

# Las Vegas Energy Efficiency MARKET TRANSFORMATION STRATEGY

**Strategies to Achieve Energy Savings and Economic  
Development in Commercial and Industrial Buildings**



*A project developed the Massachusetts Institute of Technology Community Innovators Lab  
Green Economic Development Initiative for the City of Las Vegas Sustainability Office*



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## About this Project

The Massachusetts Institute of Technology's Community Innovator's Lab Green Economic Development Initiative (MIT GEDI), and the City of Las Vegas' Office of Sustainability, partnered in January 2013 on an "action research" project to develop an Energy Efficiency Market Transformation Strategy for commercial building in Las Vegas. This report documents the findings of our research, and suggests strategies to grow energy efficiency in the region. This work is intended to support Las Vegas' ongoing economic development and environmental initiatives.

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## About the MIT CoLab Green Economic Development Initiative

MIT GEDI is a project of the Community Innovators Lab, a center for planning and development within the [MIT Department of Urban Studies and Planning \(DUSP\)](#), which focuses on advancing a socially just and environmentally sustainable economy. MIT GEDI conducts applied research; develops tools and resources for practitioners; disseminates knowledge; and partners with economic development organizations to design strategic planning initiatives intended to transform economic development practice. GEDI is generously supported by a grant from the Rockefeller Brothers Fund.

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# Executive Summary

Fostering stronger energy management—e.g. strategies to minimize buildings’ energy costs and meet other energy-related goals—can make Las Vegas a more prosperous and environmentally-friendly city. The documented economic development benefits of supporting energy management include:

- Greater business profitability.
- Increased real estate values.
- Job growth, stemming both from a growing energy services sector, as well as energy savings being reinvested in the local economy.
- Healthier buildings, with increased occupant productivity.

Despite these benefits, cost effective energy management improvements frequently do not occur. Indeed, by one estimate, there is a \$165 billion opportunity to provide energy efficiency in existing US commercial buildings (McKinsey & Co, 2009), and there are increasing opportunities to implement demand response and lower cost supply as well. In order for good energy management to be adopted the following conditions need to be met:

- Building owners, financial decision-makers, managers and operators must prioritize energy management, and possess sufficient knowledge, training and experience to implement projects.
- Highly skilled service providers must be available to serve all different types of buildings, without excessive transaction costs.
- Building owners need access to financing for energy management projects at attractive terms.

- Incentives must be aligned between owners and tenants.

## *Market Conditions in Las Vegas*

To better understand the conditions effecting markets for energy management in Las Vegas, we conducted an “industry analysis”, comprising of a review of existing publications on local energy markets and policy; a review of energy management programs and policies active and proposed in the region; and detailed interviews with participants in the commercial energy services sector, including energy service providers, real estate organizations, building owners, building managers, workforce development organizations, and staff in various levels of government.

This research suggests that, for the purposes the City of Las Vegas’ efforts to grow markets for energy efficiency, there are three important sectors in the commercial real estate market:

### **LARGE BUILDINGS, WITH VERY STRONG ENERGY MANAGEMENT CAPACITY**

This group includes the largest hotel casinos, government and institutional buildings/campuses, Class A Offices, and major retail malls and centers. They:

- Regularly and actively pursue energy management opportunities.
- Have highly specialized and trained energy management staff.
- Note that staff time (not expertise) is the key limitation on their energy management activities.
- Have strong access to energy consultants and

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service providers.

- Readily access utility energy efficiency programs.
- Have sophisticated energy tracking systems.
- Have extensive access to capital.
- Are usually willing to pursue energy management opportunities with 2-5 year returns, with a few organizations pursuing even deeper energy efficiency measures.
- Need novel off-balance sheet financing mechanisms with longer repayment terms, to widely pursue deeper energy efficiency opportunities.

#### **MEDIUM-SIZED BUILDINGS, WITH SOME ENERGY MANAGEMENT CAPACITY**

This group includes: Mid-level Casinos, hotels, and hospitality groups; professionally managed Class B and some Class C office space; smaller government buildings and institutions (school, medical centers); professionally managed retail; and large restaurants. These buildings:

- Are aware of energy management opportunities, though they pursue them less systematically than the large buildings segment.
- Have less specialized staff, with less training and time to focus on energy management.
- Are served by energy management service providers and contractors, and utility energy programs.
- Focus on short term mechanisms, with very little interest in longer term payback measures.
- Have limited access to project financing and are hesitant to assume debt.

#### **SMALLER BUILDINGS, WITH LIMITED ENERGY MANAGEMENT CAPACITY**

This group includes “Mom & Pops” of the commercial building sector, such as smaller restaurants; retail venues without extensive professional management; and Class C and B office spaces.

Have little to no staff with energy management training and capacity.

- Have little to no service providers serving the sector who actively seek out energy management projects.
- Rarely use utility programs.
- Have very little access to capital.

#### ***Recommended Market Transformation Strategies***

Given these market conditions, there are two important steps the City of Las Vegas and its partners can take to support market transformation and grow the uptake of good energy management practices.

#### **ESTABLISH AN “ALL-IN COMMERCIAL ENERGY INITIATIVE” (“ACE INITIATIVE”)**

The Initiative will provide buildings in the region, particularly the mid-sized and small building segments, with promotions, training, education and technical assistance to implement energy management projects. The Initiative should function as a non-profit public-private partnership, delivered first as a pilot in Downtown Las Vegas, with potential to scale across the Las Vegas metropolitan region. The Initiative should be guided by a steering committee comprised of representatives from the private, public sectors, and non-profit sectors, including the non-profits Green Chips and EnergyFIT Nevada. The Initiative will:

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- Conduct outreach and marketing to recruit a large percentage of the regions' commercial real estate.
  - Track participating buildings energy performance (which will not be disclosed, without utility bill payers permission).
  - Provide technical assistance in energy management via a variety of new and existing programs, training, and services. These opportunities include:
    - Providing qualified contractors to provide energy assessments and retro-commissioning.
    - Facilitating property manager and building operator energy management training.
    - Developing a Green Lease Coaching Workshop, to guide owners, tenants and brokers through green lease terms.
    - Developing a Speaker Series and Sharing Forum, to disseminate good energy management practices.
    - Develop a Deep Energy Upgrade Gameplan service, providing an intensive workshop for teams of building owners, designers, financial consultants, and property managers to identify future

opportunities to undertake comprehensive energy upgrade improvements.

- Developing a new Small Business Program, initially focused on Downtown Las Vegas, which will provide comprehensive “turnkey” energy management services, financing opportunities, and quality control for small businesses energy upgrade projects.
- Reward and recognize participants—Annually, local political and cultural figures should recognize participants in the ACE Initiative for their accomplishments.

#### **IMPLEMENT PACE PROJECT FINANCING**

The City of Las Vegas' political leadership and senior staff should advocate at the State legislature to enable PACE financing. Upon amendments to the legislation, they should move to establish a PACE program in the City of Las Vegas.

By leading various stakeholders in implementing “ACE and PACE”, the City of Las Vegas can position itself as a national leader in supporting markets for strong energy management services. These efforts will grow jobs, and support local businesses, a thriving local economy, a healthy citizenry, and a better environment.

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# I. Introduction

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## Purpose of this Report

This document reports on the findings of a research collaboration between the Massachusetts Institute of Technology's CoLab Green Economic Development Initiative (MIT GEDI) and City of Las Vegas Sustainability Office to develop strategies that foster energy management practices in private commercial buildings in Las Vegas. Realizing greater energy savings can in turn achieve economic development and positive environmental outcomes.

This report:

1. Outlines the economic case for speeding the uptake of good energy management practices in commercial buildings.
2. Summarizes current energy management practices, the market for energy services in the city of Las Vegas and the broader metropolitan area, and barriers that hinder the adoption of better energy management.
3. Articulates roles that the City of Las Vegas and its partners can plan in promoting good energy management in private-sector commercial buildings.

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## A. What is “Energy Management”?

“Energy Management” refers to efforts to minimize buildings’ energy costs and meet other energy-related goals, such as environmental performance and healthy indoor conditions. Comprehensive energy management often requires action by multiple stakeholders in buildings – Building owners; property managers; building operators; tenants;

energy efficiency program administrators; third party consultants and energy service providers; financiers; and others. Energy management can entail a whole host of initiatives by these stakeholders. Below, we note some important energy management practices used in commercial buildings, which are summarized in Figure 1.

Figure 1: Key energy management practices



### *Adopting an energy management plan / policy*

Building owners are increasingly adopting energy management policies to guide efforts to improve energy management in their portfolios. These policies may provide authorization from senior management to engage in energy management; establish targets, actions and timelines; identify occupational responsibilities and team members to lead initiatives. Adopting such a high level commitment is a good early step in the energy management process.



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## Tracking Performance – Energy dashboards, reporting & benchmarking

You can't manage what you do not measure and track. Increasingly, building owner, managers, operators and tenants are making use of "energy dashboards". Such dashboards synthesize energy data from multiple sources (utility bill, equipment readings, etc.) and provide key information to the appropriate stakeholders involved in energy management (owners, managers, operators, tenants). While some firms develop dashboarding systems independently, there are increasing number of software services that perform these functions as well.

### BENCHMARKING

Benchmarking entails comparing a buildings' energy use with its historic use and the energy use of peer buildings. Benchmarking helps managers prioritize energy projects, and identify which buildings are performing poorly. The US EPA's Energy Star Portfolio Manager is the de facto national benchmarking platform, with 40 percent of commercial building space in the USA tracked in this system. Other benchmarking systems also exist, drawing from their own comparison data sets and normalization criteria.

## Operational improvements & commissioning

How buildings are operated profoundly influences their energy use. By some estimates, half of all cost-effective energy efficiency opportunities can be achieved just by no- or low-cost improvements to existing systems (EON, 2013). Ensuring building operators are properly trained is critical. Likewise, many real estate firms are incorporating energy performance criteria into building operators' and managers' job description, to incent improved performance. Additionally, building operations can be aided by the assistance of a professional commissioning agent.

### BUILDING COMMISSIONING OR "TUNE-UPS"

Commissioning services (or "tune-ups") involve a detailed assessment of building systems to

ensure that all systems are functioning optimally in accordance with their original design intent, and correct any deficiencies. This service is typically provided by a specialist third-party commissioning agent. Commissioning encompasses a variety of techniques, including testing that equipment is in working order; calibrating sensors; reviewing building scheduling, and adjusting building air heating and conditioning set points accordingly; re-programming building controls; and other techniques.

Commissioning has traditionally been offered as a short term service (perhaps lasting a few months), ideally repeated every 2-5 years to ensure the building remains in working order. However, novel "on-going commissioning" are increasingly becoming available. These services use data from building systems controls and meters, streaming this data through computer applications to identify energy saving opportunities in real-time.

Commissioning has tremendous potential to reduce energy use. ***The most comprehensive national survey of building commissioning project reveals a median 22% savings in energy costs for office buildings (16% for all building types), with a payback time of 1.1 years.*** Yet, perhaps only 5 percent of the market potential of commissioning has been realized; the vast majority of appropriate buildings do not undertake regular comprehensive retro-commissioning (Mills, 2011).

## Capital upgrades

In addition to operational improvements, many energy efficiency opportunities involve "upgrading" building equipment and systems with more efficient systems. Often, upgrades to systems occur only once systems reach the end of their life; however, savvy building owners and managers will pro-actively replace systems when doing so lowers net costs.

### ENERGY ASSESSMENTS TO IDENTIFY UPGRADE OPPORTUNITIES

In order to determine these opportunities, building owners and/or managers typically have an "energy assessment" (or "energy audit") performed on

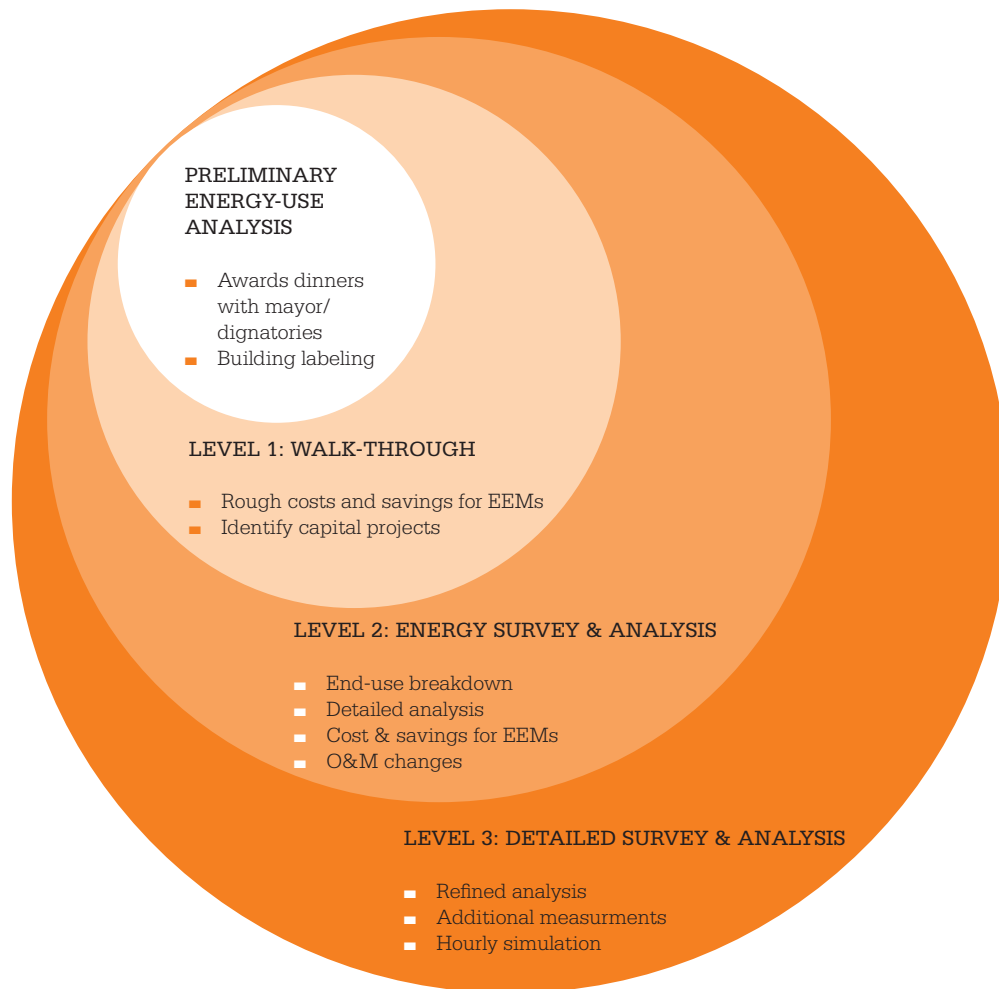
their property. The American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) recognizes three categories of assessments:

- A simple “walk-through”, to provide a high-level assessment of major opportunities.
- A more detailed analysis, specifying different upgrade measures and estimates of their costs and financial implications.
- A highly detailed assessment, reliant on computer building modeling with hourly simulations of building performance.

### REMOTE DIAGNOSTICS

Increasingly, computer applications are being used to remotely identify and prioritize capital upgrade opportunities, just as in “continuous commissioning” services. These applications use simple information about building systems (entered by a facility manager, or obtained from public data sets) and utility metering data to construct models of buildings’ energy performance, and make educated guesses about upgrade opportunities. These applications can help energy service providers to more quickly and comprehensively assess buildings, and identify upgrade opportunities and/or operational improvements. Their market penetration remains limited at present, though it is growing rapidly.

Figure 2: ASHRAE’s three levels of energy assessments



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## STANDARD UPGRADES

A variety of upgrades entail relatively prescriptive equipment replacements, which necessitate minimal interruptions to building users and thus can be implemented at most times in a buildings' life cycle. These standard upgrade measures involve lighting and simpler HVAC equipment replacements. Such standard upgrades typically yield 15-25 percent energy savings, with energy savings paying back the cost of upgrades in 2-5 years. These are the most common types of upgrades; Zhai et al (2012) report that a little over 2 percent of all commercial buildings in the USA receive some type of standard upgrade each year.

## DEEP ENERGY UPGRADES

"Deep energy upgrades" are defined as those that aim to achieve greater than 40% energy savings. Deep energy upgrades include major HVAC systems redesign and improvements to the building envelope, in addition to the measures included in standard upgrades. Deep energy upgrades are best realized through an "integrated design process", involving the building owner; architect and engineering design teams; financial decision-makers and advisers; and building operations staff. These stakeholders engage in an iterative design process involving: identifying the optimal technical potential of the building; key constraints that necessitate scaling back elements of the technical optimum; and arriving finally at a technical and financial plan to upgrade the building (RMI, 2013).

Frequently, deep upgrades can realize even greater financial performance than standard upgrades in terms of the projects' net present value, though deep upgrades may entail longer payback periods. However, unlike standard upgrades that can be deployed at most times in a buildings' lifecycle, deep upgrades often only make sense at certain milestones in buildings' life, including:

- Renovation / Redevelopment / adaptive reuse of an existing building.
- Near the end-of-life of roof, windows, siding, HVAC, or major lighting systems.
- New acquisition or refinancing.
- Major new tenants.

At these times, disruptions from major renovations are less of a concern, the deep energy retrofit may be coupled with other building improvements, and the building owner may have greater access to affordable financing.

Currently, there is low uptake of deep energy retrofits in American commercial buildings, although there is growing interest in such services.

## Occupant/tenant engagement

Building occupants' behavior has a profound effect on buildings energy use. Many energy management efforts include occupant engagement, aimed at changing behaviors that effect energy use.

## GREEN LEASING

Green leases include provisions that encourage both tenants and owners to pursue cost-effective energy management strategies, and align their interests in pursuing good energy management. Important provisions include:

- "Pass through" provisions, whereby owners can pass the costs of energy management projects that save tenants on their utility bills through to tenants. Otherwise, buildings will face a "split-incentive" in energy use, whereby they are expected to invest in energy upgrades but tenants reap the financial benefits.
- Allowing the owners' energy service providers and/or building engineers to review tenants' space design during tenant improvements, to suggest better choices.
- Specifying tenants energy consumption targets and/or equipment that will not be included in the building (incandescent light bulbs, non-Energy STAR appliances, etc.).

A number of organizations, such as the national Building Owners and Managers Association or the Natural Resources Defense Council, have developed green lease language (BOMA, 2011) (NRDC, 2011). The adoption of green lease terms is growing rapidly in the commercial real estate market; nevertheless,

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in MIT GEDI's experience, the majority of building owners and property managers are not well versed in these tools, and require guidance and encouragement in their adoption.

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## B. How Much Energy Can Good Energy Management Save?

Buildings differ markedly in the extent and quality of their energy management practices. However, there are opportunities to cost-effectively save energy in virtually all buildings. Nationally, it is estimated

that 30 percent of energy spending in existing commercial buildings could be saved cost-effectively (McKinsey & Co, 2009). Moreover, innovations in technologies and services, and an increasing focus on climate change mitigation, could realize even greater savings in the coming decades. What is more, commercial buildings can increasingly save money and realize environmental goals by switching to more sustainable energy supply technologies, whose costs are falling rapidly (IRENA, 2012).

Given that in 2010, commercial buildings spent \$179 billion on energy in the USA (US DOE, 2012), the opportunity save such significant percentages of buildings energy use, and switch to other sources of energy supply, represents a profound economic opportunity. McKinsey & Company estimate that

### *Developing the Energy Management Workforce*

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There are a wide variety of jobs associated with energy management, including positions in design, construction, property management, operations and maintenance, financial services, and other sectors. Generally, a growth in the energy management will entail growth in these pre-existing sectors, which requires existing and new employees to acquire new energy management skills and competencies. As the energy management sector expands, it will be especially important to increase skills in key occupations relating to energy management. Not all people working in energy management will engage in this work fulltime, but it will be important they possess the skills to complete these jobs.

Following requests from national real estate firms interested in ensuring more standardize energy management credentials, the U.S. Department of Energy's Building Technologies Office is in the process of defining energy management competencies for different jobs (DOE BTO, 2012). These positions include:

- Commercial Building Energy Auditor – A professional who provides energy assessments.
- Commissioning/Retro-commissioning Authority – A professional who provides commissioning services.
- Facility Manager.
- Operating Engineer/Building Technician.

Currently, a varied range of credentials exist that designate competency in these different job categories (see Appendix 1 – Energy Management Credentials). In the future, credentialing organizations will be encouraged to certify to the DOE competency.

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*investing in all cost effective energy efficiency in USA commercial buildings could realize savings of \$165 billion in net present value terms over ten years* (McKinsey & Co, 2009). Again, integration of cost-effective distributed and low-carbon energy generation presents a further opportunity for profit.

At this time, MIT GEDI is aware of no studies of the energy savings potential of Las Vegas commercial real estate; a detailed engineering study of the building stock in the city would be required. However, based on the energy intensity of many of the commercial building uses in the region and its hot climate, the savings potential in the region is likely quite substantial. Based on rough estimates by MIT GEDI, commercial and retail buildings in Downtown Las Vegas together spend on the order of \$16 million on energy; throughout the metropolitan area, they spend perhaps \$300 million.\*

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## C. Economic Benefits of Energy Savings

Section A above notes the substantial savings that better energy management can realize. Achieving this potential for energy savings in Las Vegas can result in a wide variety of local economic benefits. Some of these benefits are noted below.

### ENHANCED BUSINESS PROFITABILITY

Reducing operating costs by lowering energy spending realizes greater profits for businesses. Energy and other utilities comprise the largest non-labor operating costs for buildings in most regions of the USA. For example, energy and water account for 22 percent of office owners' operating expenses, equating to about \$2.25 per SF (RMI, 2013).

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\* This estimate is rough, intended only to indicate the approximate magnitude of energy spending. Values were derived by multiplying City data of square footage of buildings in different regions by the Western Census Region energy expenditure averages estimated by the USA Commercial Building Energy Consumption Survey (US EIA, 2006).

### ENHANCE VALUE OF REAL ESTATE

Lower operating costs, healthier buildings, and a "green" brand, can add to building values and rents, as occupants 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 and ENERGY STAR rating on real estate performance has found consistently positive premiums on rents, sales price, and occupancy (see Figure 3).

### Job Creation

Energy management can meaningfully increase the amount of employment opportunities available in local economies. Energy efficiency engenders economic activity and a net increase in jobs in one of two ways:

1. **Jobs are created due to investments in energy management ("investment related jobs"):** Short-term spending on energy projects leads to direct, indirect, and induced jobs. Job creation begins when an energy efficiency project is undertaken and workers are needed, thus leading to the creation of direct jobs. Indirect jobs are created when suppliers of energy management products (HVAC systems, insulation, etc.) bring on more workers to produce goods. Finally, all these workers spend their earnings in the local economy, realizing further economic activity and job impacts.
2. **Jobs are created due to the reinvestment of energy savings ("savings related jobs"):** As energy savings are shifted away from spending on utilities, and towards more labor-intensive sectors of the economy, increased jobs and economic productivity are realized.† Thus, investments in energy efficiency entail an "import substitution" strategy, as less energy per unit of economic product will be

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† Nationally, the energy generation and distribution sectors have a job intensity of 10 jobs per \$1 million spent in these industries. In comparison, the economy as a whole has 17 jobs per \$1 million spent (Bell, 2012). Thus, shifting utilities spending to other economic sectors realizes job growth.

Figure 3: Increase in percent of profit associated with energy savings.

Source: (NTHP PGL, 2013) Data from the IRS

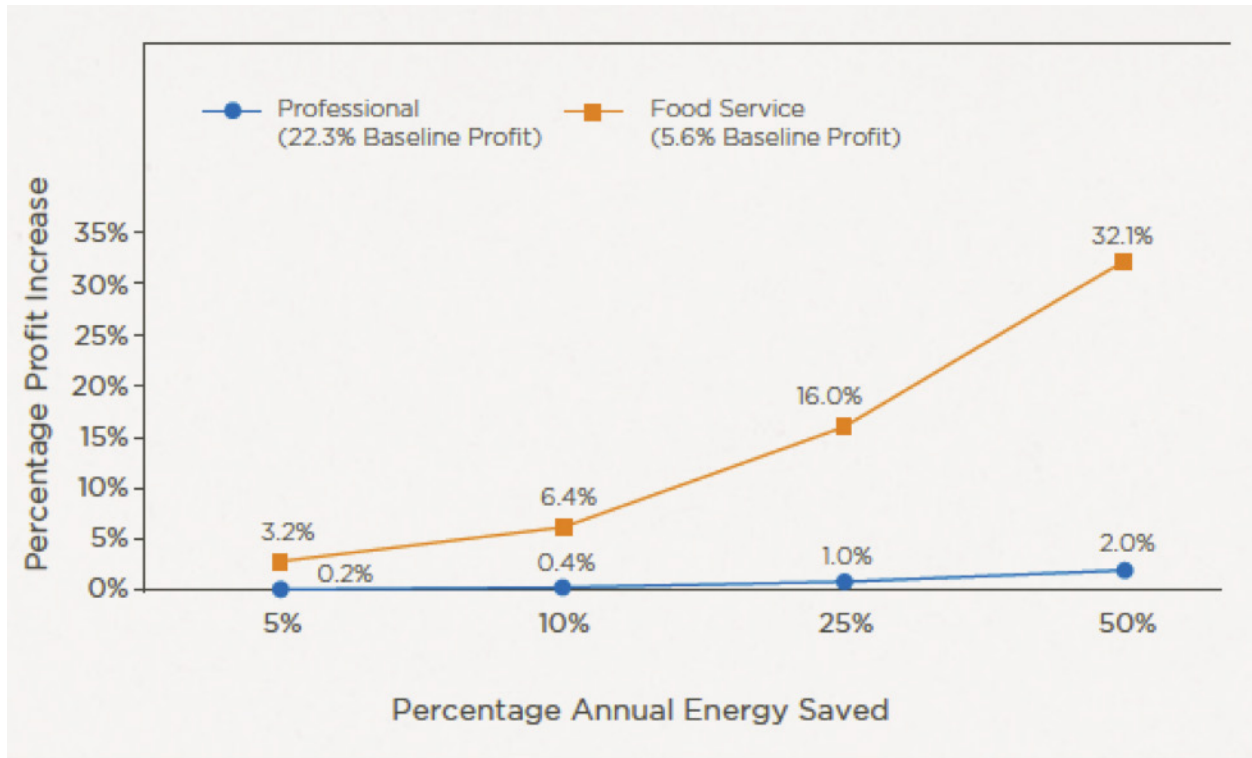
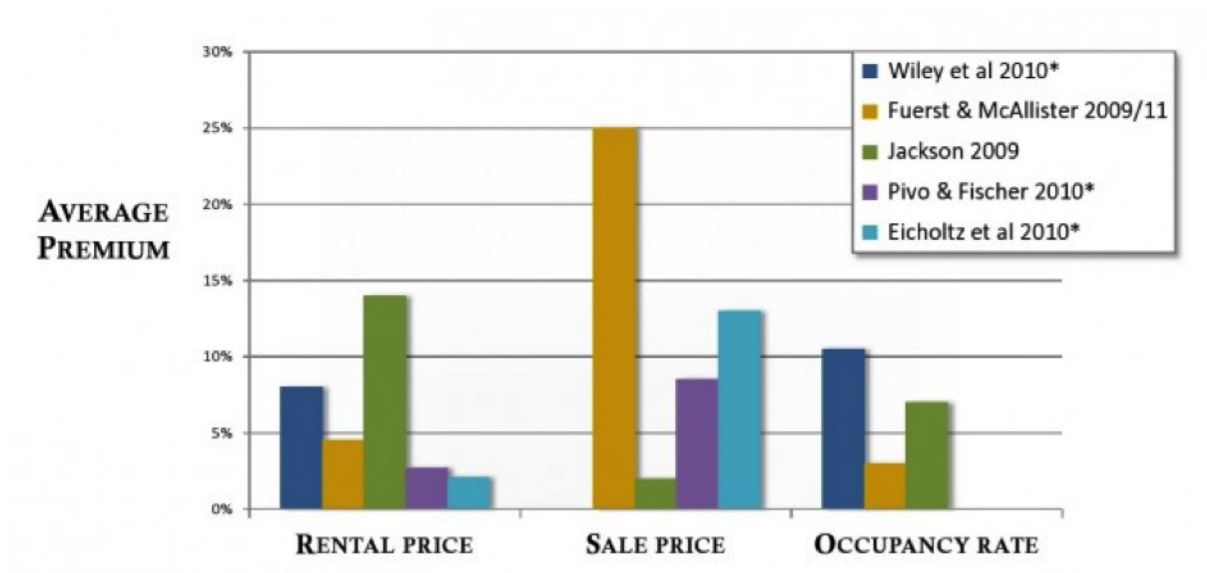


Figure 4: Premium associated with green rated commercial real estate—results from multiple studies.

Source: Institute for Market Transformation.



need to be imported to the region. These import substitution effects are likely stronger in metropolitan regions, as most metropolitan regional economies do not have a large number of jobs in fossil fuel supply sectors.

Table 1 on the following page summarizes a number of studies that estimate the increase in net job associated with policies that encourage investments in energy efficiency. ***This net increase in employment is about 1-2% in most of the regions studied, and all studies suggest that energy savings policies will realize net positive economic outcomes.*** However, the impacts suggested by these studies differ substantially, ranging from about 0.2% in some locales, to about 8% in the Northeast states. These differences in employment projections are the result of a number of factors: Each study estimates regions' energy efficiency potential differently, and conducts the analysis over different time horizons. Additionally, regions differ in the structure of their economy, and the price of energy; these differences profoundly influence the macroeconomic impacts of investments in efficiency. Finally, these studies differed in their economic modeling methodology.

To get a better understanding of these dynamics in the Las Vegas region would necessitate a detailed econometric study of the region. However, it is safe to conclude from the literature that ***investments in energy management can contribute meaningfully to a healthier and more job-intensive economy.***

### ***Health and Productivity Improvements Associated with Building Design & Energy Management***

Building energy upgrades can also realize health and productivity improvements for employees working in these buildings. Table 2 summarizes MIT GEDI's literature review of studies evaluating

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\* MIT GEDI estimated these net impacts by using Bureau and Labor Statistics State and Local employment data, and projecting out the total level of future employment and applying a simple 1.5 per annum job growth estimate. This methodology is highly simplistic, and is intended only to illustrate the approximate scale of impact that investments in energy efficiency can realize.

the link between energy management initiatives and improved occupant health. While more study is needed, the balance of evidence suggests that:

Energy efficient building design and good energy management practices can improve worker performance. A number of studies have shown that measures such as temperature control, improved indoor air quality, lighting system quality, and access to the natural environment can both reduce buildings' energy use and improve the individual performance of employees working in those buildings. Workers accomplish their objectives in shorter amounts of time and in general demonstrate individual productivity gains. Some studies suggest that investments in efficiency and healthy buildings are also associated with decreased turnover costs, or the costs associated with employees leaving a company and necessitating replacement.

Energy efficient building design and good energy management practices can improve worker health. The balance of evidence suggests that investments in energy efficiency and improved building performance can realize positive impacts on workers' health and well-being. In particular, upgrades have been shown to address indoor air quality and reduce sick building syndrome.

The health and productivity benefits result in an even more compelling financial case for energy management. Employee and labor costs typically exceed the costs of space for firms by well over an order of magnitude (see Figure 5); therefore, small incremental improvement to occupants' health and productivity associated with energy management initiatives can realize substantial lifecycle savings for building occupants. Thus, local governments have an interest in fostering such energy management initiatives, to build a healthier and more productive city. The challenge is creating market demand for such outcomes amongst owners and tenants, especially when research in this area is still relatively new and conditions in each building will differ.

These effects will likely be most pronounced when owners, design teams, operators and managers explicitly aim to improve indoor health and

Table 1: Job and economic impacts of investments in energy efficiency  
(Unless otherwise noted, all job numbers include both investment-related and savings related jobs.)

<i>Citation (author, date, title)</i>	<i>Region</i>	<i>Key Findings</i>
ACEEE, 2012, <i>Energy Efficiency and Economic Opportunity</i>	USA	In 2010, the ACEEE estimated at least 830,000 jobs related to resource and energy efficiency in the U.S. The direct jobs created as a result of pursuing energy efficiency projects are local since they often involve installing or maintaining equipment locally. Meanwhile jobs in the energy utility sector are often related to transporting or procuring fuel out of state.
Andrew C. Burr, Cliff Majersik, Sarah Stellberg, Institute for Market Transformation, Heidi Garrett-Peltier, <i>Political Economy Research Institute, 2012, Analysis of Job Creation and Energy Cost Savings From Building Energy Rating and Disclosure Policy</i>	USA	In 2012, the Institute for Market Transformation (IMT) analyzed the impact a national benchmarking and disclosure policy would have on job creation. Their study predicted that such a policy would create 59,620 net new jobs across the country by the year 2020. The estimated total energy savings reached over \$18 billion in 12 years.
Charles Goldman, Merrian C. Fuller and Elizabeth Stuart, Jane S. Peters, Marjorie McRae, Nathaniel Albers, Susan Lutzenhiser and Mersiha Spahic, 2010, <i>Energy Efficiency Services Sector: Workforce Size and Expectations for Growth</i>	USA	The Lawrence Berkeley National Laboratory's 2010 study evaluated the size of the "energy efficiency services sector" (e.g. investment related jobs). It estimates the sector comprised of 114,000 Person-Years-of-Employment (PYE) in 2008, which they translate to being approximately equal to 380,000 individuals.
Heidi Garrett-Peltier, 2011, <i>Employment Estimates for Energy Efficiency Retrofits of Commercial Buildings</i>	USA	A study of the effects of a national program promoting building retrofits to increase their energy performance found that for every \$1 million saved by USA real estate, 6.5 direct PYEs and 4.0 induced PYEs.
Mark Muro, Jonathan Rothwell, and Devashree Saha with Battelle Technology Partnership Practice, 2011, <i>Sizing the Clean Economy: A National and Regional Green Jobs Assessment</i>	USA - metropolitan focus	Energy efficiency improvements have the benefits of import substitution in regional economies. The majority of energy efficiency products are over 90% U.S. made, including components for heating, ventilation, and air conditioning (HVAC) systems. Comparatively, the domestic share of production for other products in the U.S. is around 76 percent.
Hendricks, Bracken and Jorge Madrid, 2011, <i>A Star Turn for Energy Efficiency Jobs. Center for American Progress.</i>	USA - regional focus	A study of the macroeconomic effects of energy efficiency in the provinces of Québec, New Brunswick, Nova Scotia, and Prince Edward Island. Even in the more conservative investment scenario, it was found that, over 15 years, energy benefits would exceed participant and efficiency programs costs by \$40 billion, in terms of net present value. This would then drive job creation.
Environment Northeast, 2012, <i>Energy Efficiency: Engine of Economic Growth in Eastern Canada</i>	Eastern Canada	A study of energy efficiency investments in New England, found that efficiency investments pay for themselves over a fairly short period of time in terms of increased economic activity and job creation. Over 15 years, the increase in employment due to spending on electricity efficiency investments would equal 767,011 PYEs. Annually, this would equal a maximum increase of 43,193 PYEs.
Jamie Howland & Derek Murrow, ENE Lisa Petraglia & Tyler Comings, Economic Development Research Group, Inc., 2009, <i>Energy Efficiency: Engine of Economic Growth</i>	New England	An early study done in 2005 examined the impact of energy efficiency programs in New England and found that for every \$1 million spent on energy efficiency, 1.77 direct PYEs would be created, but 2.61 induced PYEs would be created. Over ten years, these programs were expected to create a total of 15,533 direct, indirect, and induced jobs.



<i>Citation (author, date, title)</i>	<i>Region</i>	<i>Key Findings</i>
Richard Sedano, Catherine Murray, Economic and Environmental Impact Modeling by Synapse Energy Economics, Inc., William R. Steinhurst, Ph.D., 2005, <i>Electric Energy Efficiency and Renewable Energy in New England</i>	New England	When the Midwest Governors Association passed policies promoting energy efficiency and renewable energy, the Union of Concerned Scientists completed a 2011 study estimating that 85,000 net jobs would be created by 2030 over baseline projections.
Claudio Martinez, Jeff Deyette, Sandra Sattler, Anee McKibbin, 2011, <i>A Bright Future for the Heartland: Powering the Midwest Economy with Clean Energy</i>	Midwest	In the Southwest, the electric utility industry only supports 4 to 5 jobs per \$1 million spent, while sectors like the construction, services, and retail sectors support between 11 and 33 jobs per \$1 million spent. This study evaluated the impact of adopting a range of energy efficiency policies in the region. It found that 58,000 net jobs would be added to the region as a result of these policies.
Hewlett Foundation Energy Series, 2002, <i>The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest</i>	Southwest	This study evaluated the impacts of Wisconsin's Focus on Energy Conservation Program. It calculated the program engendered 5100 job-years, annually.
Lisa Petraglia, Tyler Comings, and Glen Weisbrod, Economic Development Research Group, Inc., 2010, <i>State of Wisconsin Public Service Commission of Wisconsin, Focus on Energy Evaluation, Economic Development Benefits: CY09 Economic Benefits</i>	Wisconsin	A study of the impact of energy efficiency and renewable energy programs on Kentucky's economy projected a net increase of 28,000 job-years by 2022. This is due to the increase in the cost of electricity when there is the added cost of complying with a carbon regulation.
Rick Hornby, David White, Tommy Vitolo, Tyler Comings, and Kenji Takahashi, 2012, <i>Potential Impacts of a Renewable and Energy Efficiency Portfolio Standard in Kentucky</i>	Kentucky	Energy efficiency measures implemented in California from 1976 to 2006 have resulted in creating 1.5 million savings-related jobs while future policies have the potential to create 403,000 more direct (investment-related) jobs up through 2020.
David Roland-Holst, 2008, <i>Energy Efficiency, Innovation, and Job Creation in California</i>	California	An analysis of PG&E's proposed energy efficiency initiatives in California found that impacts would include the creation of 30,000 jobs annually in the PG&E service area and 39,000 jobs annually across the entire state.
EDR Group, 2012, <i>Economic Impact of PG&amp;E Proposed Generation, Distribution &amp; Related Infrastructure Investments</i>	California	A study by ECONorthwest estimated that in Oregon, 1,235 jobs were sustained by energy efficiency activities in the year 2011.
EcoNorthwest, 2012, <i>Economic Impacts From Energy Trust of Oregon 2011 Program Activities</i>	Oregon	This study estimates that implementing residential and commercial efficiency programs will result by 2030 in the creation of net 27,100 PYEs (in that year) and \$1 billion additional dollars in wages.
ACEEE, 2013, <i>Louisiana's 2030 Energy Efficiency Roadmap: Saving Energy, Lowering Bills, and Creating Jobs</i>	Louisiana	This study of the impacts of establishing proposed energy efficiency programs in San Antonio would realize 1700 investment-related jobs each year, by the programs' tenth year.
Economic Development Research Group, Inc., 2005, <i>Economic Impacts of Cost-Effective Energy Efficiency: Final Report on Proposed CPS Programs</i>	San Antonio, Texas	By 2030, implementing residential and commercial efficiency programs in New Orleans will result in the creation of 1,500 PYEs and \$62 million additional dollars in wages.
ACEEE, 2013, <i>New Orleans' Efficient Path to 2030: Leadership to Save Energy, Lower Bills, and Create Jobs</i>	New Orleans, Louisiana	By 2030, implementing residential and commercial efficiency programs in New Orleans will result in the creation of 1,500 PYEs and \$62 million additional dollars in wages.

conditions as part of their energy management practices. Thus, improved health and wellbeing should be a key focus of energy management initiatives.

## D. What is required to achieve good energy management?

Based on studies and experiences in multiple markets, achieving the full potential of energy management requires that:

***Owners and financial decision-makers must understand and prioritize energy management.***

Firms' ownership and senior management must recognize the opportunity that energy management represents, direct their staff to pursue these opportunities, and be willing to invest some time in considering energy projects. Too often, owners

and chief financial officers are too busy to prioritize energy management.

***Building management and operations staff must have strong understanding of energy management opportunities and financial analysis.*** These staff must possess proper training and experience, and sufficient time to develop and implement projects. They must also possess the experience, understanding and skill to manage services by third parties.

***Building owners and managers must have connections to highly skilled service providers.*** Many energy management projects require the assistance of expert third party advisors and project managers. In some nascent markets (both regions and building types), there are not a sufficient number of skilled service providers. Additionally, it is often not cost-effective for service providers to market their services to smaller clients with less capacity, for whom transaction costs will be higher; in these cases, firms need assistance originating clients.

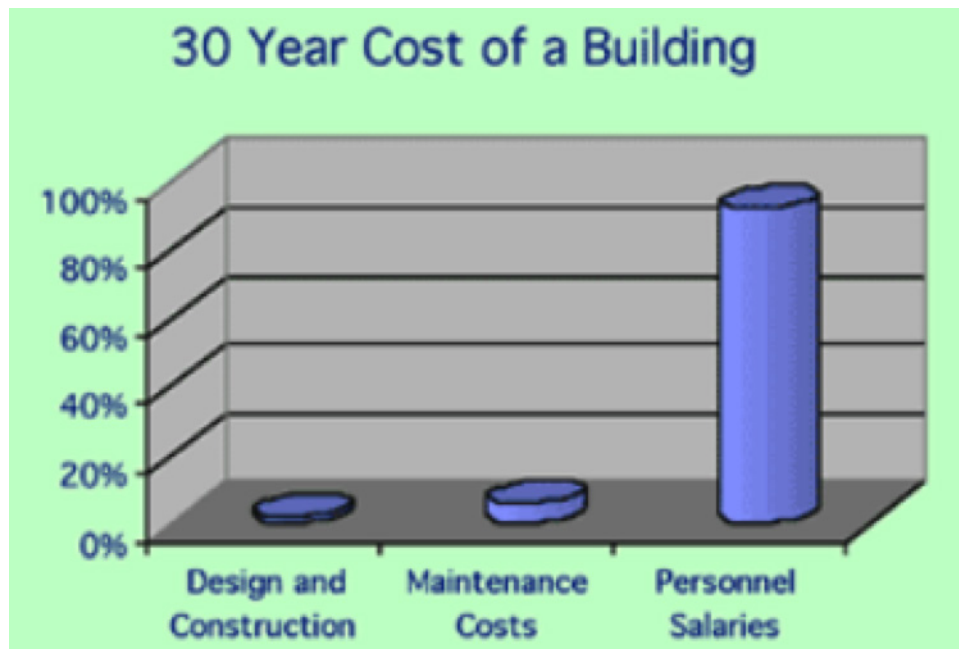


Figure 5: Costs associated with an office building

Source: National Institute of Building Sciences, 2010

Table 2: Summary of literature review of health and productivity impacts of energy management practices.

<b>Citation (author, date, title)</b>	<b>Key Findings</b>
Vivian Loftness, Volker Hartkopf, Beran Gurtekin, David Hansen, Robert Hitchcock, 2003, <i>Linking Energy to Health and Productivity in the Built Environmen: Evaluating the Cost-Benefits of High Performance Building and Community Design for Sustainability, Health and Productivity</i>	Improvements in indoor air quality, temperature control, lighting system quality, and access to the natural environment are linked to increased individual productivity. A range of design strategies, including increasing outdoor air ventilation rates, improving ventilation effectiveness through improved HVAC systems, and decoupling ventilation and thermal conditioning can lead to these productivity improvements. However, in order to achieve both health and energy savings it is important to pursue high performance technology that improves the IEQ of buildings without resulting in energy costs.
Olli A. Seppänen, William Fisk, 2006, <i>Some Quantitative Relations between Indoor Environmental Air Quality and Work Performance or Health</i>	This study looked at the change in performance per increase of 10L/s (liters per second) per person in ventilation rate. The result was a clear trend of increasing performance with increased ventilation rate up to levels of 16 L/s per person.
Romm and Browning, 1994, <i>Greening the Building and the Bottom Line</i>	After a building undergoes a lighting retrofit with parabolic louver fixtures and high-efficiency fluorescent lights, this study shows a 13.2% increase in productivity, a 25% reduction in absences, and a 69% energy savings in the lighting sector.
W. J. Fisk, D. Black, G. Brunner, 2011, <i>Benefits and costs of improved IEQ in U.S. offices</i>	The economic benefits of improving indoor environmental quality (IEQ) in the US building stock is estimated at \$20 billion per year. The majority of these IEQ improvements can be achieved while also achieving energy savings, although a few are associated with small increases in energy costs.
Robert J. Rose, Jack Dozier, 1997, <i>EPA Program Impacts Office Zoning</i>	Temperature control is clearly linked to energy savings. On average, HVAC systems with independent controls for each room save 43% more energy than large-zone HVAC systems. Temperature control is further linked to worker productivity and comfort.
Amanjeet Singh, Matt Syal, Sue C. Grady, and Sinem Korkmaz, 2010, <i>Effects of Green Buildings on Employee Health and Productivity</i>	This study observed the effect on health and productivity for workers moving from conventional office buildings to those with green building ratings according to LEED. In two different case studies it was found that the improved IEQ in the green buildings led to reduced absences, lower reports of asthma and depression, and self-reported productivity improvements.
McGraw-Hill Construction, 2009, <i>Green Building Retrofit &amp; Renovation</i>	A 2009 survey showed that 50% of tenants who moved into a green space did so partly because they anticipated productivity gains.
S. Abbaszadeh et al., 2006, <i>Occupant Satisfaction with Indoor Environmental Quality in Green Buildings</i>	Workers in green buildings self-report that they are more satisfied with the thermal comfort and air quality than occupants on non-green buildings.
Thayer, 1995, <i>Daylighting and Productivity at Lockheed</i>	This case study suggested that a building designed around daylighting, which integrates layout, window placement, type of glazing, and ceilings, results in 50% energy savings in lighting, ventilation, and cooling energy, and reduced absences 15% compared to the company's previous office building.
Figueiro et al., 2002, <i>Daylight and Productivity - A Field Study</i>	During the winter, workers in windowed offices with access to daylight spend 15% more of their time doing work-related tasks in the office and use 35% less electric lighting than workers without windowed offices.
Milam, 1992, <i>Underfloor Air Distribution HVAC Analysis</i>	Floor-based ventilation is linked to both first cost and energy savings. Underfloor air distribution systems saved 1.55 kWh per square foot more than ceiling-based air ventilation system. Increased ventilation is one of the most basic ways to improve building IEQ and worker health and productivity.
National Lighting Bureau, 1989, <i>Lighting and Human Performance: A Summary Report</i>	The NLB identified a 6% increase in worker productivity, accompanied by a 65% decrease in lighting energy consumption when a building was retrofitted with high-efficiency fixtures and full-spectrum fluorescent lights.

Table 2 (continued): Summary of literature review of health and productivity impacts of energy management practices.

<i>Citation (author, date, title)</i>	<i>Key Findings</i>
Jones Lang Lasalle, 2012, <i>Connected City</i>	Cities that invest in smart grid technology improve the effectiveness of energy production and distribution and implement programs that encourage energy efficiency at a corporate level. This, in turn, leads to productivity improvements within corporations and for the entire city.
U. Haverinen-Shaughnessy, D. J. Moschandreas, R. J. Shaughnessy, 2010, <i>Association between substandard classroom ventilation rates and students' academic achievement</i>	Improved student and teacher health, decreased absences, increased productivity, and reduced operational costs are all benefits of improving IEQs within the classroom. The most basic step to improving IEQ is providing good ventilation, which this study shows is linked to improved academic achievement in fifth graders.
Nicklas and Bailey, 1996, <i>Energy Performance of Daylit Schools</i>	Students in daylit classrooms perform 3% above the average performance of all students in the county, and daylit schools use 60% less energy than non-daylit schools.

**Building owners must have access to financing for energy management projects at attractive terms.** Building owners have limited access to cash reserves and traditional financing; they typically prefer to spend their resources on their core business. Moreover, many properties are highly leveraged, and cannot accommodate further debt. Additionally, owners require project financing mechanisms that they can pass through payments to tenants, and that can be readily assumed by future owners. Historically, such efficiency financing mechanisms meeting these criteria have not been available. This situation is changing, however; as documented in MIT GEDI's forthcoming Energy Project Financing Whitepaper, a number of innovative project financing that can overcome the various barriers to efficiency finance are increasingly available.

**Owners must not face "hold" barriers** – Many building owners only intend to hold ownership of their property for a limited time. Thus, they will only be interested in energy management projects that pay back in a short period of time; that future owners will recognize the value of and pay for; or that that they can pass the financing and contract terms to the next owner. Again, this has traditionally severely hindered deeper energy management projects, though some innovative services and financial mechanisms that can address these barriers are emerging in different parts of the USA.

**Incentives must be aligned between owners**

**and tenants.** Frequently, owners are expected pay for building upgrades, while tenants may reap the benefits of lower utility bills. To overcome this split-incentive, owners' require a means to pass the cost of the project on to tenants, or to recoup their spending with higher rent. Different financing mechanisms, green leases, or educated tenants that recognize the value of reduced energy use in their buildings.

### **The Need for Market Transformation**

In practically all real estate markets, these conditions are far from being realized. Thus, there is a strong movement to foster market transformation. Market transformation refers to efforts to reduce barriers to energy management, and realize more perfectly functioning markets by providing better quality information; reducing transaction costs; facilitating access to capital; and aligning structural incentives so that building owners, managers and tenants all have an interest in pursuing cost-effective energy management. A myriad of different strategies are used to effect market transformation, and government, utilities, the private sector, and non-profit organizations all play important roles in these efforts.

In the following chapter, we examine market conditions in Las Vegas. Chapter III outlines opportunities for the City of Las Vegas and its partners to engage in market transformation.

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# II. Energy Management Market Conditions in the Las Vegas Region

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## A. Regional Industry Analysis

As documented in Chapter I above, fostering better energy management in private buildings can realize a variety of economic development and environmental benefits. Unfortunately, energy efficiency is hindered by a variety of common barriers.

Chapter II aims to better characterize the extent of energy management practices, markets for energy services, and barriers to the adoption of better practices, in the city of Las Vegas and the broader metropolitan region. To make this characterization, MIT GEDI and the City of Las Vegas Sustainability Office engaged in an “Industry Analysis”. The analysis included:

- A review of existing publications on: Energy efficiency policy and initiatives in Nevada; the local real estate market; and the economic development potential and needs of the energy sector.
- An review of existing regional energy efficiency programs; energy efficiency financing programs; economic development initiatives; and workforce development initiatives.
- Interviews with approximately thirty participants in the commercial energy services sector, including energy service providers; real estate organizations representing regional building owners, developers and managers;

individual property owners and managers; workforce development organizations; community college energy management faculty; and government staff.

The following subsections outline important conclusions from this analysis.

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## B. Commercial Building “Segments” in Las Vegas

In order to inform the City’s efforts at market transformation, this report defines three broad “segments” of the commercial real estate sector. These sectors differ in the extent of financial and human resources that they can devote to energy management, and whether they are currently served by energy service providers and utility energy programs. Because of their varying capacity, these different segments will benefit differently from interventions the City of Las Vegas and its partners can make to energy upgrade markets. The three market segments are:

1. Large buildings; most have very strong energy management capacity.
2. Medium-sized buildings; typically have some energy management capacity.
3. Smaller buildings; found to be limited in energy management capacity.

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Within these categories, various building types exist, and various levels of specialized energy management strategies are used within these sub-types. However, for the purposes of informing Las Vegas' Market Transformation Strategy, these categories suffice. Each is characterized on the following pages.

### **Large, high capacity buildings**

This group includes:

- The largest hotel casinos, and buildings owned/managed by conglomerate hospitality groups.
- The largest government and institutional (universities and hospital) buildings/campuses
- Large Class A Offices
- The largest retail malls and centers

Frequently, buildings in this category will be owned by real estate corporations with multiple holdings. These building types are typically on strong financial footing, and well established within the region.

#### **ENERGY MANAGEMENT CAPACITY, MOTIVATION & PRACTICES**

**Highly specialized and trained energy management staff** – These building types typically feature highly professional management teams, and usually include a specialized set of individuals that are educated in and focus on energy efficiency and sustainability. Management staff actively search for energy cost reduction strategies, and have strong financial analysis skills with which to communicate the benefits of energy upgrade projects to financial decision-makers. Building operations are typically performed by highly qualified building engineers.

**Management teams recognize the need to invest in their staff's energy management skills, but have faced recent financial limitations** – Many management teams recognize the importance of providing ongoing education for their staff to enhance energy management and improve the bottom line; one manager noted that they continually seek opportunities to refine staff skills, and to cultivate intra-organization "learning communities". However, in recent years, there have been decreased

resources available to managers for education; many managers noted that in the current economy, they have not had access to adequate budgets for staff training.

**Strong access to energy service consultants and providers** – These buildings are served by a diverse array of national energy service providers. Moreover, buildings' management and ownership staff are often experienced in administering energy service contracts.

**Sophisticated energy tracking and benchmarking systems** – These buildings typically have sophisticated building management systems, which monitor and report energy use and can diagnose operational deficiencies. Operations staff and typically are skilled and trained in using these systems. Most buildings engage in benchmarking against historic energy use, though casino-hotel personnel note that these buildings are highly unique given their individual theming; thus, benchmarking to peer buildings is not particularly useful.

**Some buildings disclose carbon emissions and other environmental attributes** – Many organizations aim for a degree of transparency with their energy usage, engaging in such programs as the Carbon Disclosure Project. However, many are wary of public disclosure of energy use, given hotel casinos' inherent energy intensity.

**Staff time is one of the key limitations to adopting greater efficiency** – Managers routinely noted that time was the greatest barrier to adopting better energy management.

**Capital is readily available for short-midterm energy projects** – Broadly speaking, large properties can access significant amounts of financing for energy efficiency projects, provided that the project proposal for any capital shows a strong net benefit across the trio of bottom lines. These groups typically depend entirely on their own private capital to internally fund energy efficiency projects and other sustainability projects. Most have ready access to debt financing and established relationships with lenders as well.

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***Buildings actively pursuing measures with 2-5 year payback*** – Interviewees routinely noted that their dedicated energy management staff would pursue all energy projects within established target payback periods. Firms variously indicated that they would typically pursue all measure with payback less than 2 to 5 years, and consider some longer payback periods.

***There are significant barriers to pursuing longer term payback measures*** – Some interviewees from large long-term owner-occupied hotel-casinos noted that they would pursue even deeper energy upgrade opportunities, with perhaps up to 10 year payback terms, if the project resulted in net-present value, improved indoor conditions and environmental performance. However, hold-barriers impede energy management in many hotel upgrade projects. Tenanted office and retail space still face split-incentives to investing in energy efficiency. Investment owners face hold-barriers, and may hesitate to invest in longer-term energy upgrades.

***Limited uptake of innovative financing mechanisms that can realize deeper upgrade projects*** – Interviews with market participants suggest that there has been limited uptake of innovative financing measures which address split-incentive and hold barriers, and are off-balance sheet. The lack of a Property Assessed Clean Energy (PACE) financing program is a key constraint preventing buildings from pursuing deeper efficiency; depending on how the PACE program was designed, multiple property sizes could make use of such financing.

### ***Mid-sized buildings***

This group includes:

- Mid-level Casinos, hotels, and hospitality group.
- Professionally managed Class B and some Class C office space.
- Smaller government buildings and institutions (school, medical centers).
- Mid-large industrial, distribution and warehouse space.
- Professionally managed retail.

- Large restaurants.

***Less specialization, training and time to focus on energy management*** – These properties are typically professionally managed and operated; however, they tend to feature a more fluid management structure, with individuals fulfilling multiple management and operative roles. Many facility managers and building operators possess little formal training in energy management.

***Interest in investing in staff, but limited resources*** – Like their larger counterparts, most management teams recognize the importance of energy management education, the need to invest in staff’s skills, and establish internal “learning communities”. However, they generally possess lesser budgets for staff education, and have been even more acutely affected by recent economic conditions, limiting the extent investment in their staff.

***Extensive sharing between firms throughout Las Vegas*** – One interviewee noted that the building management and operations community in Las Vegas is quite tight-knit. There tends to be significant sharing of practices between firms. This sharing should be encouraged, given it disseminates good practices quickly.

Energy service firms available – Specialized energy service companies and various contractors offer energy management services to buildings in this sector.

***Focus on short term mechanisms; little/no interest in longer term paybacks*** – Most interviewees noted that managers in properties typically focused on short-term energy management opportunities, with 2-3 year simple paybacks. Longer term measures are rarely considered.

***Limited access to financing*** – Many interviewees noted that medium sized properties face limited access to project financing for energy management. Firms frequently do not have cash on hand they can invest in upgrades, nor established relationships with a financial institution providing debt. They thus sometimes forgo or delay energy management projects that require substantial amounts of capital,

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even if costs can be recovered on the 2- to 3-year timescale.

**Hesitancy to assume debt** – Many interviewees noted an aversion to assuming debt for energy upgrades. Especially given current economic conditions, they are hesitant to use the scarce capacity for debt on their balance sheets for non-core business upgrades. Moreover, they noted a desire to avoid the risk of assuming payment for energy services, without mitigating the risk of energy projects being established.

### **Small Buildings**

Organizations in this group include the small “Mom & Pops” of the commercial building sector. They include:

- Smaller restaurants.
- Smaller retail venues
- Some Class C and B office spaces.

Notably, there is a large concentration of these buildings in downtown Las Vegas.

**Limited professional management** – These organizations typically have little professional management, relying primarily on their owners and on some service contracts. Their operations budgets and staff are very limited.

**Little attention to energy management** – Staff and owners of these buildings typically do not actively search out energy management opportunities.

**Few available energy service providers** – These buildings typically have relationships with HVAC, lighting, and other contractors impacting energy use. These contractors may be responsible for maintenance of equipment. However, there are few contractors focused on providing dedicated energy upgrade and energy management services for these buildings. While cost-effective energy saving opportunities are readily available, the transaction costs of originating clients means that firms typically do not market energy services to this sector.

**Little use of utility energy programs** – Building

owners and managers frequently do not take advantage of utility energy programs. Interviewees reported that many are unaware of their availability. Moreover, they do not possess the time or knowledge of good practice to readily administer contractors implementing energy upgrade work. Interviewees suggested that these customers require turnkey solutions with a significant degree of handholding and third party administered quality assurance, to increase uptake of energy efficiency.

**Highly limited access to capital** – This group is defined by a lack of access to capital and lack of financial reserves. Very few owners will take out loans for any kind of energy efficiency project, simply because they do not have the financial security nor the collateral necessary to count loans as a viable financing option; indeed, most are struggling to make ends meet.

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## **C. Utility Programs & Policy**

The utilities NV Energy (electricity) and Southwest Gas both offer rebates to businesses installing energy efficient equipment. This research and MIT GEDI’s experience in broader energy efficiency efforts suggest a few important conclusions:

**The extent of technical assistance and quality assurance is limited in existing utility efficiency programs** – These programs have advisory staff that can suggest to customers eligible rebate opportunities. However, contractors and energy service providers undertake the lion’s share of marketing and interaction with clients, and the programs are largely contractor driven. Utilities play only a limited role in promoting energy management opportunities, and helping customers evaluate their options and interpret consultants’ recommendations.

Especially for smaller buildings, this can make it difficult for building owners to readily understand the opportunity for energy improvements. Without a disinterested third-party vetting the value of energy upgrades, building owners and managers may not trust in the value of the services energy service providers. Additionally, small and medium



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sized businesses' staff are frequently too busy and/or inexperienced to effectively manage and engage with contractors via these programs – such efforts require soliciting bids from multiple energy service providers or contractors, evaluating proposals, administering the contract, and ensuring that measures have been implemented properly and savings realized. More rigorous assistance from a third party program administrator can be helpful in overcoming these barriers; however, MIT GEDI's interviews indicated that service providers currently do not consistently provide this level of engagement.

***Utilities do not have financial incentives to rapidly transform markets to adopt stronger energy management*** – Utilities active in Las Vegas have regulated targets for the extent of energy efficiency the programs should realize, but do not have the budget nor fiscal incentives to exceed these targets. The current programs that are implemented through service providers, especially the electric programs, often over-subscribe during their program years. Indeed, utilities face some disincentive to grow markets for efficiency, especially after the adoption of legislation (Senate Bill 123) during the 2013 Nevada State Legislative session, as it can cut into the extent of energy infrastructure they install, reducing the total value of their regulated returns on their investments. Without a significant focus on aligning utility incentives towards market transformation at the State and utility regulator level, utilities are unlikely innovate new programs and initiatives that will speed the uptake of better energy management practices. Thus, other agents of market transformation may be required.

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## D. Workforce Development Initiatives

It is important that both property managers and building operators possess sufficient skills to conduct energy management, and that highly skilled energy service professionals and contractors are available locally. Our research suggested that the Las Vegas region faces:

***Continuing education challenges for property management and operations staff*** – Interviewees noted that the following are the most significant challenges for workforce development:

- Facilitating on the job training. Interviews with service providers and building managers indicated most important training was OJT.
- Providing training for incumbent employees. Many owners will be hesitant to invest in their staff.

***Limited training opportunities and demographic challenges in the professional energy service sector*** – Professional energy service providers noted that the industry as a whole faces the challenge of cultivating sufficient numbers of highly trained and experienced engineers.

***Limited energy management training programs currently available*** – Currently, there are few programs offering detailed training and credentialing in energy management for property managers, building operators, or contractors. Likewise, none of Nevada's universities or community colleges offer programs in energy engineering, nor energy technician associate degree programs, which provide formal training for professional energy management services. Some community college programs, unions, non-profits and private firms do provide specialty training and certifications for related trades, such as BEST, LEED, HVAC, plumbing, mechanical, and electrical.

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# III. Recommendations

Chapter II suggests a variety of market barriers that hinder adoption of energy efficiency in Las Vegas. Notably:

- Property management and operations staff lack the time, education and experience to fully capture all energy management opportunities.
- Building owners are hesitant to invest in their staff's energy management expertise.
- Smaller buildings in particular have very little energy management capacity; they need turnkey services from energy programs.
- All but the very smallest commercial buildings could benefit from PACE financing options, which would enable deeper energy upgrade investments.

The following sections of this chapter lay out a two-pronged strategy to address these barriers and realize deeper energy upgrade strategies. We recommend that the City of Las Vegas and other area stakeholders:

1. Support the development of an “All-in Commercial Energy Initiative” (ACE Initiative), to provide building, particularly the mid-sized and small building segments, with promotions, training, education and technical assistance to implement energy management projects.
2. Support enabling legislation for PACE financing, and expediently adopt a PACE program if and when such legislation passes.

These recommendations are based on MIT GEDI's research into best practices nationally, as well as considerations of Las Vegas' unique market.

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## A. Establish an “All-In Commercial Energy Initiative” (“ACE Initiative”)

The rapid uptake of good energy management in Las Vegas, particularly in mid-sized and small buildings, will depend on a prominent effort to promote energy management, and provide training and education on available technical services and project financing mechanisms.

Thus, the City and its partners should launch an “All-In Commercial Energy Initiative” (ACE Initiative; name subject to change), providing outreach and education to commercial buildings. The Initiative should launch as a pilot in Downtown Las Vegas, with the potential to expand metropolitan region-wide in subsequent years. The Initiative should function as a non-profit public-private partnership. The project should begin with three years of funding, with opportunities for extension thereafter. The ACE Initiative will build on the work of EnergyFit Nevada, Green Chips, USGBC, and other NGOs to promote energy efficiency opportunities; existing utility programs; services and technical assistance opportunities provided by regional vendors and educational institutions; and existing government programs that aid businesses.

Figure 6 on the following page outlines the process that the ACE Initiative will lead participating buildings through, which is intended to meet these criteria. The ACE Initiative will:

- **Conduct outreach & register participants** – The ACE Initiative should aim to enroll a large percentage of the regions' buildings.
- **Track participants' energy performance**

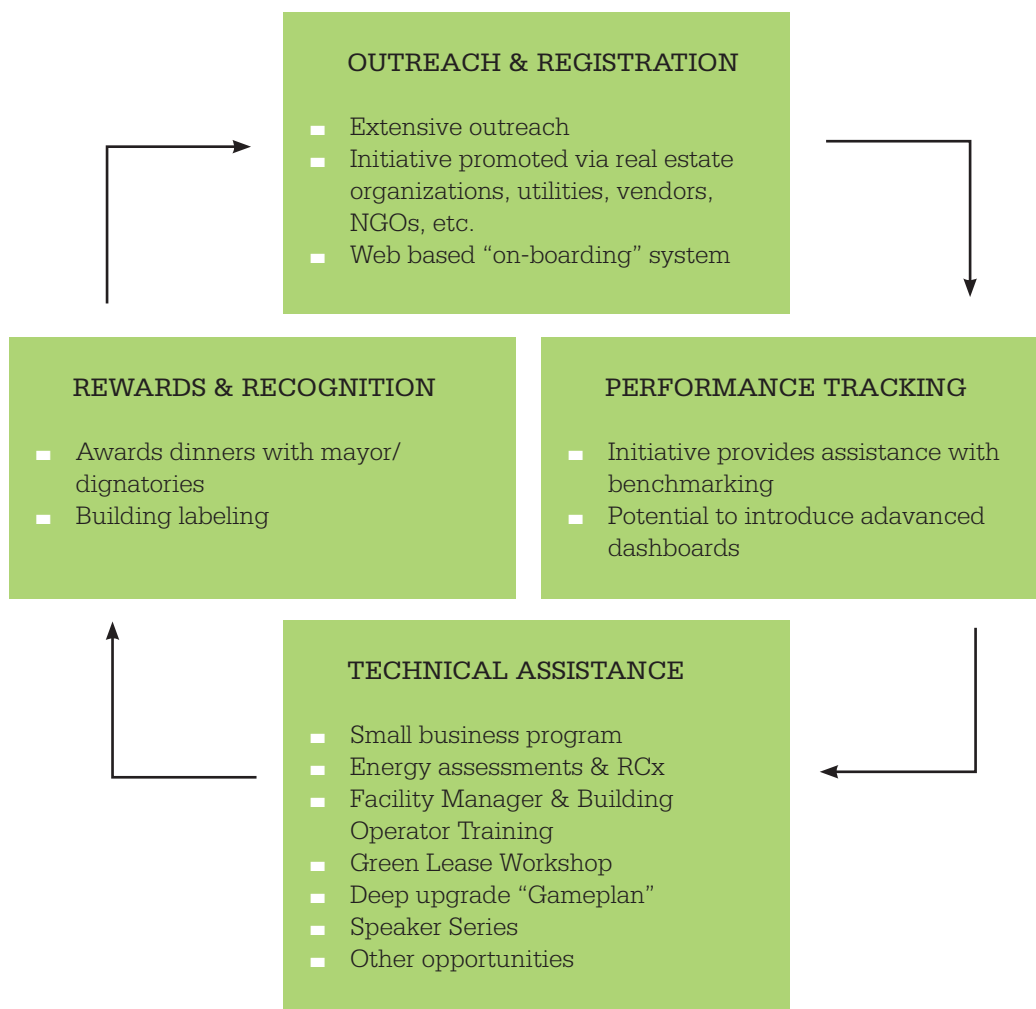
– The ACE Initiative should track at least buildings’ annual energy consumption in the year before and after participation; additionally, it should connect buildings with more granular energy tracking services.

- **Provide technical assistance in energy management** – The ACE Initiative will connect participants to new and existing programs, training, and services to aid their energy management.
- **Reward and recognize participants** – Annually, the ACE Initiative will recognize participants for their accomplishments.

The following subsections outline key considerations for each of these steps. These recommendations anticipate a well-resourced Initiative; the initial pilot may comprise of a more modest program scope.

The ACE Initiative should be led by a multistakeholder Steering Committee, comprised of many organizations interested in expanding energy management in the region. The program’s steering committee will guide the development and implementation of the ACE Initiative. Appendix 2 includes a discussion of steps to establish the Steering Committee, and preliminary guidance on the ACE Initiative’s potential staffing, budget and timeline.

Figure 6: Process for participating in the ACE Initiative



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## Outreach & registration considerations

**Aim for broad participation. Make buildings' commitment to track energy use and consider energy management opportunities the sole requirement for participation.** MIT GEDI believes that the ACE Initiative is likely to achieve the greatest energy savings by cultivating a broad membership encompassing as much floor space in the region as possible. High levels of participation can be achieved: For example, the green building management program Envision Charlotte received written agreement to participate from 98% of the floor-space in their downtown core.

To achieve broad participation, the ACE Initiative should make a modest “ask” of buildings. Participating buildings should only be required to track their energy using Energy Star Portfolio Manager, and share percent changes in annual energy consumption with the ACE Initiative (the ACE Initiative should not disclose this energy consumption data without consent). Additionally, building owners should be asked to commit to considering energy management opportunities, without having to commit to any specific target or technologies at this juncture.

Subsequently, the ACE Initiative can promote more intensive technical assistance opportunities, which buildings can elect to participate in. Likewise, once buildings are participating, the ACE Initiative can encourage them to adopt more quantitative energy management goals.

Market the program via existing networks and channels – Building owners and staff are most likely to participate in an ACE Initiative endorsed and promoted by established networks, colleagues, and institutions. To promote the program, the ACE Initiative's marketing staff should build relationships with the senior leadership and communications personnel in a variety of organizations, including:

- BOMA Nevada
- The Las Vegas Real Estate Investors Association
- The various regional Chambers of Commerce
- NV Energy and Southwest Gas

- Government agencies with connections to business (e.g. The Las Vegas Redevelopment Authority; Las Vegas Economic and Urban Development Department; Clark County Sustainability Office and Economic Development Department)
- Prominent Energy Service Providers.

**Develop a web-based “Participant Relationship Management” System** – The ACE Initiative should feature a web-based Participant Relationship Management (PRM) system. This PRM should:

- Include a participant-facing interface allowing participating buildings' staff to: register; enter building information and utility data; enter contact information for key personnel (property managers, financial decision-makers, etc.); and learn about various technical assistance opportunities.
- Provide an ACE Initiative staff-facing interface, allowing ACE Initiative staff to: register participants (especially important to reach buildings with less technical capacity, who might not want to otherwise use the interface); monitor participants' progress through various technical assistance programs; and track buildings' performance.
- Track buildings energy consumption, at the very least by connecting to Energy Star Portfolio Manager. The ACE Initiative should strongly consider integrating with the future US Department of Energy SEED (Standardized Energy Efficiency Data) platform.
- Be capable of connecting to other databases (assessors records, utility data, etc.) to facilitate building analytics, reporting, easier data population, etc.
- Potentially, facilitate connection to deeper buildings analytics and energy dashboarding, by connecting with comprehensive energy management dashboarding and tracking systems that can communicate with multiple building systems (such as Lucid Design's Building\_OS).

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## Chicago Green Office Challenge's Green Per Square Foot Platform

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The Chicago Green Office Challenge was co-developed by City staff, the non-profit ICLEI, and Office Depot. The Challenge is a collaboration between the City of Chicago and ICLEI (Local Governments for Sustainability) with core funding from the Office Depot. Through the Challenge, participants have saved over \$17.5 million in energy costs.

The Challenge provides a web tool that assists buildings in reducing waste and reducing their use of energy and water, the "Green Per Square Foot platform. The Green Per Square Foot platform assists building owners and managers find energy and money-saving opportunities and connects users with energy retrofit service providers. The platform serves as a broker between buildings and different energy management opportunities, providing unbiased information about sustainability products, services, and incentives. It includes an e-procurement system that matches customers with the services they need and emphasizes cost savings and transparency. GreenPoint therefore connects customers with the right solutions but does not actually implement them.

- Potentially, serve as an online broker platform, allowing buildings to assess energy management opportunities, and solicit contractors and financiers to assist them with their work. Chicago's Green Office Challenge integrated such a brokerage function (see text box below).
- Providing such a PRM can enrich buildings experience in the program, providing them with contacts to vendors and resources. Chicago's Green Office Challenge Green Per Square Foot Platform illustrates the value of such interfaces. The ACE Initiative should solicit Requests for Expressions of Interest from firms providing web-based energy information and service brokerage systems, to identify opportunities and costs for developing the PRM.

***Focus especially on engaging ownership and financial decision-makers, in addition to facility and energy managers*** – Experience from other programs suggests that successfully catalyzing

greater uptake of energy management requires buy-in from both senior financial management, as well as more regular participation from energy/facility management staff. Buildings' financial decision-makers ultimately decide on the extent of energy management activities to pursue, and their buy-in will be critical to speed the adoption of deep energy upgrades. However, many green building ACE Initiatives around the country have struggled to engage senior management. Las Vegas' ACE Initiative must make cultivating relationships with senior financial decision-makers a key priority. One opportunity is to have political leaders and leading building owners advocate for participation.

***Undertake an "on-boarding blitz", a major marketing push ~16 months before the first year of the ACE Initiative culminates. However, allow buildings to register at anytime*** – The ACE Initiative should aim to establish a "cohort" of buildings, that proceed through Technical Assistance and rewards programs at the same time. The ACE Initiative should include an 8-16 week "on-boarding blitz", so that participants can discuss

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the program with their peers and encourage others to participate. However, to maximize participation, it is important that buildings be able to register at any time.

**Host a Strong “Kick-Off” event** – Have an in-person or virtual meeting with participants to make them aware of the competition requirements and resources available. Distribute introductory information and familiarize participants with the competition’s requirements and goals. Be sure to provide technical support in the form of training sessions to help participants with benchmarking and utilizing the technical assistance resources offered during the ACE Initiative.

**Renew past participants’ registration** – Once a building registers, it should be automatically registered for all subsequent years, unless the building owner or manager requests to be un-registered. This makes registration easier for building owners and managers and encourages long-term strategies.

### **Considerations for Performance Tracking**

**Require buildings to benchmark their energy use with Energy Star Portfolio Manager** – Participation in the ACE Initiative should require that buildings track their performance in Energy Star Portfolio Manager (ESPM). The ACE Initiative should require an ESPM report from participating buildings; the ACE Initiative should liaise with the US EPA

to automatically receive this report with buildings register and consent to sharing this information. Buildings in the ACE Initiative would be free to use other tracking/dashboarding systems, however, as the vast majority of such systems interface with ESPM.

**Provide training in using ESPM and/or other PRM building performance tracking tools** – Especially in smaller properties, many property managers will not have experience, and will need assistance in properly setting up projects in ESPM, and/or other building information tracking systems used in the PRM. The ACE Initiative must have in-person trainings, webinars and/or a call number. These trainings must be available as soon as buildings begin their outreach.

**Consider facilitating other energy tracking, dashboarding & analytics** – Increasingly, a variety of web-based services provide advanced energy tracking and dashboarding services, providing key information, analytics, and connections with energy management vendors for buildings. The ACE Initiative could include an optional component, where buildings are provided such services. There may be an opportunity to provide discounted costs, when multiple buildings within the ACE Initiative are aggregated. The interface required for these services could be integrated into the PRM (see above). For example, the Seattle 2030 District provides its members with the opportunity to use the Lucid Building\_OS energy tracking and dashboarding system (see text box below).

### *Seattle 2030*

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Seattle 2030 is a building district comprised of Downtown Seattle. The district’s goal is to reduce the environmental impact of constructing and operating buildings and to educate and encourage collaboration between building owners and managers. The district is a public-private collaborative that uses the goals of the Architecture 2030 Challenge for Planning as guidelines, aiming to reduce energy use in the District 50% by 2030. Seattle 2030 uses the Lucid Buildings Dashboard to track buildings energy use, and also facilitates buildings use of Lucid’s Building\_OS comprehensive energy data tracking and dashboarding system.

The ACE Initiative should solicit Requests for Expressions of Interest from firms providing web-based energy information and service brokerage systems, to identify opportunities and costs to incorporate building analytics and energy information services into the PRM.

### Considerations for Technical Assistance

The ACE Initiative must offer useful assistance to participants, providing access to a variety of optional programs, which can aid energy management in various buildings. The program should focus on connecting buildings with existing initiatives, though some programs will need to be newly designed and/or involve substantial redevelopment of existing initiatives. Below, these various technical assistance opportunities are described.

**Qualify contractors and energy service providers who can provide energy assessment and retro-commissioning studies** – The ACE Initiative should qualify contractors and energy service providers that it can recommend to properties to undertake energy upgrades assessments and retro-commissioning studies. Qualification standards could be based on documented experience, referrals, certifications, and other criteria.

The ACE Initiative should explore with contractors, energy service providers and participating buildings the extent to which skepticism regarding the costs of energy assessments and/or retro-commissioning studies are a barrier to buildings adopting such assessments. If so, the ACE Initiative could consider

establishing an “Assessment Value Assurance Fund”. The fund would provide a backstop of funds, which would guarantee building owners that they be remunerated the cost of their assessment, if it did not identify energy saving measures whose net present value at least equaled this cost.

**Facilitate property manager and building operator training** – Continuing education programs and credential programs aimed at improving the energy management skills of property managers and building operators are available in the region. A sample of such credentials are listed in Table 4 below. However, participation in these continuing education programs is low, relative to the number of building operators and managers active in the area.

The ACE Initiative should serve to recruit greater participation in these opportunities. The ACE Initiative should liaise with utilities and the state workforce development system to identify opportunities for co-funding existing worker retraining in energy management. Likewise, building owners should be encouraged to co-sponsor training. The ACE Initiative should further help document and develop the case for these trainings to present to building owners, managers and operations staff.

**Develop a Green Lease Coaching Workshop** – Green lease terms align building owners and tenants interests in savings the most on energy as possible. The ACE Initiative should implement a Green Lease Coaching Workshop, guiding teams of owners, key tenants, real estate brokers, and others through green lease terms for different types of leases.

Table 4: A sample of available continuing education trainings available to property managers and building operators in the region.

<b>Name of Administering Body &amp; Credential</b>	<b>Available in Southern Nevada?</b>
Building Operator Certification (BOC)- Level I & Level II	Not currently. May be opportunities for hosting future courses. See: <a href="http://www.theboc.info/h-training-locations.html">http://www.theboc.info/h-training-locations.html</a>
NV FOCUS - Energy Efficiency Training and Certification for Building Systems Operators	Not currently. History of providing workshops in the region. See: <a href="http://www.nevadaie.com/nvfocus/index.php/who_is_nv_focus/">http://www.nevadaie.com/nvfocus/index.php/who_is_nv_focus/</a>
BOMI International – Multiple Property Management and Systems Operations credentials	Available via distance learning. <a href="http://www.bomi.org/Students/Educational-Offerings/Our-Educational-Offerings.aspx">http://www.bomi.org/Students/Educational-Offerings/Our-Educational-Offerings.aspx</a>
International Facility Management Association - Sustainability Facility Professional™ (SFP ®) & Facility Management Professional (FMP®)	Currently on offer by the Nevada Chapter of IFMA. <a href="http://nvifma.org/meetinginfo.php?id=51&amp;ts=1377635659">http://nvifma.org/meetinginfo.php?id=51&amp;ts=1377635659</a>

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**Develop a Speaker Series & Sharing Forum** – A Speaker Series provides a low-cost way to provide useful content about good practices and services available in the region. The speaker series should feature presentations from area vendors, properties, and outside experts. Likewise, the ACE Initiative should host a forum for property managers to share their good practices and experiences conducting energy management.

**Provide the Opportunity to Develop a “Deep Energy Upgrade Gameplan”** – When it comes to energy upgrades, buildings will pick the low-hanging fruit, but rarely venture further up the ladder. Indeed, opportunities for deep energy upgrades typically only occur for buildings at key junctures in their lifecycle – for instance, a change of ownership, re-financing, re-tenanting, or renovations.

To address these impediments to deep energy upgrades, the ACE Initiative should help building owners develop a “Gameplan” to undertake deep energy upgrades. The Gameplan service should include a workshop with the owner, property management, designers, and financial consultants, aimed at identifying key opportunities to undertake deep energy improvements in existing buildings. Key points in buildings lifecycle should be identified when different upgrade opportunities may make sense. These opportunities should be recorded in the ACE Initiative’s PRM, to facilitate future encouragement and assistance from the ACE Initiative, and other economic development resources in the region.

The ACE Initiative should issue a Request for Expressions of Interest to organizations who can develop a process to help building owners develop their plans for deep energy upgrades. The City of Las Vegas can test this Game Plan service in their own buildings.

**Consider other sustainability programming, in addition to energy management** – The ACE Initiative offers a great opportunity to provide technical assistance and encouragement to participate in other sustainability initiatives (sustainable commuting, waste management, high-roads employment standards, etc.). The ACE Initiative should seek to partner with groups offering such programming.

**Develop and implement a new Small Business Program** – As noted in Chapter II, small buildings are currently do not take advantage of energy upgrade opportunities. They miss these opportunities because they do not have the capacity to navigate utility programs and manage energy projects on their own; there are very few regional contractors that actively focus on this sector; they have no access to financing; and they frequently lack professional management, with experienced staff who recognize the value of energy management.

To realize greater uptake of good energy management in the small business sector, the ACE Initiative should develop a new Small Business Program. The Small Business Program (SBP) will feature rigorous promotions; turnkey project management; appropriate project financing; and strong documentation of buildings’ performance. The SBP will:

- Be contractor driven – The SBP should be driven by qualified contractors. For each participating business, a contractor will:
  - Provide energy assessment for properties.
  - Develop the technical upgrade and financing plan for the project.
  - Managing the implementation of the services.
  - Track energy performance, to ensure savings are realized.

The program may begin with just one or a few qualified contractors. However, in the longer term, efforts should be made to recruit contractors that can provide specialized services to different small building types (restaurants, small office, etc.).

- Be overseen by a Program Manager – Contractors will be overseen and guided by a SBP Manager employed by the ACE Initiative. The Program Manager will be responsible for:
  - Recruiting and qualifying contractors.



- ❑ Developing and implementing quality assurance regimes, to ensure that contractors are providing quality services for participating businesses. This should include evaluating contractors' financial proposals, and their implementation of projects.
  - ❑ Liaising with financiers, contractors, and local economic development organizations to identify and develop project financing appropriate for small businesses.
- Facilitate financing mechanisms for small businesses – Project financing mechanisms can provide greater percentages of small businesses to be served with energy upgrades, as few have capital available to undertake upgrades. Unfortunately, few project financing products are established for this sector; however, as profiled in MIT GEDI's forthcoming Energy Financing Whitepaper, a few financing tools are becoming available that can serve the small business sector. The SBP Program Manager and other ACE Initiative participants will need to work with contractors and financiers to develop project financing tools. This may entail some development finance entity (like the LVRDA) taking a junior position in financing instruments, to reduce projects' cost of capital.
- Be marketed via the broader ACE Initiative – The ACE Initiative's marketing staff should program the program. It is important that they work in close concert with the qualified contractors and service providers who will deliver the program.
- Pilot in Downtown Las Vegas first, subsequently expanding across the Metro region – The Small Business Program should operate as a small pilot in its first year, available only in a select neighborhood, perhaps Downtown Las Vegas. During subsequent years, it may expand region wide.
- Be utility funded – The ACE Initiative should seek utility funding to support a significant portion of the Small Business Program, given that it will serve to drive small businesses

with low participation rates to their program. However, the ACE Initiative should also consider other funding sources.

The Program will need to be designed in greater detail. The Steering Committee should first finalize the broad parameters guiding the ACE Initiative. It should then issue a Request for Qualifications to design the program.

### *Considerations for Rewards & Recognition*

***Recognize buildings' collective and individual accomplishments at a year-end celebration, attended by political leaders*** – A celebration of the accomplishments of the ACE Initiative's participants should be held about 15 months after it first launches, and every year thereafter. Politicians (e.g. mayor) and cultural icons (perhaps Vegas should be asked to attend).

***Theme the ACE Initiative and the Celebration with Vegas-appropriate promotions*** – For instance, participant buildings could be allotted a number of chips, reflecting their net energy savings. They could then have opportunities to compete for prizes. Prizes might constitute a mix of cultural events (sporting events, Vegas shows, etc.) and energy-related prizes, donated by local vendors (free energy assessments, etc.).

***Recognize multiple types of success*** – The program should recognize:

- The cumulative impacts of all participants' actions.
- All participants (with a certificate).
- All participants that saved above some threshold of absolute energy use (perhaps 10 percent), with some more substantive reward (a plaque).
- The greatest absolute energy savings achieved for different property types (with more substantive rewards).
- The most improved Energy Star Score.

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## B. Implement a PACE Project Financing Mechanism

Interviews with market participants revealed that all categories of buildings would benefit substantially by the introduction of project financing mechanisms that could:

- Cover 100 percent of projects' costs.
- Feature relatively low interest rates payable over a long time period, allowing projects to be "cash flow positive" with energy savings outweighing financing payments. This likely requires that outside security features or credit enhancements are provided for financing mechanisms.
- Be structured so that it does not add debt to the property and financing payments can be treated as an operating expense.
- Be structured so that payments can be passed through to tenants under existing lease terms.
- Be readily transferred to future property owners, overcoming "hold" barriers.

Various innovative project financing mechanisms have been introduced around the country, with varying ability to realize these criteria (MIT GEDI's forthcoming Energy Financing Whitepaper profiles many of these mechanisms). In MIT GEDI's estimation, Property Assessed Clean Energy financing programs offer a particularly strong tool to enable energy upgrades in commercial buildings. PACE financing involves a building owner voluntarily taking on financing, which is repaid via an assessment on their property tax bill. The PACE mechanism can use both private and public funds to finance upgrades. Approximately forty PACE programs have been established across the USA. More are in development.

***The City of Las Vegas' political leadership and senior staff should advocate at the State***

*legislature to enable PACE financing. Upon amendments to the legislation, they should move to establish a PACE program in the City of Las Vegas.*

### ***Background on efforts to introduce PACE in Nevada***

Legislation was introduced and approved during the 2011 legislature that enables local governments to add energy conservation and renewable energy to the list of eligible items that can be included in a special improvement district. Unfortunately, that legislation had shortcomings that did not allow local governments to establish and implement PACE programs. To correct these shortcomings, SB250 was introduced in the 2013 legislature. The bill was supported strongly by municipal and county governments, contractors and non-profit organizations. It failed to pass out of committee. Below is a recap of the concerns that were voiced during committee hearings.

#### **LOCAL GOVERNMENT LIABILITY**

There are two primary methods for backing debt for Special Improvement Districts under NRS:

1. Local government is legally obligated to pay bonds in case of default.
2. Private entity is legally obligated to pay bonds in case of default.
  - These are commonly used for infrastructure development in master planned communities.
  - The City of Las Vegas currently has \$88 million in outstanding SID debt backed by private developers.
  - City has no legal obligation to pay these bonds in case of default.
  - This debt does not impact bond rating, is not accounted for under City's debt (shows up as a footnote on financial statements), and does not impact City's

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bonding capacity.

- ❑ There has never been a default on SID bonds backed by private entities, nor has there ever been a late or missed payment.
- ❑ These SIDS have performed at the highest standard during the severe recession and high number of foreclosures.
- SB250 simply allows for energy improvements to be funded using privately backed SID model, where there is no legal liability to local government

#### **CONCERN OF THE REPUTATION OF ISSUING ENTITY WITH RATING AGENCIES**

- If a privately held SID were to fail, it is highly unlikely, in the opinion of the City's Chief Financial Officer and Bond Counsel, that rating agencies would lower a City's bond rating, particularly when the legal obligation for the debt falls on a private entity.

#### **WHY SID MODEL, WHY GOVERNMENT**

- Renewable energy projects have long payback periods, typically 10 – 15 years.
- With the SID/EID model, loan terms for energy improvements can be extended to match the payment with the savings on the energy bill, so there is a net zero, or positive impact on operating costs and cash flow.
- Businesses and homeowners are reluctant to finance these projects for long terms. If the owner sells their property, the benefit of low or zero energy would transfer to the new owner, yet original owner would be obligated to pay the debt.
- Under the privately funded SID model, the benefit AND the payment would transfer to the new owner.

Support needs to be generated for reintroducing the language contained in SB250 in the 2015 legislature. This bill will provide a valuable tool for

local governments to bring investment dollars to the State, assist businesses to lower operating costs, create jobs and reduce energy demand. The privately funded SID model has been in use in Nevada for many years with great success. Local governments, finance and legal community in Nevada have the experience and knowledge to successfully implement a privately funded SID program focused on energy projects.

#### ***Why PACE can be a "Game Changer"***

In the words of one interviewee, "PACE is a game changer". PACE meets the needs of project financing for commercial buildings well. It:

- Can cover all project costs.
- Allows for lenders to offer better interest rates and terms than would be available for other types of secured and unsecured lending. As PACE financing is repaid on the property tax bill, it
- May be structured to be "off-balance sheet". Recent analysis indicates that PACE repayments would not be considered debt under future FASB (Federal Accounting Standards Board) rules.
- Repayment costs can be passed through to tenants under many triple net leases and modified gross leases. This avoids the split-incentive problem faced by investments in energy efficiency.
- Assessment to the property pass with the property to future ownership, significantly reducing hold barriers.

PACE financing does a better job at addressing the barriers to energy project financing in commercial buildings than most other mechanisms currently in use around the country (see Table 7). While adopting or facilitating other mechanisms would also enable stronger energy management in the region, PACE is especially well positioned to effect market transformation.

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### *PACE Program Recommendations*

Once enabling legislation has been established, the City of Las Vegas will need to establish a PACE financing district, and specify the conditions under which energy project financing repayments can be added to the property tax roll. Typically, this involves establishing a program or specific conditions under which financing may be repaid via PACE. The US Department of Energy offers detailed guidance on establishing new PACE financing programs. The City of Las Vegas should consider this guidance once the adoption of a PACE district has been enabled. MIT GEDI further recommends that the City:

- Convene area local governments, service providers, and real estate reducing transaction costs; representatives to determine criteria for PACE program administration, aiming for regional consistency.
- Establish an “open market” system, in which multiple lenders may provide PACE financing, to encourage competition to provide more attractive financing terms.
- Commission a PACE Program Administrator to manage the program. The Program Administrator will provide marketing; some base terms, technical underwriting and financial underwriting criteria which financiers and energy service providers agree to adhere to; qualify lenders; coordinate the property assessment and repayment mechanisms.
- Evaluate financiers’ comfort with providing PACE financing, and consider whether credit enhancements are necessary to provide better terms of financing. The City should consider establishing a loan loss reserve fund, or using the Las Vegas Redevelopment Authority to provide standard terms to take on a junior portion of the project debt, to provide greater financier interest in lending to the program.

Table 7: Energy project financing mechanisms.  
Adapted from Buonicore 2012.

<i>Energy Project Financing Mechanism</i>	<i>Lower cost of capital (realized through stronger security)</i>	<i>Longer term financing feasible (10-20 years)</i>	<i>100% project financing</i>	<i>"Off-balance sheet" – No debt on property</i>	<i>Overcomes "split-incentive barrier" – Costs can be passed through to tenants without renegotiating lease</i>	<i>Overcomes "hold barrier" – Financing may be readily passed through to future owners without negotiation</i>
<b>Internal</b>	N/A	N/A	N/A	✓	x	x
<b>Bank Debt</b>	x	x	x	x	x	x
<b>Lease</b>	x	x	✓	Unlikely – pending FASB	x	x
<b>Energy Performance Contract</b>	?	?	✓	Unlikely – pending FASB	x	x
<b>Efficiency Service Agreement</b>	x However, off balance sheet treatment could leave cash & credit available for other uses	x	✓	Likely – pending FASB	✓	x New owner must agree to service agreement.
<b>Managed Energy Service Agreement</b>	x However, off balance sheet treatment could leave cash & credit available for other uses	x	✓	Likely – pending FASB	✓	x New owner must agree to service agreement.
<b>PACE Repayment</b> (Bank debt, EPCs, ESAs, MESA, may all be repaid via PACE)	✓ Senior lien is a strong security.	✓	✓	Likely – pending FASB	✓	✓/- Financing payments pass automatically to new owner with property taxes.
<b>On-utility Bill Repayment</b> (Bank debt, EPCs, ESAs, MESA, may all be repaid via OBR)	✓ Shut-off provision enhances security.	x	✓	Depends on financing mechanisms	✓	Yes, if an on-bill tariff. No, if an on-bill loan.
<b>Metered Energy Efficiency Transaction Service</b>	✓/- Utility counter-party realizes added security.	✓	✓	Likely – pending FASB	N/A - owner is paid a nominal "lease" for allowing EE to be sourced from its property. Utility is the counter-party.	x New owner must agree to service agreement.

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## IV. Conclusion

There are many significant barriers that limit the uptake of strong energy management in commercial buildings in Las Vegas. These barriers include limited building owner and management staff capacity and time; lack of access to appropriate financing mechanism; and limited access to trusted consultants and contractors. These barriers are most pronounced for small and medium buildings. An “ACE and PACE” strategy that establishes an “All-in Commercial Energy” (ACE) Initiative and Property Assessed Clean Energy financing can reduce these barriers. By implementing these strategies, the City of Las Vegas and its partners can create economic opportunity for the local energy services industry, associated jobs, improve real estate values, enhance indoor health, and help to mitigate environmental challenges including climate change.

# Appendix I: Energy Management Credentials

Table 8: Energy Credentials (Energy Auditor, Energy Manager, Commissioning/Retro-Commissioning Authority, Operating Engineer/Building Technician)

<i>Name of Program</i>	<i>Applicable Job Categories</i>
<b>ASSOCIATION OF ENERGY ENGINEERS (AEE)</b>	
Certified Energy Auditor (CEATM)	Energy Auditor
Certified Energy Manager (CEM®)	Energy Manager
Certified Building Commissioning Professional (CBCP®)	Commissioning/Retro-Commissioning Authority
Existing Building Commissioning Professional (EBCPTM)	Commissioning/Retro-Commissioning Authority
Certified Measurement & Verification Professional (CMVP®) (also administered by Efficiency Valuation Organization)	Energy Manager Operating Engineer/Building Technician
Building Energy & Sustainability Technician (BEST™)	Energy Manager Operating Engineer/Building Technician
Government Operator of High Performance Buildings (GOHP™)	Operating Engineer/Building Technician
Energy Manager in Training (EMIT™)	Energy Manager
Energy Auditor in Training (CEAIT™)	Energy Auditor
Master's Level Certified Building Commissioning Professional (MCBCP)	Commissioning/Retro-Commissioning Authority
Certified Building Commissioning Firm (CBCF™)	Commissioning/Retro-Commissioning Authority
<b>NORTH AMERICAN TECHNICIAN EXCELLENCE (NATE)</b>	
HVAC Efficiency Analyst	Operating Engineer/Building Technician
<b>BUILDING OPERATORS CERTIFICATION</b>	
Building Operator Certification (BOC)- Level I	Operating Engineer/Building Technician
Building Operator Certification (BOC)- Level II	Operating Engineer/Building Technician
<b>GREEN BUILDING CERTIFICATION INSTITUTE</b>	
LEED Accredited Professional (LEED AP) Operations and Maintenance (O+M)	Operating Engineer/Building Technician
<b>AABC COMMISSIONING GROUP (ACG)</b>	
Certified Commissioning Authority (CxA)	Commissioning/Retro-Commissioning Authority
Certified Commissioning Technician (CxT)	Commissioning/Retro-Commissioning Authority
Energy Management Professional (EMP)	Energy Manager

<i>Name of Program</i>	<i>Applicable Job Categories</i>
<b>AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)</b>	
Building Energy Assessment Professional Certification (BEAP)	Energy Auditor Energy Manager
Commissioning Process Management Professional Certification (CPMP)	Commissioning/Retro-Commissioning Authority
Operations and Performance Management Professional Certification (OPMP)	Operating Engineer/Building Technician
<b>UNIVERSITY OF WISCONSIN-MADISON, DEPARTMENT OF ENGINEERING AND PROFESSIONAL DEVELOPMENT</b>	
Commissioning Process Authority Professional (CxAP)	Commissioning/Retro-Commissioning Authority
Commissioning Process Manager (CxM)	Commissioning/Retro-Commissioning Authority
Commissioning Process Technical Service Provide (CxTS)	Commissioning/Retro-Commissioning Authority
Green Commissioning Process Provider (GCxP)	Commissioning/Retro-Commissioning Authority
Qualified Commissioning Process Provide (QCxP)	Commissioning/Retro-Commissioning Authority
<b>BOMI INTERNATIONAL</b>	
Systems Maintenance Technician (SMT®) Designation Program	Operating Engineer/Building Technician
Systems Maintenance Administrator (SMA®) Designation Program	Operating Engineer/Building Technician
Building Systems Maintenance Certificate (SMC)	Operating Engineer/Building Technician
<b>NATIONAL ENVIRONMENTAL BALANCING BUREAU</b>	
Building Systems Commissioning (BSC)	Commissioning/Retro-Commissioning Authority Operating Engineer/Building Technician
Retro-Commissioning (RCx)	Commissioning/Retro-Commissioning Authority
<b>INTERNATIONAL FACILITY MANAGEMENT ASSOCIATION</b>	
Sustainability Facility Professional™ (SFP®)	Operating Engineer/Building Technician
Facility Management Professional (FMP®)	Operating Engineer/Building Technician
<b>NORTHWEST ENERGY EDUCATION INSTITUTE (NEEI)</b>	
Energy Management Certification	Energy Manager
<b>UNIVERSITY OF CALIFORNIA, DAVIS</b>	
Certificate Program in Energy Resource Management	Energy Manager
<b>ENERGY AUDIT INSTITUTE</b>	
Commercial Energy Audit Certification	Energy Auditor
<b>NATIONAL ENERGY AND SUSTAINABILITY INSTITUTE (NEASI)</b>	



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<i>Name of Program</i>	<i>Applicable Job Categories</i>
Commercial Energy Auditor Certification	Energy Auditor
<b>TESTING ADJUSTING AND BALANCING BUREAU (TABB)</b>	
Certified Commissioning Supervisor (CCS)	Commissioning/Retro-Commissioning Authority
Certified Commissioning Contractor (CCC)	Commissioning/Retro-Commissioning Authority

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# Appendix II:

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## A. ACE Program Governance and Resources

The following paragraphs provide guidance on the governance and resources required to implement a fully scaled ACE Program.

**Convene key stakeholders to develop the ACE Initiative.** The City of Las Vegas' Sustainability Office should work closely with area stakeholders and other local government offices to co-develop the ACE Initiative. The Sustainability Office staff should hold this meeting in Fall 2013.

Invitees should include:

- The City of Las Vegas Economic and Urban Development Department
- Clark County's Sustainability Office
- USGBC Nevada
- EnergyFit Nevada
- Green Chips
- Nevada Sustainable Energy Coalition
- The Nevada Chapter of the Association of Energy Engineers
- Major energy service providers
- NV Energy Surebet

A meeting agenda and brief should be distributed beforehand, with goals established for the meeting. These meeting goals should include:

- Arriving at a preliminary consensus on the key goals and programs that could be included in the ACE Initiative.
- Soliciting proposals for what organization should take the lead in administering the program.

- Identifying funding opportunities.
- Establishing a preliminary timeline for ACE Initiative development.
- Soliciting interest in participating on the ACE Initiative Steering Committee, and brainstorming other interested stakeholders who could be brought into the ACE Initiative.
- Establishing a next meeting of the Steering Committee.

**Establish an ACE Initiative Steering Committee** – The Steering Committee should be responsible for guiding the strategic direction of the ACE Initiative, formalizing its non-profit public-private partnership status, and leading early fundraising efforts.

The program should be funded for at least three years. Securing sufficient funding to secure three years of operations can allow the program to achieve scale and refine its services to offer participants maximum value. Experience from other jurisdictions has shown that participation in such programs tends to accelerate at the second year. During the third year, opportunities for refining and better tailoring program offerings emerge.

**Seek multiple funding sources to support design and operations** – The ACE Initiative should seek to leverage an array of funding, including local government funds; utility funds; senior government and foundation grants; vendors, service providers, and related trade allies (for example, Office Depot is interested in sponsoring such ACE Initiatives); local real estate organizations; and other sources. The ACE Initiative should ultimately seek to offer some of its technical assistance on a fee-for-service basis; however, in its early years, the initial will likely need to rely substantially on other sources of revenue.

**Establish sub-committees to guide different elements of the program** – Different elements of the ACE Initiative should be guided by a number of sub-committees. These sub-committees will provide oversight to ACE Initiative staff, and guide the conceptual development of the programs. Sub-committees could meet monthly for the first year of the program, and quarterly thereafter. The following may be appropriate sub-committees:

- Program Marketing, Outreach & Celebration Committee.
- Technical Assistance Committee.
- Small Business Program Committee.
- Project Financing Committee.

**Aim to have key partners, Steering Committee members, a finalized ACE Initiative concept, and a realistic funding plan established by December 2013** – The ACE Initiative should aim to have its strategic direction established by December 2013. The timeline in the following section assumes this is realistic. Should Initiation take longer, the timeline should be extended.

### Staffing, Budget and Timeline

The ACE Initiative's staffing, budget and timeline will be the product of the ultimate strategic direction decided on by the Steering Committee. The scope and design of the ACE Initiative laid out above may change considerably. What follows are **highly preliminary** considerations for staffing, budget, and timing that MIT GEDI postulates are appropriate to deliver the ACE Initiative.

**Employ a FT Program and Marketing Manager** – The Program and Marketing Manager will be charged with oversight and management of the whole ACE Initiative; marketing the ACE Initiative; managing the development and implementation of the PRM (participant relationship management) system; and implementing the celebration.

**Employ a FT Technical Assistance Manager** – The Technical Assistance Manager will be responsible for developing and implementing all Technical Assistance resources for participating buildings, except the Small Business Program. This work will involve extensive collaboration with outside programs, and will require experience in green building and sustainability initiatives.

**Employ a FT Small Business Program Manager** – The Small Business Program will require substantial managerial duties, akin to any utility program management (indeed, serving small businesses likely involving greater managerial efforts, given the greater turnkey services needed in this sector).

**Hire consultants and contractors on an as needs basis** – As noted in the Considerations for Technical Assistance section above, a number of the program elements will require contractors and consultants to be fully developed.

Table 8 below provides a preliminary three year budget, reflecting costs anticipated to deliver the ACE Initiative as conceived above.

Table 8: Three-Year Program Budget

<i>Preliminary Three-Year Budget Items</i>	<i>Budget</i>	<i>Notes</i>
Office and Administrative Support	\$0	Anticipated in-kind
Program and Marketing Manager	\$300,000	Approximately 1 FTE over 3 years; all costs
Technical Assistance Manager	\$300,000	Approximately 1 FTE over 3 years
Small Business Manager	\$300,000	Approximately 1 FTE over 3 years
PRM and Energy Dashboarding Systems	\$150,000	Contracted development and administration; rough estimate, bids necessary
Marketing and Celebration	\$50,000	
Small Business Program Design	\$30,000	Assuming short-term consulting
Contingency	\$100,000	
<b>Total</b>	<b>\$1,230,000</b>	