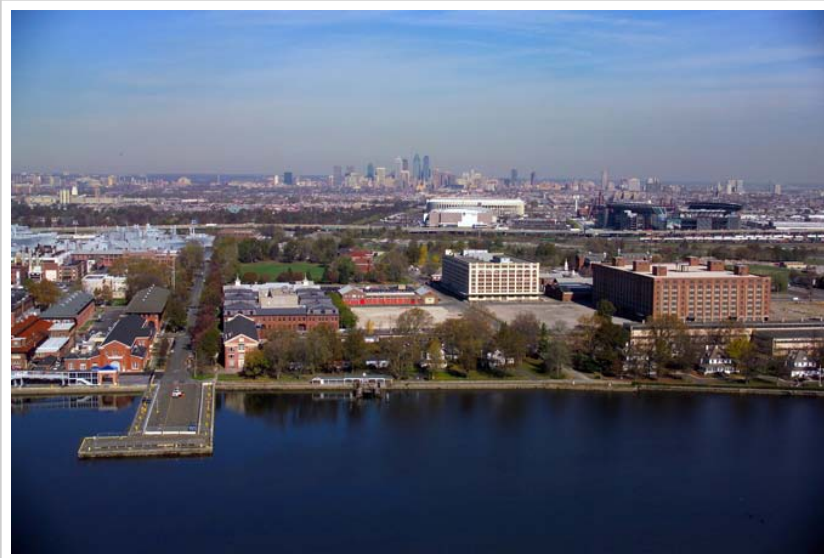


An aerial photograph of The Navy Yard in Philadelphia, showing a mix of historic brick buildings and modern multi-story structures. In the foreground, there is a large body of water with a dock. The Philadelphia skyline is visible in the background under a clear sky.

Greater Philadelphia Innovation Cluster (GPIC) for Energy-Efficient Buildings

A U.S. DOE Energy Innovation Hub
The Navy Yard, Philadelphia
<http://gpichub.org>



GPIC Headquarters: Building 661

Tim Wagner, UTRC

Jenn Rezeli, Re:Vision Architecture

GPIC Partners Meeting

April 19, 2011

- **Transform the commercial/institutional building retrofit environment by providing means and methods to improve energy efficiency by 50 percent that can be readily adopted by industry and implemented in the marketplace over the next 10 years.**
- **The strategic market focus of the HUB is on full-spectrum retrofit of existing average size commercial , institutional and multi-family residential buildings in the 10 county region defining greater Philadelphia.**

- **Energy Efficiency - Annual energy savings per square foot**
- **Scalability - Installed cost of energy saving retrofit**
- **Constraint – deliver good indoor environment**

GPIC Headquarters: Vision



- **House and foster whole-systems research for improving energy efficiency**
- **The work of the HUB should be visibly apparent (“Ooze innovation”)**
- **Function as a Living Laboratory to research and demonstrate scalable retrofit approaches for energy reduction that are market ready or near-market ready.**
- **Serve as a regional resource that makes energy efficiency sexy to building owners, researchers, and policy-makers.**

The Navy Yard





East Facade



South Facade



**UMMM, WHY
BUILDING 661?**



Framing the Mid-Atlantic Commercial Building



Retrofit Challenge (by total floor area)

- 25% Offices
- 14% Education
- 11% Warehouse
- 8% Lodging

47% Buildings before 1960
25% before 1960 Nationally

Enclosures (all mid atlantic):
67% brick, stone, stucco, concrete
~50 % windows single glazed (<1960)
34% built up roofs
31% synthetic/rubber
24% skylights/atrium

38% buildings <50,000 sqft
54% buildings <100,000

63% 1-3 floors

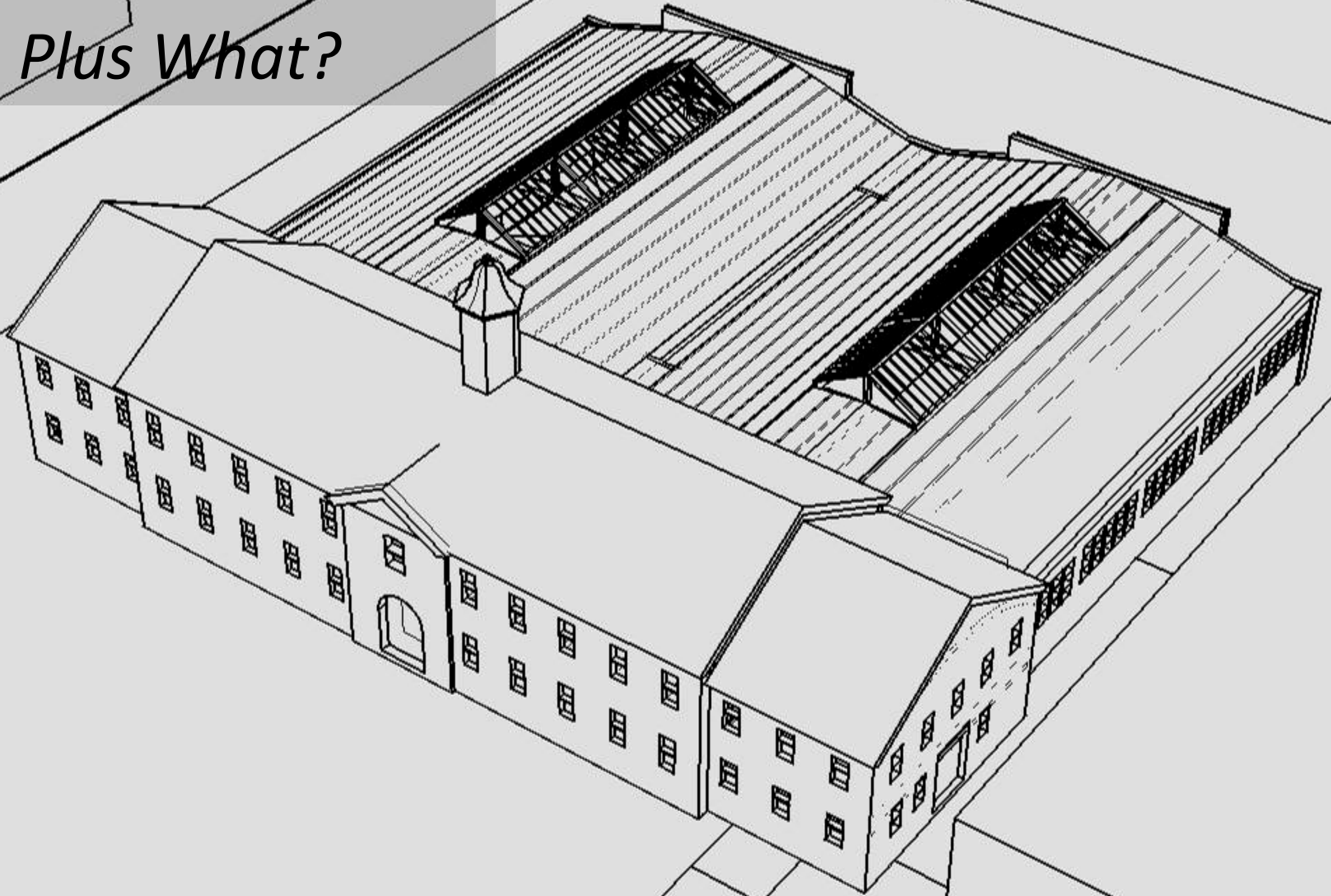
Heating
48% boilers
26% furnaces
23% packaged heating
10% district heat

36% no renovations since 1980
58% no HVAC renovations
58% no lighting renovations
64% no window replacement
76% no insulation upgrade

Lighting
~50% w/out
electronic ballasts

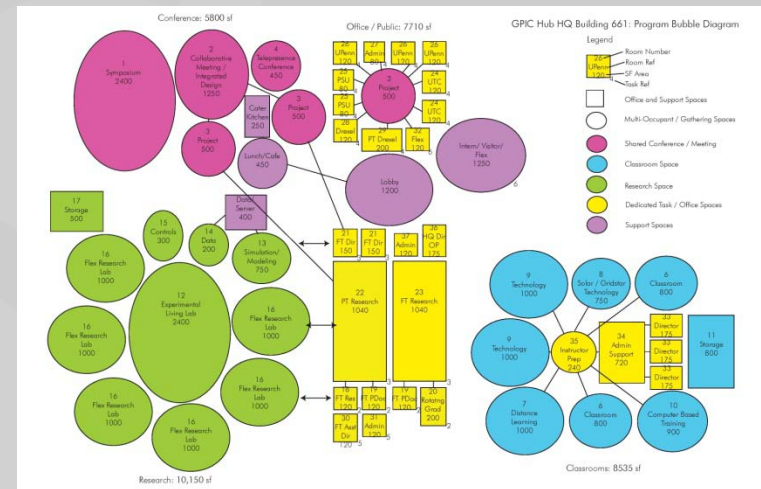
Cooling
52% packaged AC
28% window AC
21% 'residential' AC
15% central chillers
6% district chilled

BUILDING 661+
Plus What?



661 PRE-DESIGN UNDERWAY

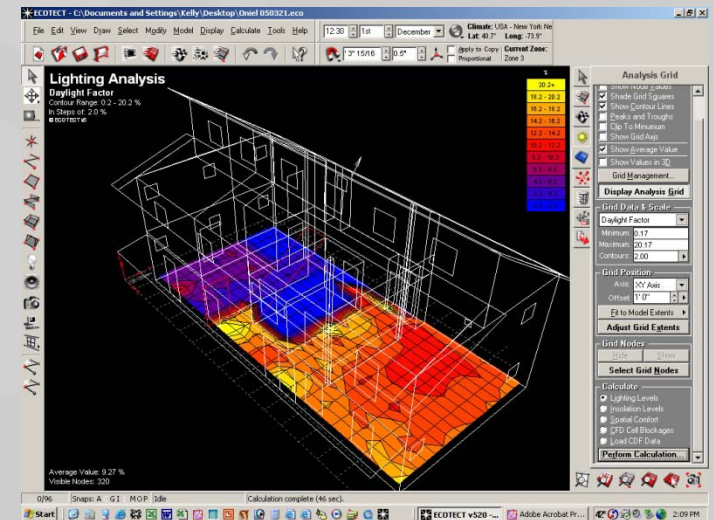
- **Due Diligence for 661**
 - To be complete early May by Hill International
 - No fatal flaws surfaced during on-site work
- **Programming for 661**
 - Vision for the HQ
 - Spatial Needs, Qualities, Adjacencies
 - Conceptual Techs/Systems
 - Cost Estimating
- **Design Team Selection**



- **General Types of Space:**
 - **Offices:** HUB Researchers and Key Partners
(mix of public and private)
 - **Labs*:** Research, Testing, Simulation
 - **Conference/Meeting:** On-Site and Distance Capabilities
 - **Classrooms:** Education, Workforce Development
 - **Demonstration:** Energy Efficiency Technologies

PROGRAMMING OVERVIEW

- Anticipated Research within HUB HQ:
 - Integrated Assemblies
 - Integrated Building Controls
 - Building / Energy Simulation



- **Anticipated Research Using the HUB HQ:**
 - Mega-Metering and Validation of Models
 - Intensive Building Management Systems
 - Potentially Redundant Systems
 - Occupants as Subjects for “Energy Effectiveness,” e.g. acoustics, lighting quality, thermal comfort, etc.

Design Team Selection

- **Qualifications – Based Process**
- **Integration & Expertise of All Team Members Important**
=====
- **Begin Process June-July 2011**
- **Request for Letters of Interest to be posted on PSU Office of Physical Plant website www.opp.psu.edu.**
- **10 Teams will be selected to submit a Full Proposal**
- **3 Teams will be interviewed**
- **Final Selection: Sept PSU Board of Trustees Meeting**
- **Design to commence shortly thereafter**

VISION FOR HUB HQ

- **Ooze innovation.** The work of the HUB should be visibly apparent.
- **House and foster collaboration** between research, training, and commercialization activities focused on clean and energy efficient processes, policies, and technologies.
- **Function as a Living Laboratory** to research and demonstrate over time the processes and products identified and/or developed by the HUB as scalable retrofit approaches for energy reduction that are market ready or near-market ready.
- **Serve as a regional resource** that makes energy efficiency sexy to building owners, researchers, policy-makers
- **Demonstrate intersection between energy efficiency and energy effectiveness** (e.g. efficient spaces that are also comfortable, healthy, functional, appealing)

Overarching Goal

- “Transform the commercial/institutional building retrofit environment by providing means and methods to improve energy efficiency by **50 percent** that can be readily adopted by industry and implemented in the marketplace over the next **10 years.**”

Thank You



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www.linkedin.com/groups?gid=3843153



info@gpichub.org

The screenshot shows the GPIC Hub website homepage. At the top, there is a navigation menu with links for Home, About Us, HUBlog, Research & Development, Education & Workforce, Technology Transfer, Facilities, and Contact Us. A search bar is located in the top right corner. The main content area features a large image of a man working on a computer, with a sidebar titled "Design Tools Team" that describes their work on integrated design, verification, and modeling tools. Below the main image, there is a section titled "Greater Philadelphia Innovation Cluster (GPIC) for Energy-Efficient Buildings, a U.S. DOE Energy Innovation Hub led by Penn State University." This section includes a brief description of the hub's goals and a "Follow the GPIC Hub" section with social media icons for Facebook, Twitter, LinkedIn, and HUBlog. There are also sections for "Press Releases" and "Upcoming Events" with links to more information.