High-Performance Buildings Powered by Renewable Energy

11th Annual North American Passive House Conference
Philadelphia, PA
“Policy, Codes & Incentives”
September 24, 2016

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Environmental and Energy Study Institute

- Independent, not-for-profit organization founded in 1984
- Mission to help create a sustainable and resilient economy with energy efficiency and renewable energy
- EESI Board of Directors: Addressing climate change is a moral imperative
- Policy/Program areas:
  - Energy and Climate
  - Transportation
  - Sustainable Biomass
  - Buildings and Communities
Approach

• Inform and educate policymakers and stakeholders
  • Congressional briefings to showcase state/local examples of projects, programs, policies; disseminate and give “additional legs” to key reports
  • One-on-one meetings;
  • Fact sheets, issue briefs, articles

• Build coalitions and consensus

• Develop and promote policy solutions
The Building Sector: A Big Part of the PROBLEM

Major energy consumer
~ 40% of U.S. total for building operation
~ 70% electricity

~ 40% of greenhouse gas emissions

Vulnerability to multiple hazards
New Opportunities to Push Agencies to Adopt High-Performance Building Standards such as Passive House
Threats to/Impacts from Buildings

• GHG emissions and climate change
• Flooding, wind damage, wildfires, earthquakes
• Dependence on, and depletion of, non-renewable energy resources
• Degradation and loss of ecosystems, habitat, biodiversity
• Volatile energy markets
• Manmade hazards (pollution, fuel/chemical spills, fires, cyber attacks, physical attacks, biohazards)
• Age and disrepair of buildings, electric grid and other infrastructure
Other Challenges

• Affordable housing crisis

• Crumbling infrastructure

• Aging population (“silver tsunami”)

• Internet-connected Haves and Have-Nots

• Government policy uncertainties
What Should Policymakers Address First?

- Climate change
- Natural/manmade hazards
- Health care
- Affordable housing
- Infrastructure needs
- Job creation
- Other
All of the Above!
Performance Goals: What Should the Building “Do”?

For Example:

Provide an Optimum Learning Environment

- Acoustic Comfort
- Safety and Security
- Superior Indoor Air Quality
- Thermal Comfort
- Visual Comfort
- Inspiration

... in addition to meeting energy performance and other goals!

www.wbdg.org
Whole Building Design Guide

Heritage Middle School
Innovative Design
Raleigh, North Carolina
(www.innovativdesign.net)
Statutory Definition of High-Performance Building


A high-performance building is—

A building that integrates and optimizes on a life cycle basis all major high performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.
Attributes of High Performance

• Accessibility
• Aesthetics
• Cost Effectiveness
• Functionality
• Historic Preservation
• Productivity
• Resiliency
• Security/Safety
• Sustainability

Future Attributes:

How will buildings and communities evolve?

What will societies demand?
The Multiple Benefits of High-Performance Buildings

• For occupants: Improved comfort, health, safety, cash flow... well-being
• For insurers (and government): Risk management
• For owners and investors: O&M cost savings, long-term value
• For the environment on which we all depend: Resource conservation, reduced pollution and greenhouse gas emissions, ecosystem protection/restoration
• For communities: Prosperity and resiliency (if benefits apply to all)

Economic, Environmental, Social Sustainability
(The “Triple Bottom Line”)
Policies and Other Drivers of High-Performance Building

International
• Paris Climate Agreement
• Health impacts of emissions and pollution
• Phase-out of HFCs (Montreal Protocol)
• U.S. Department of Defense initiatives
• Sustainable development – Leap-frog industrial age?

Domestic
• Extreme weather in GAO High Risk Reports (gov’t fiscal exposure)
• Tax credits/deductions for developers, businesses, consumers
• President’s Executive Orders for federal agencies
• DOE programs (such as Zero Energy Ready Homes)
• USDA loans for EE upgrades
• Grid modernization
• New bi-partisan Congressional caucuses, resolutions
Policies and Other Drivers of High-Performance Building

- Affordable housing development incentives such as PA Housing Finance Agency’s extra points for Passive House

- State programs/incentives for Passive House such as NYSERDA

- Evolving energy sector – PV prices; distributed generation and storage; Internet of Things (grid-connected controls and sensors, thermostats, appliances)

- Financing products

- Innovators & entrepreneurs

- Congressional action?? (agency funding, comprehensive energy bill, tax credits)
Not Helpful

• Directives for federal agencies to choose a specific “comprehensive” green building certification system

• Large and confusing array of “green” building programs and labels, codes and standards

• Contract and procurement officials who do not understand how to differentiate

• Special interest lobbying against 3-year code update/adoPTION

• Inadequate incentives for high performance and/or resources for code enforcement
How to Push the Pace?

- Integrated, holistic planning for sustainable neighborhoods, communities
- Building codes
- Tax credits/deductions, other incentives
- Government-industry R&D (and demonstration)
- Market education/incentives (consumers, developers, lenders, appraisers, insurers)
- Technical training for building professionals
- Clean Power Plan Implementation
- Carbon Pricing?
“Zero/Positive Energy” Buildings
Can be a Big Part of the SOLUTION

Climate Change Mitigation + Adaptation
= Sustainability + Resiliency

“Path to Zero”
PASSIVE HOUSE AND YOU ARE...

- transforming the building sector from being a big part of the problem to being a big part of the **SOLUTION**.

WE CAN...

- turn building-related threats and challenges into OPPORTUNITIES to enhance environmental, economic and social sustainability and resilience.
THANK YOU

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