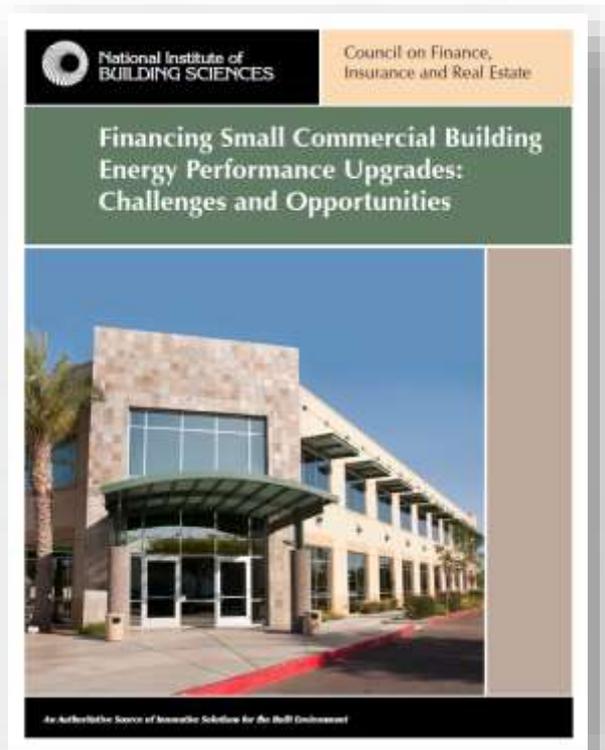


# Financing Energy Performance Upgrades: Challenges and Opportunities



**National Institute of  
BUILDING SCIENCES**  
*An Authoritative Source of Innovative Solutions  
for the Built Environment*

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# Public Law 93-383, Sect. 809

*Congress directed the Institute to “exercise its functions and responsibilities in four general areas.....”*

- **Develop and maintain** performance criteria for maintenance of life, safety, health, and public welfare for the built environment
- **Evaluate and prequalify** building technology and products
- **Conduct** related and needed investigations
- **Assemble, store, and disseminate** technical data and related information



National Institute of  
BUILDING SCIENCES

# Mission

“... to serve the nation and the public interest by supporting advances in building sciences and technology to improve the built environment.”



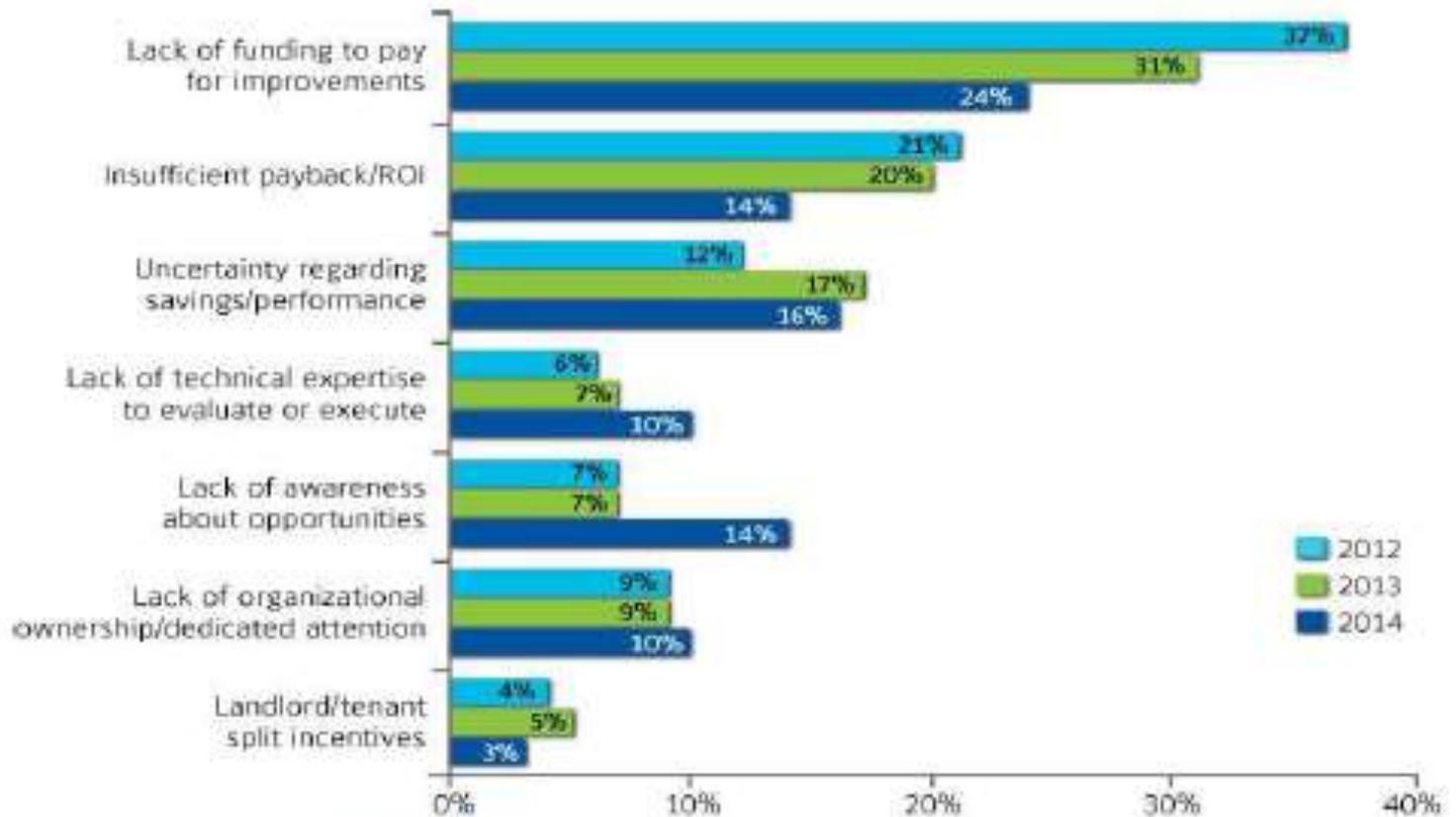
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# The Council on Finance, Insurance and Real Estate

- Examines the intersection of finance, insurance, investment and design, construction and ownership to encourage the development and assist in the affordability of high-performance buildings.
- Provides an objective source for information and identification of valid performance methodologies and provides a forum for the AEC and finance and insurance industries to come together to understand each other's perspectives/concerns and engage in problem solving.

# Barriers to Pursuing Energy Efficiency

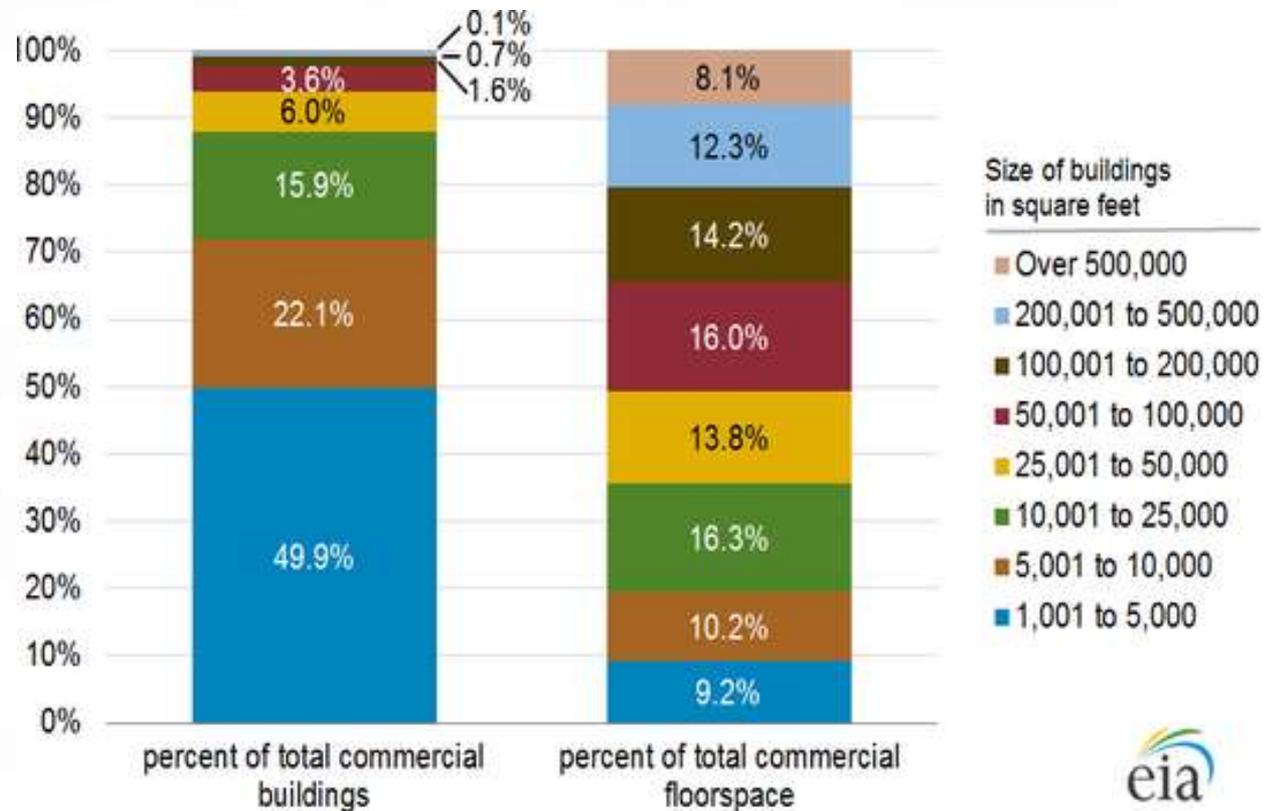


# Small Building Domination

≤ 50k sq.ft.

Structures 93.9%

Square Footage 49.5%



# Summary of Energy Efficiency Impact by Market Size, Climate and Employment Categories

	Residential	Commercial	Institutional	Total
<b>Economic/Financial Impact</b>				
Energy Savings (Trillion Btu)	1,892	848	293	3,033
Total Investment (\$ Bn)	182	72	25	279
<b>Social Impact</b>				
Cumulative Job Years Created (# FTEs over course of investment program, '000s)	2,152	857	296	3,305
<b>Environmental Impact</b>				
Greenhouse Gas Emission Reduction (million metric tons of CO <sub>2</sub> mitigated per year)	382	175	59	616

Source: Rockefeller Foundation, 2012. McKinsey, *Unlocking Energy Efficiency in the U.S. Economy* (2009); Center for American Progress, *The Economic Benefits of Investing in Clean Energy* (2009); Energy Information Administration *Commercial Building Energy Consumption Survey 2003, Residential Energy Consumption Survey 2000*. Note: Analysis is based on an assumption of 30% energy savings in buildings built before 1980. Category impact information represents an aggregation of the values calculated for the segments associated with that category. TBtu = Trillion Btu.

# Estimated Energy Retrofit Market Opportunity

	Total	Commercial Buildings	Small Commercial Buildings <sup>1</sup>
Investment (\$billion)	\$279	\$72	\$35.64
Energy Savings (trillion BTUs)	3033	848	419.76
Energy Savings ( 10 years, \$ billion) <sup>2</sup>	1000	\$279.6	\$138.4
Cumulative Job Years (thousand FTEs)	3305	857	424.2
GHG Reductions (million metric tons CO <sub>2</sub> /year)	616	175	86.6

## Sources:

Fulton Mark, et al., *United States Building Energy Efficiency Retrofits, Market Sizing and Financing Models*, DB Climate Change Advisors, Deutsche Bank Group, March 2012, pp. 3, 7  
 U.S. Energy Information Administration, "2012 CBECS Preliminary Results," June 2014, <http://www.eia.gov/consumption/commercial/reports.cfm>

## Notes:

1. Small commercial building share estimated at 49.5% of commercial building share, per 2012 CBECS preliminary results.
2. Commercial energy savings in dollars derived from the ratio of commercial Btu savings to total BTU savings.

National Institute of Building Sciences Council on Finance, Insurance and Real Estate. 2015. "Financing Small Commercial Building Energy Performance Upgrades: Challenges and Opportunities."

[https://www.nibs.org/resource/resmgr/CC/CFIRE\\_CommBldgFinance-Final.pdf](https://www.nibs.org/resource/resmgr/CC/CFIRE_CommBldgFinance-Final.pdf).



# Challenges to Investment

*Demand decisions – owners, managers, tenants*

1. Skeptical savings will materialize
2. Do not understand analysis & technology
3. Lack expertise to manage upgraded tech
4. Weak financials: weak credit access, limited cash

# Challenges to Investment

*Supply, capital sources: banks, lenders, CapEx, new financing (PACE, etc.)*

1. Complex underwriting due to atypical configurations, mixed uses
2. Hybrid loan product: construction + perm
3. Transaction fees a high % of loan amount

# Property Configurations and Risk Profiles

## Lowest-Risk Property Configuration

- A single building of conforming/typical design and size
- Improvements in average or better condition
- On a single, fully useable land tax parcel
- Occupied by a credit-worthy single user (owner or tenant)
- Located in a market with good sale velocity (for that kind of building).

## Highest-Risk Property Configuration

- Configured for multiple occupants/tenants
- Occupied by tenants of mixed or low credit quality
- Improved for multiple uses (retail + apartment + warehouse)
- Atypical size, access, building configuration
- Improvements with deferred maintenance, sub-average condition
- Located on multiple land tax parcels (with perhaps extra land)
- Located in a rural, thinly traded unstable market



# Some Bright Spots to Build Upon

- PACE, utility on-bill financing
  - Collection procedures, standardization, vetted contractors
- Government & utility related financing
  - loan loss reserves, loan guarantees, and interest-rate buy downs, and direct lending using revolving loan funds
- Small Business Administration's 504/CDC credit enhancement program
- Federal tax incentives
  - Need consistency to build market/capacity



# Policy Recommendations

1. Support & expand existing key programs
  - ENERGY STAR & CBECS
  - National Labs research: M&V, equipment, software
  - SBA: expand, add programs for bldg performance, leverage DOE expertise
  - Tax incentives (remove disincentives)
  - Integrate programs and base on actual performance
2. Local, city, county programs to prove concepts
  - Lower risk, easier to modify than national programs



# Policy Recommendations

3. Federal level public-private retrofit programs
  - Credit enhancement
  - National standards: data, process, documents, aggregation
  - Coordinated approach, bundling programs
  - Turnkey energy conservation measures
  
4. Recognize local & property level variations
  - Building size, age and use
  - Construction type
  - Climates



# Policy Recommendations

## 5. Leverage CBECS database with new data sources

- Mandatory energy use disclosure laws
- Voluntary reporting, interface with utilities
- Improved benchmarking data

## 6. Utilities should play key role

- Provide building owners with actionable data
- Education and outreach to customers

# Policy Recommendations

7. Anticipate loan aggregation into bonds
  - Engage secondary market: rating agencies, banks
  - “Green Bond” bandwagon
  - Bonds are cheapest source of capital, good P3 history

# Additional Thoughts

- Focus on Actual, Measured Performance
  - GSA Federal Center South, Seattle
  - DBOM/P3
  - Leverage benchmark data

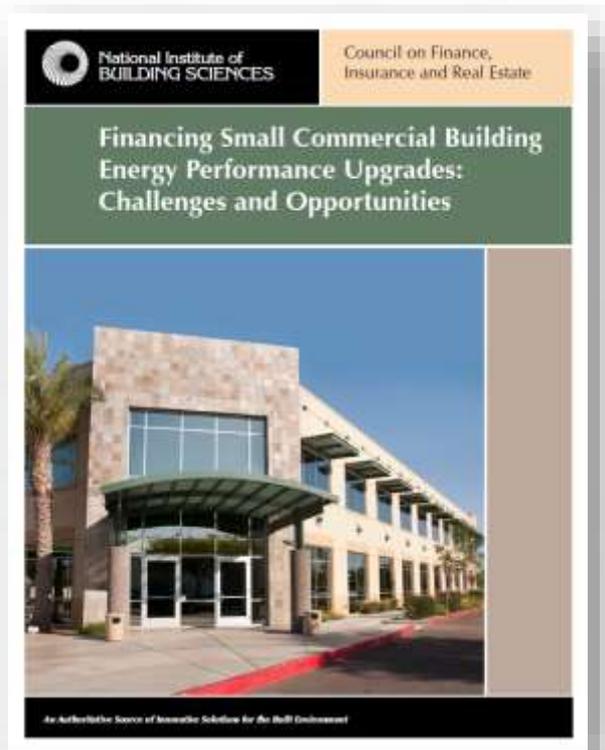


The screenshot displays the WBDG (Whole Building Design Guide) website. The header includes the WBDG logo, a navigation menu with links for HOME, ABOUT, CONTACT, SITE MAP, LOG IN, and social media icons, and a search bar. Below the header is a secondary navigation bar with categories: DESIGN GUIDANCE, PROJECT MANAGEMENT, OPERATIONS & MAINTENANCE, DOCUMENTS & REFERENCES, TOOLS, CONTINUING EDUCATION, and BIM. The main content area features a sidebar on the left with a list of articles under tabs A-C, D-H, I-R, and S-W. The main article is titled "Outcome-Based Pathways for Achieving Energy Performance Goals" by Ryan M. Colker, dated 04-25-2016. The article's introduction discusses the importance of reducing energy use and achieving performance goals through various approaches. A "Within This Page" box lists links to the "Introduction" and "Additional Resources" sections. On the right side, there are options to comment, bookmark, and share the page, along with a list of related resource pages such as "Achieving Results with a Mobile Infrastructure and Facilities Management System" and "Codes and Standards Development".

<http://wbdg.org/resources/outcomebasedpathways.php>



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