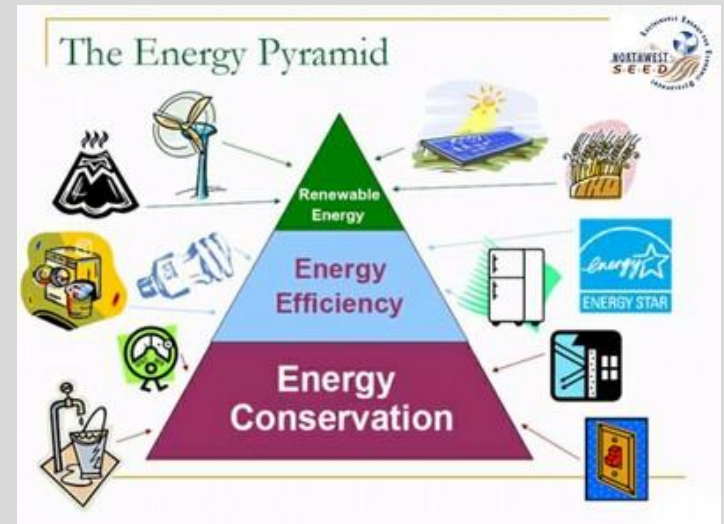
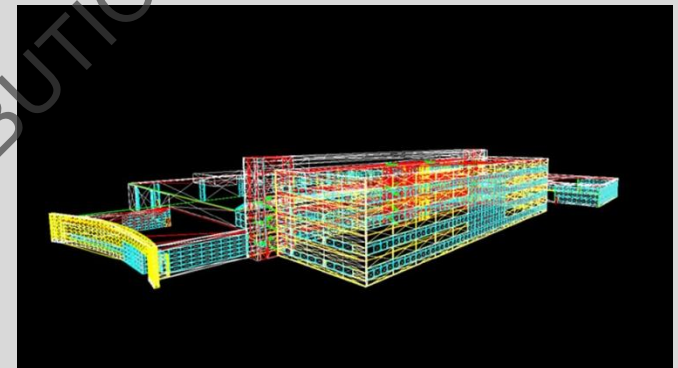


Engineering and Energy Planning



Engineering and Energy Planning Department

- Organization
- Function and background
- Objectives
- Engineering Group
- Energy Planning Group
- Programs

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Mechanical Engineer

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Sr. Electrical Engineer

Earl Boston
Sr. Controls Engineer

Jeff Rizak
Sr. Electrical Engineer

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Engineering and Energy Planning Department



Some of our main responsibilities:

- Engineering design reviews
- Support O&M on modifications and repairs
- Energy conservation efforts and ERF
- Recommissioning program
- Utility metering and billing
- Preventative maintenance on electrical gear
- Facility Condition Assessments and FRF

Department Objectives

- Stewards of the University in support of the mission of UPenn: education and research
- Experts in our technical fields. Knowledgeable about the buildings and systems. Know the most energy efficient ways to improve our buildings. Be top level experts.
- Provide opinions and views that are valued and desired by our customers because they trust us to give them the best advice.
- Support design and construction by being knowledgeable about what we want built and ensuring that what does get built is the best and most energy efficient.
- Involved in the day to day operational problems so we can provide solutions that are trusted by the trades.

Engineering



- Led by Mike Coyne
- Hasanaat Prophete (mechanical), Phil Kershner (electrical), Jeff Rizak (electrical), and Earl Boston (controls)
- Participate in design development to meet our standards
- Perform design reviews for construction
- Play an active role during the construction process
- Help trades and area managers with operational problems
- Maintain and operate SCADA system
- Conduct preventative maintenance on electrical switchgear and substations

Energy Planning



- Manage Recommissioning Program
- Manage energy audits and implement recommended energy saving measures
- Manage Energy Reduction Fund program
- Manage meters and provide meter engineering support to measure energy usage and for billing
- Evaluate and pilot test energy conservation technologies
- Support load serving entity operations, energy procurement, and strategies for energy savings

Engineering and Energy Planning - Programs Overview

- Facility Renewal Fund
- Facility Condition Assessments
- Energy Reduction Fund
- Century Bond Fund
- Building Energy Metering
- Recommissioning
- Engineering “shop” in AIM

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Facility Condition Assessments/FRF



- Manage contractors performing the assessments and validating their inputs
- Manage database of facility condition assessments
- Provide data from FCA database for Facility Renewal Fund project prioritization and capital planning
- Select projects and develop the FRF budget (75 projects for FY14/approx. \$28M and)

Energy Reduction Fund

- Funding source for energy conservation projects
- School/center must contribute 20% of project cost
- Projects are identified by the school/center and submitted to Andrew Zarynow for study
- School/Center pays for study to develop costs and paybacks
- Project is entered into a scoring database that ranks the projects
- Project lists are reviewed with senior FRES management for approvals

Century Bond

- 2 challenges facing the University are energy consumption and deferred maintenance.
- In April 2012, University borrowed \$300 million with a term of 100 years at a rate of 4.67%
- Replace the aging and inefficient HVAC and lighting systems
- 40-plus buildings being studied. 32 buildings for lighting upgrades and 17 for potential heating-ventilation-air-conditioning (HVAC) overhauls
- Buildings may see as much as a 60% decrease in energy use, saving on utility costs and shrinking the University's carbon footprint.
- Newer systems will greatly reduce the operations and maintenance costs.
- Feasibility studies are scheduled to be completed in the end of March 2013.
- Interest on the bonds (\$14 million/yr) paid with energy savings from the lighting upgrades
- Principal on HVAC replacements paid by the schools/centers receiving funding.

Century Bond Feasibility Study - Summary of Projects by School/Center

School/Center	Lighting Replacement Projects	Comprehensive HVAC Projects
LAW	Silverman Hall	
PSOM	Anatomy/Chemistry John Morgan Medical Building Richards Johnson Pavilion	Anatomy/Chemistry John Morgan Medical Building Richards Building Edward J. Stemmler Hall
PENN DESIGN	Meyerson Hall - Fine Arts Morgan Fine Arts Building Duhring Wing of the Furness Bldg Fisher Fine Arts Library	Meyerson Hall - Fine Arts
SAS	David Rittenhouse Labs Leidy Labs CRET wing - Chem 41 Fels Center Center for Judaic Studies Stiteler Hall Williams Hall	David Rittenhouse Labs Goddard Laboratories - Biology Building Leidy Labs LRSM (shared with SEAS)
SEAS	Hayden Hall Towne Building GRW Moore	Hayden Hall LRSM (shared with SAS) Towne Building
SDM	Evans Dental Medicine Levy Dental Oral Health	Evans Dental Medicine
SVM	Rosenthal Building Veterinary Medicine Old Quadrangle	Rosenthal Building Ryan Veterinary Hospital Veterinary Medicine Old Quadrangle
ANNENBERG CENTER	Annenberg Center	
BUSINESS SERVICES	Stouffer Triangle Dorm and Offices	
DRIA	Hollenback Center Hollenback Annex Palestra Weightman Hall	
EVP	Franklin Annex	
ICA	Institute of Contemporary Art	
MUSUEM		University Museum University Museum - Academic Wing

Building Energy Metering

- Program to install energy meters in almost every building on campus
- Measure electricity, steam, and chilled water use
- Remote reading of meters
- Measurements will be used monitor building performance
- Plan to bill schools and centers directly for energy use
- Predict energy usage based on historical trends
- Allow benchmarking of buildings
- Allow measurement and verification of energy conservation efforts

Recommissioning

- Process through which buildings are commissioned again at some time after their initial completion, occupancy, and commissioning.
- It is the application of the Commissioning Process to projects that have previously been commissioned.
- During building operations, systems may become out of balance or may be adjusted. As a result, the building may not operate in an efficient manner.
- Additionally, the needs of a facility may change as tenants, owners, and technologies change.
- Its goal is to return the building to its originally designed optimum operation as well as identify and perform repairs, identify energy saving opportunities, and recommend energy conservation measures.

Engineering “shop” in AIM

- Shop in AIM that can help solve operational problems
- Purpose in setting up a shop is to provide a method for providing support to the trades in completing work orders by adding engineering services. Also to document the solution for future reference.
- Work orders are submitted by area managers with input from BA's.
- Engineering shop reviews and assigns engineering support to complete the job
- Provides a method to track and measure the level of engineering support needed for O&M

How can we help you?

- Support your area manager through work orders in engineering shop
- Support energy conservation with ERF, meter installations and meter data
- Provide funding for capital improvements through FRF, CB, and ERF
- Offer energy conservation strategies through recommissioning and pilot testing.
- Provide technical support for operational and design issues in general