

UNIVERSITY OF CINCINNATI

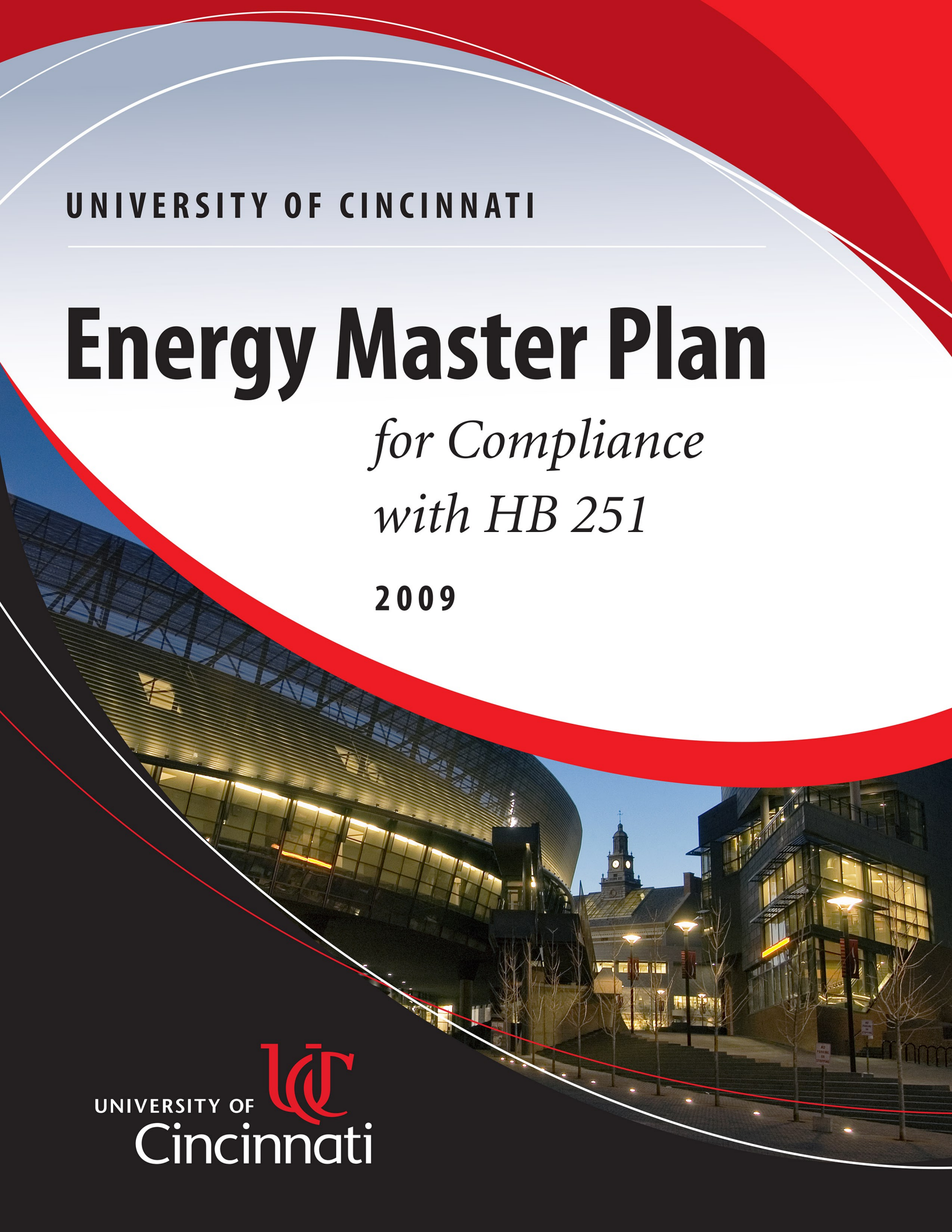
# Energy Master Plan

*for Compliance  
with HB 251*

2009



UNIVERSITY OF  
Cincinnati



## Introduction



Abstract photograph of the Central Utility Plant, 2009



Chilled Water Storage

In accordance with the requirements of Sub House Bill 251 (HB251) of the 126th Ohio General Assembly, the University of Cincinnati's goal is to achieve a 20% reduction from the 2004 baseline by 2014 in the areas of energy efficiency and conservation. This Master Plan document outlines the university's plans for phasing energy efficiency and conservation projects over the next fifteen years. There are four components to the University of Cincinnati's approach to achieving this goal including innovation in alternative or renewable energy.

### GUIDELINES PER STATUTE

The Energy Efficiency and Conservation Guidelines as incorporated into Ohio Revised Code Section 3345.69 are as follows:

- 1 Include a goal to reduce on- and off-campus building energy consumption by at least twenty per cent by 2014, using calendar year 2004 as the benchmark year, while recognizing the diverse nature and different energy demands and uses of such buildings and measures already taken to increase building energy efficiency and conservation;
- 2 Prescribe minimum energy efficiency and conservation standards for any new, on - or off-campus capital improvement project with a construction cost of one hundred thousand dollars or more, which standards shall be based on general building type and cost-effectiveness;
- 3 Prescribe minimum energy efficiency and conservation standards for the leasing of an off-campus space of at least twenty-thousand square feet;
- 4 Incorporate best practices into energy efficiency and conservation standards and plans;
- 5 Provide that each board develop its own fifteen-year plan for phasing in energy efficiency and conservation projects;
- 6 Provide that project impact assessments include the fiscal effects of energy efficiency and conservation recommendations and plans;
- 7 Establish mechanisms for each board to report periodically to the committee on its progress relative to the guidelines.

# Fifteen-Year Project Phasing Plan for Increasing Energy Efficiency and Conservation

There are five components to the University of Cincinnati’s approach to achieving this goal including innovation in alternative or renewable energy and are outlined as follows:

## 1 Changes in Operations to Reduce Energy Consumption

- the goal is a 4 to 5 percent reduction
- Heighten awareness to promote conservation
- Change room temperature settings
- Reduce ventilation rates during un-occupied periods

## 2 Building Renovations

- the goal is 5 to 6 percent reduction
- Incorporate energy efficiency into new systems
- MSB—Major renovation of a high energy using lab (bid/award)
- Zimmer (complete)—Replace over 400 incandescent light bulbs with fluorescent bulbs and added a green roof to the building
- McMicken perimeter heating (complete)—Replace un-control steam system with a hot water system

## 3 Improve the Efficiency of the Utility Plants

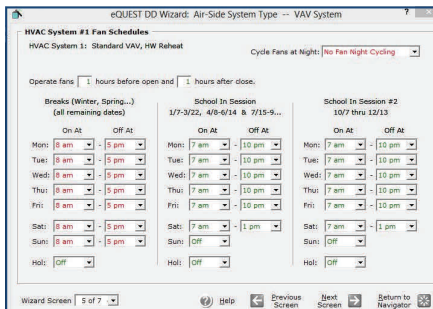
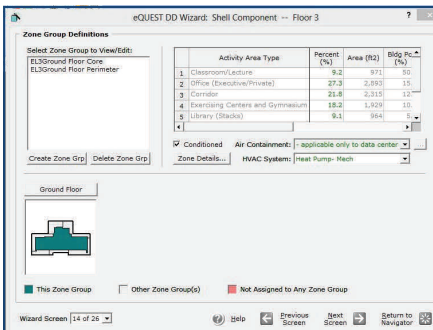
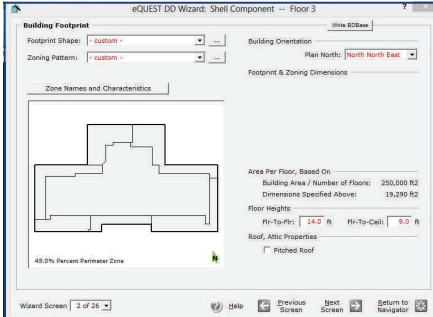
- Allocate \$5,000,000 for capital projects – the goal is 4 to 5 percent reduction
- Various options are being analyzed and implemented

## 4 Reduce Energy Consumption in Campus Buildings

- Allocate \$13,000,000 for capital projects to – the goal is 5 to 6 percent reduction
- Add controls to reduce ventilation rates in laboratories during unoccupied hours and/or add energy recovery systems to 100% outside air systems.
- Replace old inefficient equipment with more efficient equipment.
- Add occupancy sensors to reduce ventilation and lighting during unoccupied periods.

## 5 Reducing the Cost of Energy

- Construction of a \$4,000,000 gallon chilled water tank for off-peak cooling.



## *Exhibit Status*

The current status of the UC Master Plan for HB 251 is detailed with the following Exhibits:

Exhibit No 1. – UC Energy Savings Project Funding Summary and Status.

- Indicates the funding sources as debt funding for FY 2007-2008 and FY 2008-2009 in the amount of \$8M and \$10M, respectively.
- Identifies the current Energy Savings Projects including project budget and current project status.
- Identifies future Energy Savings Projects in planning/concept including estimated project budgets to recommend BOT approval of \$12M in debt funding for FY 2010-2011.

Exhibit No. 2 - Five Year (fiscal year 04-09) Summary

- Identifies that Energy Savings Projects including operations to reduce energy consumption, capital projects with no energy savings funding, capital projects to improve the efficiency of the utility plants, and capital projects to reduce energy consumption in the buildings
- The five year, FY 2004 to 2009, Current Source Energy Intensity in (kbtu/Sq.Ft.) is a reduction of 8.3 percent

Exhibit No. 3 – UC BOT Resolution approval of debt funding for Energy Projects

Exhibit No. 4 – Energy Conservation Measure Project Survey, Funded Projects

Exhibit No. 5 – Energy Conservation Measure Project Survey, Master List

# Exhibit 1

## UC Master Plan for HB 251

### Energy Saving Project - Funding Summary and Project Status Exhibit No. 1

		Available Funding	
FY 2007-2008		\$ 8,000,000	
FY 2008-2009		\$ 10,000,000	
FY 2010-2011		\$12,000,000	to be approved

Project No.	Project Description	Estimated Project Cost	Comments/Status
07074A	Leather Lab - Center Hill: Aircuity - Optinet Facilities Monitoring System	\$ 53,049	COMPLETE
07071A	Baldwin Hall occupancy sensors, 85 sensors	\$ 46,445	COMPLETE
07072A	Rec Center additional switches and lighting modifications	\$ 40,000	COMPLETE
07081A	Utility Plant Improvements - A/E fees and UC administration	\$ 680,000	COMPLETE
07081B	Steam turbine generator	\$ 1,175,000	COMPLETE
07081C	Water to water heat pump in MSB	\$ 1,395,000	COMPLETE
07081D	Ash Removal System & Closed Loop Cooling	\$ 680,000	COMPLETE
07081E	Central plant condenser water piping modifications	\$ 900,000	COMPLETE
07075A	Install valve insulation throughout both campuses	\$ 335,000	COMPLETE
08018A	Rhodes Engineering Alumni Learning Center	\$ 1,300,000	COMPLETE
08034A	Rieveschl Energy Savings Study	\$ 23,000	COMPLETE
05178Z	Proctor Hall Exterior	\$ 500,000	COMPLETE
		\$ 8,000,000	\$ 7,127,494
09113A	Laboratory ventilation and controls system improvements (enrg. & soft cost)	\$ 723,750	IN PROGRESS
09113E	Kettering Exhaust Fan Modifications	\$ 1,615,750	IN PROGRESS
09113B	CARE 1-7 Air Valve Modifications	\$ 494,500	COMPLETE
09113C	CVC G-5 Air Valve Modifications	\$ 195,500	IN PROGRESS
09113D	Vontz Energy Modifications	\$ 310,500	IN PROGRESS
08083A	Rieveschl Hall 500 Level Teaching Labs Renovation	\$ 3,000,000	COMPLETE
	Rieveschl Hall 600 and 700 level Renovation	\$ 3,000,000	IN PROGRESS
		\$ 10,000,000	\$ 9,340,000
		\$ 18,000,000	\$ 16,467,494
<b>Funding Available</b>		\$ 1,532,506	
06040C	Geothermal field for Morgans Hall Renovation ( <b>ABANDONED</b> )	\$ 1,332,506	DOE Grant submitted for \$1,301,438. Total funding \$2,633,944.
08123D	Thermo Storage at 1/2 football practice field	\$ 5,800,000	COMPLETE
	HPB - AHU & energy recovery	\$ 2,000,000	IN PROGRESS
	HPB - Terminal Devices	\$ 2,000,000	IN PROGRESS
	Rieveschl Hall400/800 Level Renovation	\$ 1,500,000	COMPLETE
	Various Projects for AHU/Energy Recovery & Terminal Devices	\$ 900,000	IN PROGRESS
		\$ 12,000,000	\$ 13,532,506
* Projects in Planning are subject to committee approval. Projects will be from the Master List.		\$ 30,000,000	\$ 30,000,000