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
GPIC Mission

• 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.
GPIC Metrics

- 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.
UMMM, WHY BUILDING 661?
Framing the **Mid-Atlantic Commercial Building Retrofit Challenge** (by total floor area)

- **47% Buildings before 1960**
- **25% before 1960 Nationally**
- **25% Offices**
- **14% Education**
- **11% Warehouse**
- **8% Lodging**

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

**Lighting**
- ~50% w/out electronic ballasts

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

**Cooling**
- 52% packaged AC
- 28% window AC
- 21% ‘residential’ AC
- 15% central chillers
- 6% district chilled

**CBPD CMU for GPIC 2011 expert workshop**

EIA/CBECS 2003 data
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
PROGRAMMING OVERVIEW

• 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
PROGRAMMING OVERVIEW

• 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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