

LIVING LAB Learning Adventure

Solar Farm

ADMIN-OPER

LOW CARBON CAMPUS



RESEARCH PROBLEM

How to neutralize carbon emissions through the purchase of solar energy?

SOLUTION

A partnership was established to construct a 650 acre, 60-megawatt solar farm on farmland in North Carolina. Called Summit Farms, the facility is the largest renewable-energy project ever built in the U.S. through an alliance of diverse buyers.

LIVING LAB Learning Adventure

The Big Plans Project

CLPR

RESILIENT ECOSYSTEMS



RESEARCH PROBLEM

How has Boston historically responded to major environmental challenges? How are cities responding to climate impacts? Who leads big planning, who benefits/loses, and why? How can the MIT campus be adapted to climate change?

SOLUTION

Student teams explored solutions such as reimagining the Student Center building, developing a Green Space Committee, improving Social connectivity for student mental health, well-being, and resilience with transit structure improvements, underground infrastructure, linear wetlands, by linking MBTA and T public transportation networks and by reimagining the Kendall square plan.

LIVING LAB Learning Adventure

The Solar Feasibility Project

CLPR

LOW CARBON CAMPUS



RESEARCH PROBLEM

How many solar panels would fit on existing MIT roofs and how much they would cost?

SOLUTION

A team of graduate and undergraduate students in the Fundamentals of Photovoltaics Course taught by Professor Tonio Buonassisi studied the solar potential of campus rooftops.

LIVING LAB Learning Adventure

The Biodeisel Fuel Processor Project

IAPC

LOW CARBON CAMPUS



RESEARCH PROBLEM

How to turn waste (vegetable oil) into something useful (biofuel) and reduce environmental impacts of the campus operations?

SOLUTION

To create a production program (Biodeisel@MIT) to process waste vegetable oil collected from campus dining locations into biodiesel fuel, to be used by MIT grounds equipment and transportation vehicles.

The Players Students enrolled in MIT's Climate Change course (11.123).
Co-Instructors: Linda Shi, Michael Wilson

Where do students feel most comfortable?

The 2013 MIT Student Quality of Life Survey asked students where they felt most comfortable on campus

Undergraduate Responses:

Graduate Student Responses:



The Story

Students enrolled in the Department of Urban Planning course explored the origins of visionary ideas and the political complexity of developing and implementing Big Plans, their implications for social equity and the environment, and the time and spatial scales by which to evaluate their impact

Lectures by the instructors, faculty, and practitioners presented U.S. and international cases, with an emphasis on Boston. Final project focused on the use of the MIT campus as a test-bed for understanding planning and environmental issues. Student proposals were presented in a public forum to a panel of planners, industry experts, academics and veteran practitioners.

Contact Linda Shi (MIT Faculty) at LindaShi@mit.edu



The Players: Boston Medical Center, Post Office Square Development, MIT, Dominion Resources, Customer First Renewables (consultant), Sun EnergyI (Developer), A Better City (Convener)

	ELECTRICITY	15,000
	WATER	27,800,000
	COAL	109,900,000
	CARS	21,700
	GASOLINE	11,500,000

The Story

MIT's purchase of power from this facility's 255,000 solar panels is equivalent to 40 percent of the Institute's current electricity use; the purchase will neutralize 100 percent of electricity consumption for both Boston Medical Center (BMC), a 496-bed academic medical center in Boston's South End, and Post Office Square Redevelopment Corporation (POS), which manages an underground parking garage and a park in downtown Boston.

The project takes the form of a 25-year power purchase agreement (PPA) between the three Boston-area institutions and Dominion. In aggregate, the expected 146 gigawatt-hours of emissions-free power per year will result in the abatement of 119,500 metric tons of carbon dioxide emissions — the equivalent of removing 25,250 cars from the road.

The farm was constructed in the fall of 2016 and the plant began generating power in 2017. The Solar Test Bed Steering Committee is exploring the feasibility of utilizing panels donated by the developer of Summit Farms, as part of new research and educational outreach on the campus of MIT.

Contact Joe Higgins (Director of Business Operations and Infrastructure) at JoeHigg@mit.edu



Students receive award of \$25K for their Biodiesel Project Research

The Players:

Students (Katie Rowe, Katrina Ellison, Joe Roy-Mahew, Matt Zedler), Facilities Department, Environmental Health and Safety Office

The Story

The idea for the Biodiesel Fuel Processor has origins in an Independent Activities Period (IAP) course offered in 2006, sponsored by the Laboratory for Energy and the Environment. The concept was further developed as part of a Undergraduate Research Opportunities Program (UROP).

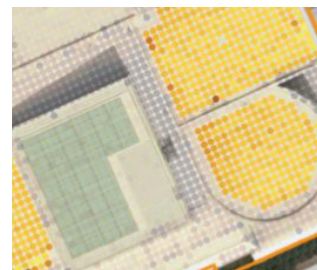
Eventually, a Biodiesel club was formed and students submitted a project proposal to an "Eco-imagination Challenge" contest sponsored by MTV in 2007 and won the first prize of \$25,000, which helped to fund the launch of the project designed to reduce petroleum diesel costs and greenhouse gasses associated with emissions from MIT's diesel fleet. With help from EHS and Operations staff, a processor facility was created, and extensive operational and safety procedures. It was deployed from 2009-2013.

Contact Niamh Kelly (EHS Officer: niamhk@mit.edu)



The Players: Graduate and undergraduate students, faculty in the Fundamentals of Photovoltaics Course (2.626/2.627).

The Story



Simulation of a potential solar array on the Media Lab building utilizing Mapdwell software.

Utilizing the Map-dwell Tool developed by Christoph Reinhart, Faculty in the MIT Department of Architecture, students determined which roof areas on campus get enough sunlight to allow solar cells to pay for themselves in seven years or less.

The team met with President Reif and also presented their findings to Tony Sharon, Deputy Executive Vice President of MIT. The results were also shared with students, faculty and staff attendees at the Sustainability Connect conference in 2015.

The findings were also provided as a resource to the Department of Facilities, as they explore the most sustainable uses for roof spaces, and led to the commissioning of additional studies of existing PV systems on campus by ARUP USA, Inc.

The Solar Feasibility Study led to the development of a new Roof Assessment Tool scheduled for launch in 2017 that will allow assist operational staff in the evaluation of numerous criteria such as suitability for green roofs and maintenance-related issues.

Contact Jeremy Poindexter (PV Lab at MIT) at jpoindex@mit.edu

