

Operational Energy Savings & Economic Development

Growing Markets for Building Energy Savings in the Minneapolis-St. Paul Region

A BRIEFING PAPER FOR ECONOMIC DEVELOPMENT PRACTITIONERS



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Massachusetts Institute of Technology
Community Innovators Lab
Green Economic Development Initiative



Massachusetts
Institute of
Technology

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About GEDI

The Green Economic Development Initiative (GEDI) is a project of the Community Innovators Lab (CoLab), a center for planning and development within the Massachusetts Institute of Technology's Department of Urban Studies and Planning. GEDI envisions the triple bottom line priorities of environmental sustainability, social justice, and economic opportunity applied broadly within the economic development field. To realize this vision, GEDI partners with economic development organizations to conduct applied research; develop tools and resources for practitioners; disseminates knowledge; and formulate policy and strategy.

Introduction

More efficient use of energy is key to a healthy, productive and green economy. The potential for energy savings is vast – various energy efficiency potential studies suggest that we could reduce our buildings energy needs and pollution by 10-30 percent from net-present-value positive efficiency investments at today's energy prices.¹ However, while significant efficiency gains are occurring, informational, financial, split-incentive, transactional and behavioral barriers hinder markets for efficiency.²

Economic development organizations (EDOs) can grow markets for energy efficiency and reduces barriers to uptake. EDOs possess extensive experience convening industries, incubating new ventures, providing innovative financing tools for nascent markets, and connecting businesses with services and technical assistance. Thus, EDOs are well positioned to complement utility, government and private-sector efficiency programs and services.

This brief summarizes work by the MIT CoLab Green Economic Development Initiative (GEDI) to transform markets for Operational Energy Savings, undertaken in partnership with the City of Minneapolis' Department of Community Planning and Economic Development.

Operational Energy Saving Services

Minimizing building energy use requires good energy management practices. Energy management can entail large-scale, capital-intensive retrofits to buildings; however, it also requires a commitment to operating buildings as efficiently as possible. "Operational Energy Saving" (OES) strategies entail diagnosing buildings' energy use, and suggesting low-cost means to save energy via improvements to building operations, controls, systems, and equipment. OES encompasses a range of diagnostic strategies, including:

- Commissioning – The systematic testing of existing buildings' mechanical equipment for faults, "trending" analysis of building conditions to find unnecessarily conditioned spaces, and the optimization of building schedules to minimize energy use and achieve greater comfort.
- Real-time monitoring of building systems using multiple sensors and automated diagnostics facilitated by computer applications, or 'ongoing commissioning.'
- Walk-through building audits.
- Benchmarking building energy use against past performance and other similar buildings.
- Comparisons of buildings' performance with building energy models, to identify energy saving opportunities.

The energy savings potential of OES is vast. For example, the most comprehensive study of commissioning practices found that the median commercial office retro-commissioning project yields energy savings of 22 percent (16 percent for all building types) with an annual return on investment of 91 percent.³

Despite these potential gains, industry estimates indicate that market penetration of building commissioning is only five percent.⁴ Other promising OES services, such as automated diagnostics and performance comparisons against energy models are even more nascent, serving just a tiny percentage of the potential market.

The Economic Development Benefits of Energy Efficiency

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Achieving greater energy efficiency, and OES in particular, can realize many positive outcomes prized by economic development practitioners and the communities they serve. These include:

Job Growth

Promoting energy efficiency can be a very effective means of fostering job growth in a region. Energy efficiency creates employment in two ways – through investment in efficiency projects themselves, and via energy savings being reinvested in the broader economy. First, energy efficiency investments results in direct diagnostic, design, and construction jobs; indirect jobs manufacturing and transporting equipment; and induced employment as these employees spend their wages. The construction sector is more labor intensive than other sectors; thus, typically more employment is associated with energy efficiency spending than investments in other sectors of the economy.

The most significant job creation stems from energy savings, however. As buildings save energy, owners shift their spending from utilities to other goods and services, which are variously estimated to be 2.2 to 2.8 times more job-intensive than utilities.⁵ Once efficiency measures are implemented, this additional job creation occurs each year. Efficiency measures that yield high returns on investment, such as OES, generate the greatest amount of jobs via energy savings.

Moreover, more of this job creation will be local, instead of bound for distant utilities. Areas that import a relatively high proportion of their energy such as the Northeast USA have especially high net job creation (see Figure 1). However, even regions that produce a higher proportion of their energy locally, such as the Southeast USA, still realize twice the amount of jobs and income from spending in other sectors as from utility spending.⁶

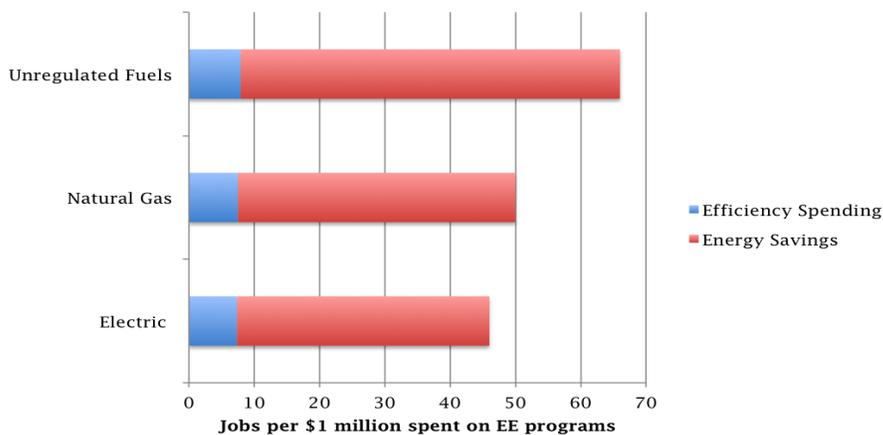


Figure 1: Job creation from Northeast states energy efficiency programs. Source: EDRG 2009.⁷

Health, Comfort and Employee Productivity

Better building operations and equipment can improve air quality, thermal comfort and lighting quality. Improved indoor conditions reduce employee absences from work, and contribute to greater work performance and productivity. One study found that improved building conditions could save the US economy \$6 to \$14 billion from reduced respiratory illness, \$1 to \$4 billion from reduced allergies and asthma, \$10 to \$30 billion from reduced sick building syndrome symptoms, and \$20 to \$160 billion from non-health related improvements in worker performance.⁸ Indeed, another study suggests that four common commissioning measures may reduce health costs for office workers by \$29 billion annually, if implemented in all appropriate buildings across the USA.⁹

Added Real Estate Value

Greener buildings can increase building values and rents, as tenants are willing to pay more to locate in such buildings. The Institute for Market Transformation's meta-analysis of national studies investigating the impact of LEED green building and the ENERGY STAR efficiency ratings finds that certification results in premiums on rents, sales price, and occupancy (See Figure 2). Higher property values benefit local governments that rely on property taxes for much of their revenue.

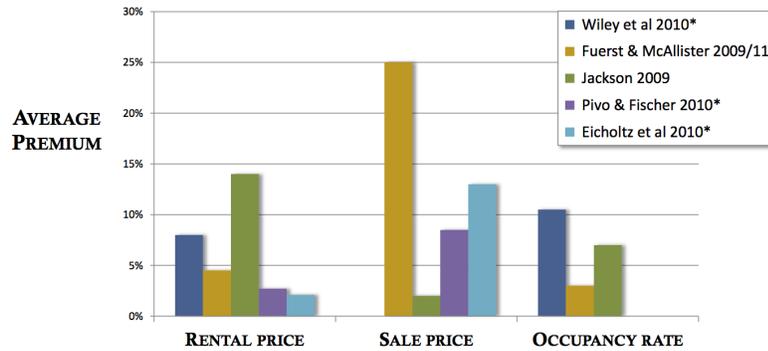


Figure 2: Premiums for ENERGY STAR rated real estate.
Source: Institute for Market Transformation. 2012.¹⁰

Local Business and Cluster Development

Increasing energy efficiency provides opportunities for local construction, design, software and diagnostic firms. Strong local efficiency policies can provide a key source of demand for local firms, which may then expand to serve broader markets. Indeed, regions with policy supporting energy efficiency, such as California, have cultivated exportable clusters in energy efficiency expertise. Moreover, advancing OES services can realize spin-off benefits for regional economies; data-intensive OES services can lead to new knowledge and innovation in building sciences, engineering and architecture.

Minneapolis-St. Paul Profile

The greater Minneapolis-St. Paul region has strengths in a variety of green sectors, notably efficient building materials manufacturing.¹¹ Interviews performed during this study suggest that the region is also home to a nascent cluster of OES providers, with some diagnostic and building modeling firms recognized as national leaders.

The State and local governments have actively sought to grow the green economy. Notably, the Cities of Minneapolis and St. Paul have partnered on the Think.Green initiative, a framework for green economic development. Under this rubric, the cities have engaged in green procurement initiatives; supported and promoted a range of utility and non-profit administered energy efficiency programs, such as the Building Owners and Managers Association Kilowatt Crackdown; altered existing business financing tools to provide more flexible energy upgrade financing via the St. Paul Port Authority Trillion BTU program and the Minneapolis Small Business Energy Loan program; developed demand-side policies, such as the City of Minneapolis' energy use disclosure policy for commercial buildings; and launched the RENEW Training and Job Placement program.

Due in part to this work, energy management, and OES activity in particular, have higher levels of penetration than other parts of the country. Most class A office space is Energy Star rated, and many facility managers report undertaking basic commissioning and other OES services.

Nevertheless, interviews with industry participants suggest that there is still extensive latent demand for OES services in the region. Moreover, buildings can benefit from more frequent service, deeper engagement, and higher quality service provision. The industry analysis undertaken as part of this study revealed the following insights:

Demand

- Class B and C properties, and smaller properties, especially have received little OES services. These properties generally face special barriers to engaging in OES, including: Greater vacancy; less extensive building management and operations capacity; and older building mechanical control systems, which are more difficult to re-program to achieve deep energy savings.
- Tenant demand is an important driver for OES. Most leases in Minneapolis are triple net leases, wherein base building utility costs are passed through to tenants. Thus, owners have no financial interest in lowering buildings' energy use, unless tenants demand it. Practically no tenants understand the full extent of efficiency potential in their buildings.
- OES projects are affected by the relationships and communication between building owners, property managers, and building operations personnel. Property managers typically will not advocate strongly for an idea not embraced by a building owner. Building operations personnel may likewise be hesitant to engage deeply in OES unless encouraged by owners and management. Successful OES delivery requires buy-in from all of these parties.
- Many owners, property managers, and operations personnel do not understand the specific techniques and value of different OES services.

Business

- Service providers have difficulty responding to clients that often have a poor understanding of OES services. Firms note that price quotes for the same scopes of work are often very disparate, suggesting that low-bid firms are not delivering the quality and depth of services specified in contracts. When clients cannot recognize that these bids are insufficient to conduct the specified OES services, nor knowledgeable enough to evaluate the quality of providers' work, it makes it difficult for service providers to consistently bid and deliver high quality OES work.
- Interviews with many service providers suggest they feel little 'common destiny'. Despite the market for OES being largely untapped, they appear hesitant to coordinate efforts to transform the market, concerned that they may assist their competition. Some providers have more vision for an expanded market and the value of coordination in developing it, however.
- Many service providers are new to providing commissioning. Industry observers note that the quality of services provided is sometimes inadequate, and energy savings opportunities are "left on the table".

Workforce

- There are two broad categories of workers in the OES space, with quite different workforce development pathways: Service providers and building operators.
 - Professional OES service providers require expert knowledge in their particular field. They largely learn technically and managerially complex OES competencies from their peers via on the job training.
 - Building operators have a range of duties; only the largest commercial buildings will feature specialized energy managers. Nevertheless, building operators require more sophisticated energy management education, to allow them to conduct ongoing OES and interact more readily with service providers.
- There is a need to rationalize the credentials for professional commissioning providers. Currently, there are a number of different commissioning related credentials, and market confusion regarding the competencies they convey.
- The local real estate industry does not consistently value energy management credentials amongst building operations and management professions. Additionally, operations and management credentialing programs have insufficient focus on energy efficiency.

Programs and Policies

- Minnesota features a strong mandate for utilities to achieve energy efficiency, and local utility programs facilitate commissioning services. However, there is limited utility incentive to engage in market transformation activities that expand the long-term capacity of the market to capture OES, as it is hard to document discrete, demonstrable energy savings from such efforts - a necessary condition for utilities to take credit for energy savings.
- Networks like the local chapter of the Building Owners and Managers Association have proven effective at stimulating participation in energy programs amongst their members.

Growing the Market for Operational Energy Savings

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To help grow OES and other energy efficiency services, and facilitate the highest possible quality work, it was recommended that the City of Minneapolis Department of Economic Development Community Planning establish an **OES Taskforce**, consisting of industry stakeholders and staffed by a full-time city project manager. The Taskforce would lead in implementing the following strategies.

Demand Generation

Build Knowledge and Norms around Engagement in OES – Owners, property managers and tenants require information on the nature of OES services; cost ranges; best practices; available programs; and the range of benefits associated with OES. The Taskforce should educate tenants via groups such as the Minnesota Retailers Association. Likewise, the property brokerage community should be encouraged to more visibly disclose energy data. The Taskforce can support a forum to connect owners, property managers and operators with OES service providers. Lastly, the Mayor and other City leaders should continue to actively promote energy efficiency, which industry participants cite as a significant driver of demand.

Aggregate Properties that Face Barriers to Participation – Smaller properties and Class B & C commercial real estate often face greater hurdles to participation in energy programs. The Taskforce can aggregate these properties; they should provide assistance developing the specifications, the scope of work to be implemented, procuring and monitoring contractor work, and facilitating the ongoing implementation of OES measures.

Provide Financing – OES typically pays back rapidly, especially in larger, newer buildings. Nevertheless, OES diagnostic phases require significant capital outlays; moreover, older mechanical systems may not offer as speedy returns (though most buildings have cost-effective OES potential). Thus, some projects could benefit from financing innovations. The City of Minneapolis' can build from its existing Business Loan Program. For instance, the City could provide a partially forgivable loan for diagnostic work, if sufficient cost-effective energy efficiency opportunities are not identified.

Green Leases – The Building Owners and Managers Association (BOMA) has developed guidance for commercial property owners, managers and tenants, outlining a model green lease mechanism that aligns incentives for energy efficiency. The Taskforce could survey the industry to determine the extent of green lease adoption, and work with BOMA to promulgate the green lease where it has not been adopted.

Mandates – The Taskforce could also explore regulatory mandates to require adoption of OES measures. Notably, the City of New York considered new laws that require that existing buildings undertake commissioning every 10 years, and meet the latest Energy Code lighting standards.

Business Development

Industry convening & organization - The OES services industry is relatively nascent and in the process of defining itself. A number of observers noted the importance of establishing a forum for peer communication, standardization, and organization. For example, not-for profit public-private partnerships like the California Commissioning Collaborative, have been instrumental in growing markets for OES services, and improving the capacity of the industry to deliver commissioning and interact with state policy makers.

In Minnesota, the non-profit Minnesota Center for Energy and Environment has proposed establishing a similar Existing Building Commissioning (EBCx) Collaboration group to serve as a forum for industry coordination among different OES service providers. This group could standardize scopes of work for different commissioning activities; engage in client education and outreach; and serve as an avenue for joint marketing. The Taskforce could support these activities.

Research – The taskforce could establish a research and development initiative around OES’s energy, health and productivity outcomes, in partnership with area universities.

Workforce Development

Increase the Capacity Professional Service Providers - OES service providers can benefit from ongoing opportunities to hone expertise in their craft, as well as a more rationalized credentialing system. The Taskforce should support:

- Forums for services providers to engage in peer-to-peer learning.
- Convening of service providers, efficiency program managers, community college professional development personnel, and property managers, to articulate the value of different commissioning credentials.. Additionally, the Taskforce and its partners should consider developing pilot intermediate credentials, in partnership with accrediting bodies, to provide career ladders for personnel entering the industry.

Increase the Capacity of Building Operators and Managers - Improving the energy literacy of building operators and managers will allow them to perform better management of facilities’ energy use, as well as better prepare them to communicate with OES service providers. The Taskforce can:

- Foster a forum for peer-to-peer learning among building managers and operations staff. The Greater Minneapolis BOMA Engineers Association could integrate this role.
- Investigate opportunities to provide existing building operators with energy management and/or building commissioning credentials and training opportunities. The Midwest Energy Efficiency Alliance (MEEA) has a building operator certification program specifically focusing on energy efficiency, which provides practical training sessions to building operation and maintenance staff and technicians.
- Investigate opportunities to provide greater energy management education as part of building operator education among the Region’s technical colleges.
- Work with existing education and training programs for building operators and managers to incorporate an expanded and improved curriculum around building energy management and OES services.

Conclusion

Many of the OES market barriers found in Minneapolis-St. Paul apply more broadly to various markets for energy efficiency in regions across the country and around the world. Economic development practitioners have an important role to play in growing energy efficiency markets. EDOs can stimulate demand for energy efficiency by influencing local, state and federal government policy and regulation. They can also drive demand by leveraging their technical assistance and financing tools to connect local businesses with efficiency services. Likewise, EDOs can convene service providers to develop businesses' capacity to serve efficiency markets. Finally, EDOs can align workforce development efforts, to ensure a diverse and highly skilled labor market serving the energy efficiency sectors. In turn, energy efficiency will realize a range of economic development and environmental benefits for regions, including job growth, energy import substitution, healthier indoor environments, and mitigation of air pollution and climate change. EDOs must reorient themselves as market transformation agents, to facilitate the shift towards a more job-rich, just, and environmentally sustainable society which services like OES can help realize.

Endnotes

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