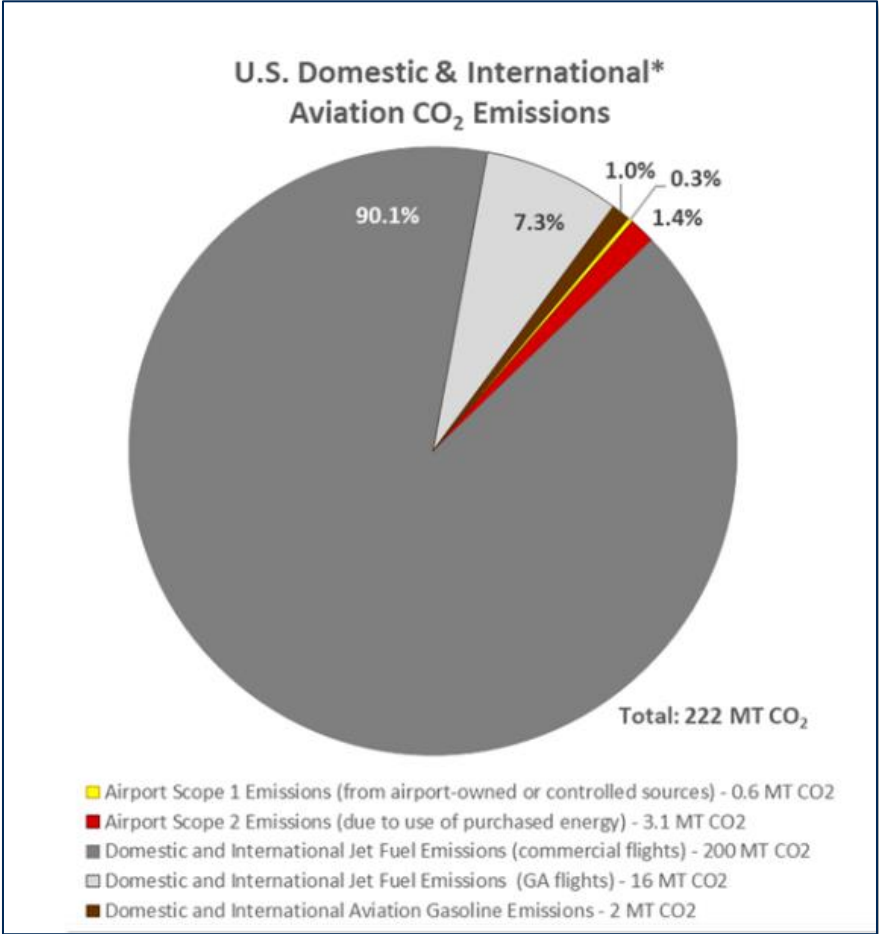
CARBON-FREE MOBILITY

- ▶ Impact to Grid
- ▶ Equity Issues
- ▶ DEI opportunities



IMPACTS OF DECARBONIZING SCOPE 3 EMISSIONS

- ▶ Impact to the grid could be larger than decarbonizing Scopes 1 & 2
- ▶ Necessary capacity does not exist currently
- ▶ First-mover advantage is very strong
- ▶ Significant questions exist about who will pay for future upgrades

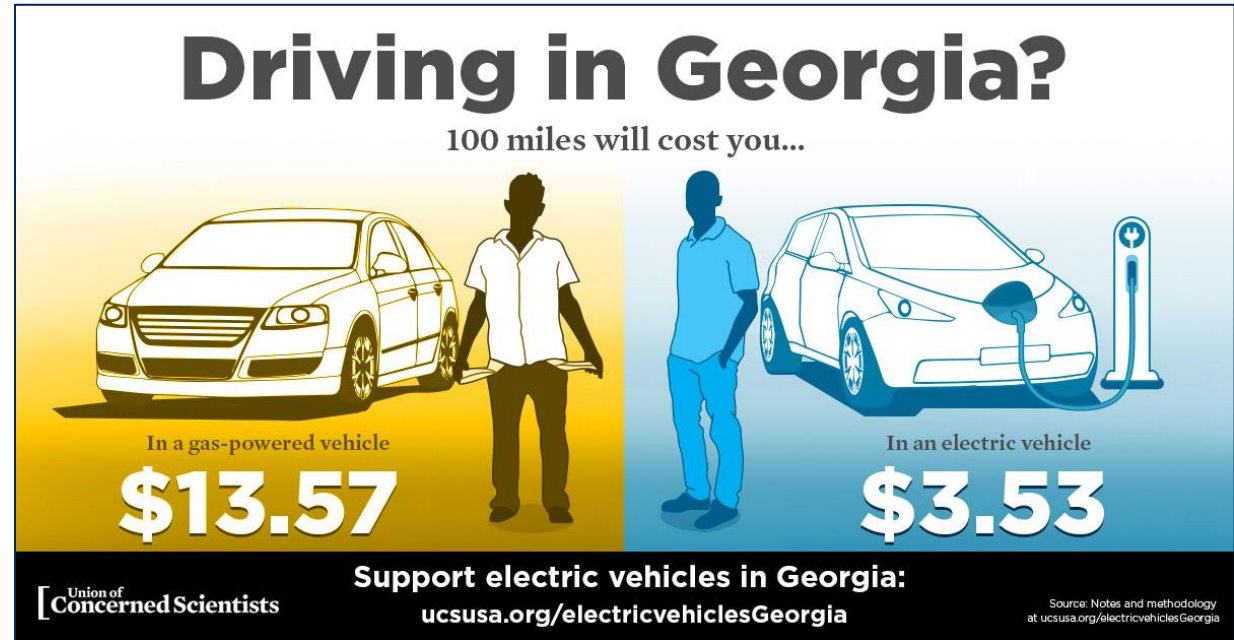


Data from the FAA



OPPORTUNITIES TO SUPPORT DEI INITIATIVES

- ▶ Often embedded in communities so can support EV needs of residents
- ▶ Employ significant numbers of middle income wage earners (particularly airports/health centers)
- ▶ Connect to multiple types of transport (from cars & buses, to e-bikes and scooters)



THANK YOU!

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Expect the Extraordinary.