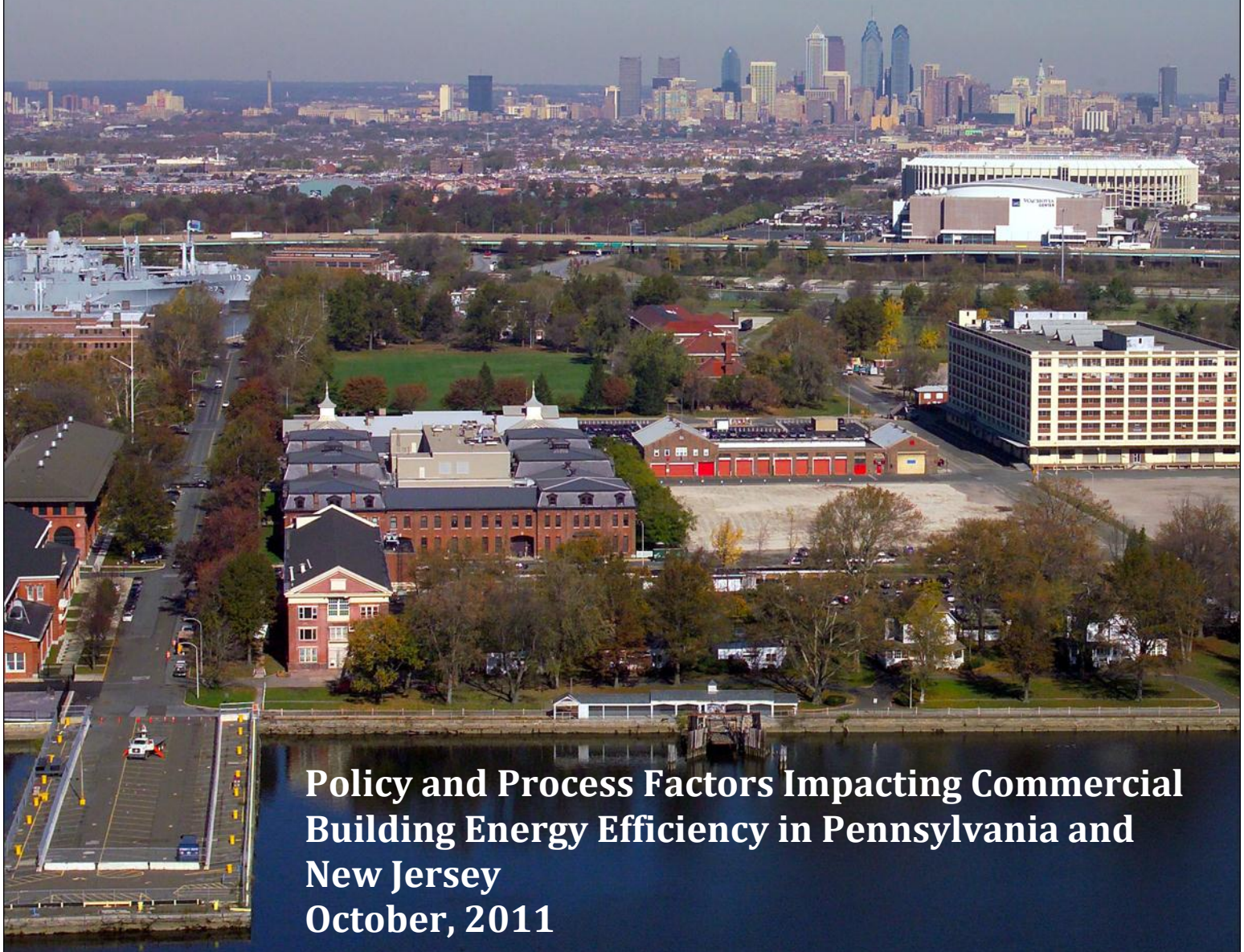
GPIC HUB

Greater Philadelphia Innovation Cluster
for Energy-Efficient Buildings
A U.S. DOE Energy Innovation Hub



Policy and Process Factors Impacting Commercial Building Energy Efficiency in Pennsylvania and New Jersey

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Greater Philadelphia Innovation Cluster (GPIC) for Energy-Efficient Buildings
Policy Markets and Behavior Task Team

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Background:

The Greater Philadelphia Innovation Cluster (GPIC) for Energy-Efficient Buildings is a consortium of academic institutions, federal laboratories, global industry partners, regional economic development agencies and other stakeholders that joined forces to secure up to $130 million in federal grants, including $122 million from the Department of Energy to establish an Energy Innovation Hub. The Commonwealth of Pennsylvania has also committed $30 million of new capital funding to support GPIC facilities at The Navy Yard. The funding will foster national energy independence and create quality jobs for the region.

The goals of GPIC, located at The Navy Yard in Philadelphia, are to improve energy efficiency and operability and reduce carbon emissions of new and existing buildings, and to stimulate private investment and quality job creation in the Greater Philadelphia region, the larger Mid-Atlantic region, and beyond. The GPIC will focus on full spectrum retrofit of existing average size commercial and multi-family residential buildings.

GPIC is supported by over 70 partners from industry associations, workforce investment boards, economic development agencies, banks and financial institutions and community organizations.

GPIC activities are organized into 6 task areas:

1. **Design Tools**- The goal of this task is to deliver accessible and affordable, calibrated and validated computer based tools built on open architecture to support integrated design of energy efficient retrofit projects by architects and engineers focused on average size commercial and multi-family residential buildings.
2. **Integrated Technologies**- The goal of this task is to develop and deliver optimal configurations of integrated technologies and system solutions for energy efficient retrofit of commercial buildings of varying functionality, size, and aspect ratio, as well as multi-family residential buildings.
3. **Policy, Markets and Behavior**- The goal of this task group is to create public policy and business market environments that support full-spectrum energy efficient retrofit of average size commercial and multi-family residential buildings in Greater Philadelphia.
4. **Education and Workforce Development**- The goal of this task is to ensure a skilled workforce at all levels in the energy efficient buildings sector in Greater Philadelphia.
5. **Deployment and Commercialization**- The goals of this task are to transform the building industry from a serially fragmented method to an integrated systems approach and to create new jobs in Greater Philadelphia
6. **Collaborative Demonstration Projects**- The goals of this task are to demonstrate performance of GPIC coordinated system integrated and operational technologies, policies, business models, workforce development approaches, and process integration methods in retrofitting of buildings at the Navy Yard and other sites in the Greater Philadelphia region.

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Summary

The purpose of this study was to identify the most significant policy and legal-related process factors effecting energy efficiency ("EE") in commercial buildings in the Greater Philadelphia area. The research focused on policy areas such as the structure of government, specific laws and regulations, government funded or mandated incentives and other financing mechanisms. Processes included legal-related factors impacting EE transactions, such as contracts, leases, public bidding requirements, and accounting standards.

Government policy and legal-related processes can have both a positive and a negative impact on EE. Some policy and process levers, like mandates, codes, incentives and appliance standards, are designed to directly address the "efficiency gap"—the gap between a customer's actual investments in EE and those that appear to be in the consumer's best interest. Other policies and processes act as barriers to EE, either directly, by prohibiting EE technologies or methods from being implemented, or indirectly by imposing additional costs, legal requirements or contradictory signals. Similarly, legal-related processes that were not designed for EE act as barriers through increased transaction costs, reduced valuation of EE assets and similar unintended consequences.

The study revealed that between Pennsylvania and New Jersey, the state and local governments have implemented almost all of the policy levers that advocates have called for to increase EE. For example, both Pennsylvania and New Jersey have up-to-date building and energy codes. The states have invested hundreds of millions of dollars collected from utility ratepayers in EE incentive programs. New Jersey has experimented with alternative rate structures for utilities. Therefore, the primary recommendation of this study is to conduct further legal and market research to compare the effectiveness of the New Jersey and Pennsylvania regulatory initiatives designed to address the efficiency gap, including the incentive and ratemaking efforts.

Although many policies are in place to promote EE, direct and indirect barriers still exist. For example, until August 2011, New Jersey did not allow sub-metering of multi-family residential buildings, creating a direct barrier to energy management. The indirect barriers are numerous, and include even the structure of government itself. For example, the multitude of governing bodies and the often inconsistent policy goals of each result in a fragmented and sometimes contradictory set of policies regarding EE.

Finally, the study found that market processes necessary for smooth transactions and full valuation of EE construction are immature, increasing transaction costs and making EE investments less valuable. For example, appraisers of EE buildings frequently ignore or undervalue EE upgrades. As a result, owners may not recoup their investment at the sale of the property, or their cost to borrow against their assets may be compromised.

1. INTRODUCTION TO POLICY AND PROCESS FACTORS

1.1. Findings

The goal of this study is to identify the primary policy and legal-related process factors in the Greater Philadelphia Area that foster or impede the retrofitting of commercial buildings to improve energy efficiency ("EE").[2] For the purpose of this study, policy factors include the structure of government, specific laws and regulations, government funded or mandated incentives and other financing mechanisms. Processes include legal-related factors that impact EE construction transactions, like contracts, public bidding process, accounting, etc.

Government policy and legal-related processes can have both a positive and a negative impact on EE. Some policy and process levers, like mandates, codes, incentives and appliance standards, are designed to directly address the "efficiency gap"—the gap between a customer's actual investments in EE and those that appear to be in the consumer's best interest.[3] Other policies and processes act as barriers to EE, either directly, by prohibiting EE technologies or methods from being implemented, or indirectly by imposing additional costs, legal requirements or contradictory signals. Similarly, legal-related processes that were not designed for EE act as barriers through increased transaction costs, reduced valuation of EE assets and similar unintended consequences.

Pennsylvania and New Jersey have many policies and programs in place to address the "efficiency gap" directly. For example, both Pennsylvania and New Jersey have up-to-date energy and building codes. Pennsylvania has adopted the 2009 Uniform Construction Code for commercial buildings, which is based on the 2009 IECC with reference to ASHRAE 90.1-2007 and New Jersey has adopted ASHRAE/IESNA 90.1-2007 for commercial buildings. Both states also require utility ratepayers to fund incentive programs designed to encourage EE. In Pennsylvania, Act 129 requires utilities to implement energy efficiency and demand response programs to reduce energy demand 1% by 2011 and 3% by 2013. As a result, the public utilities have put in place a wide variety of incentive programs to promote EE. Similarly, New Jersey assesses a per kWh "societal benefits charge" (SBC) on each ratepayer's utility bill which funds energy efficient construction incentives. The SBC generally equates to about 3% of a customer's utility bill. In addition to state programs, several local governments in the Greater Philadelphia Area have also implemented energy efficiency or green building programs, including several progressive programs initiated by the City of Philadelphia.

However, despite the direct effort to increase EE, the full benefit of policies designed to promote EE may go unrealized. For example, although both Pennsylvania and New Jersey have up-to-date building and energy codes, some studies and anecdotal evidence

[2] Greater Philadelphia Innovation Cluster, *Repository of Policies and Practices on Building Energy Efficiency*, http://gpichub.org/activities/policy/sub-section-3 (last visited Sept. 13, 2011).
[3] Galove, William H. and Eto, Joseph H., Market Barriers to Energy Efficiency: A Critical Reappraisal of the Rationale for Public Policies to Promote Energy Efficiency, xi, Lawrence Berkeley Laboratories (1996).

from code officials suggest that additional code training and enforcement is needed to ensure that buildings are meeting EE requirements. In addition, there has been limited evaluation of the EE programs in place to determine whether they are working efficiently, that the incentives are calibrated at the right level to promote the highest levels of energy savings at the least cost, and to compare the effectiveness of the varied programs across the two states.

New Jersey and Pennsylvania also have policies that essentially prohibit certain energy efficient construction methods or technologies from being implemented. For example, until August 2011, New Jersey did not allow sub-metering of multi-family residential buildings.[4] Now, only water utilities may be sub-metered. As a result, it is generally impossible to provide individual residents of multi-family buildings with demand response or energy monitoring technology. Similarly, because of public procurement requirements, it is very difficult, if not impossible, to use a design-build delivery model for public construction projects in Pennsylvania and New Jersey. Thus, the public bidding requirements impede government entities from utilizing a project delivery model which may provide cost and energy efficiency benefits.

Direct policy barriers should be the much heralded "low hanging fruit." In theory, once identified, eliminating these barriers should be simple. This is not the case. For example, efforts to allow for utility submetering of multi-family buildings in New Jersey have been underway since at least 2004, when the Board of Public Utilities first denied a petition to allow submetering. Often the issue is other competing policy considerations. In the case of utility submetering, policymakers' concern about increased utility costs and abuse of residents by landlords and utility companies, among other factors, has trumped the potential EE benefits of submetering.

Far more complicated are those policy and process factors that impede EE indirectly. Like the "efficiency gap," this is a "policy gap"—the gap between the actual policies and those that appear to be in the society's best interest, at least in terms of promoting EE.

For example, the structure of government is itself a barrier to cohesive and consistent policy efforts to promote energy efficient construction. EE is regulated at all three primary levels of government—Federal, state and local. Public utilities and quasi-governmental agencies also play a role. Therefore, the multitude of governing bodies and the often inconsistent policy goals of each result in a fragmented and sometimes contradictory set of policies regarding EE. Property Assessed Clean Energy (PACE) financing is a prime example of the impact of fragmented policymaking on EE construction. PACE is a financing model which allows local governments to offer financing for EE investments which are then paid back as an assessment on local property taxes. PACE was promoted by the states and the White House, only to be confounded by a pronouncement from the Office of the Comptroller of the Currency that mortgages with PACE assessments

[4] Some practitioners report that submetering is allowed in certain cases, but the regulations as they currently stand do not allow submetering for multi-family buildings as a general proposition.

would not be financed. Similarly, under Act 129, utilities are required to implement EE incentive programs, but utility rate regulations do not allow the utilities to earn a financial return on EE investments that is similar to the return utilities make on other capital investments. Thus, the utilities have limited incentive to promote EE beyond the statutory mandates.

Policy stacking may also be diluting the impact of policies designed to encourage EE. "Policy stacking" is a phenomenon whereby governments require that regulated parties meet different, sometimes competing, policy requirements. For example, New Jersey, Pennsylvania and the Federal government generally require owners who take advantage of most publically-funded EE incentives to adhere to "prevailing wage" requirements, which require certain wage rates set by the government to be paid. The policy goal behind prevailing wage is to even the playing field for local contractors and ensure contractors are paid a fair wage. However, some have argued that the prevailing wage requirements raise the cost of EE projects, chilling demand, and increasing burdens on contractors, reducing supply of skilled labor.

In addition to direct government policy, there are legal-related processes related to EE, like appraisals, leases, financing models, and accounting standards. These market processes necessary for smooth transactions and full valuation of EE construction are immature, increasing transaction costs and making EE investments less valuable. For example, appraisers of EE buildings frequently ignore or undervalue EE upgrades. As a result, owners may not recoup their investment at the sale of the property, or their cost to borrow against their assets may be compromised.

1.2. Recommendations

Based on the analysis of the currently existing EE policy and process landscape in Pennsylvania and New Jersey, there are different recommendations for each type of policy and process factor.

Direct Policy Efforts

Together, New Jersey and Pennsylvania have implemented almost every form of policy-based incentive to overcome the financial, structural and utility-rate related barriers to EE. For example, New Jersey has regulations allowing for utility rate decoupling and returns on utility investment in EE programs, and has imposed a "societal benefits charge" on utility ratepayers to fund EE programs. Pennsylvania has imposed an energy efficiency reduction requirement on its utilities through Act 129. Both states have implemented up-to-date building codes. Pennsylvania has implemented a fast-track smart metering program. **The primary recommendation of this study is to conduct legal and market research to compare the effectiveness of the New Jersey and Pennsylvania regulatory initiatives designed to address the efficiency gap, including the incentive and ratemaking efforts.**

Furthermore, because neither Pennsylvania nor New Jersey has implemented all of

the rate-making mechanisms designed to reduce utility disincentives to EE. **GPIC could contribute to policy efforts and analysis to determine whether alternative utility ratemaking efforts to encourage investment in EE are feasible, educate policymakers and participate in crafting the necessary documents to implement new rate structures as appropriate.**

In addition, the effectiveness of the New Jersey programs funded by the SBC has not been evaluated since 2008**. GPIC could contribute to the current policy debate in New Jersey regarding the best way to fund and deliver EE programs by providing data on the effectiveness of the programs currently in place.**

With respect to code-related policies, there are several areas for development. First, building code adoption, training and enforcement should be moved to the forefront of the EE policy agenda. **GPIC should undertake a concrete data gathering effort to evaluate the effectiveness of energy code application and enforcement in Pennsylvania and New Jersey.**

Other policy initiatives could include:

- Developing a retrofit building code for Pennsylvania and amending New Jersey's currently existing retrofit code to promote EE in existing buildings;
- Evaluating the EE opportunity and cost of increased state appliance standards; and,
- Developing legislation to allow Pennsylvania to set appliance standards.

Alternative financing mechanisms, like on-bill financing (OBF) and Property Assessed Clean Energy financing are designed to address financial barriers to EE investments. **GPIC could provide insight into the role of financial barriers in commercial EE, and whether alternative financing mechanisms help to overcome such financial barriers.**

Direct Policy Barriers

The key to addressing direct policy barriers is to understand and address the underlying resistance that is preventing obvious solutions from being implemented.

With respect to public contracting, procurement regulations appear to be a barrier to be addressed. **GPIC could consolidate best procurement practices for EE projects, work with policymakers to smooth the procurement paths for EE projects, and work with labor representatives to educate about alternative construction management models for EE projects.**

Similarly, GPIC is working on other initiatives to identify and address psychological and behavioral barriers to EE. **GPIC should examine the crossover between these barriers to EE and resistance to changing public policies. GPIC should use the data to engage policymakers, politicians and the public to address entrenched stakeholder objections to policy change.**

Indirect Policy Barriers

One of the primary indirect barriers to EE policy is the structure of government itself. GPIC is uniquely positioned across government agencies and outside of geographical boundaries to **engage politicians, regulators, policymakers and utilities on a sustained basis to contribute to and advocate for comprehensive and consistent policy development and adoption across governmental jurisdictions.**

GPIC should also identify and measure the impact of added policy requirements, like prevailing wage, on utilization and effectiveness of EE policy efforts.

Market Processes

To the extent that market processes have not caught up to the needs of EE transactions, **GPIC should develop market-acceptable models to address process issues like leasing, procurement, financial transaction documentation and appraisals**. New York City set an example of how policy institutions can create fruitful market models by developing a model green lease provision with contribution from the effected stakeholders. GPIC could undertake a similar effort to spearhead the development or piloting of model financing documents, procurement policies and appraisal requirements for EE projects.

1.3. Conclusion

The purpose of this baseline study was to identify the policy and process factors impacting EE in the Greater Philadelphia Area. The most important finding of the study was that between the two states, many of the types of policy efforts which prior EE policy studies have identified have been implemented, and many of the efforts are different between Pennsylvania and New Jersey. The policy framework provides an excellent laboratory to evaluate the effectiveness of differing EE policy efforts across the same geographic region.

Implementing the other recommendations for overcoming direct, indirect and market-based policy barriers in the Greater Philadelphia Area will contribute to achieving the overall GPIC mission of achieving "operational energy savings of 50% by 2013-2015 in a scalable, repeatable, and cost effective manner across a broad building stock..."[5]

[5] Greater Philadelphia Innovation Cluster, *Goals*, http://gpichub.org/about/gpic-goals (last visited Sept. 13, 2011).

2. DIRECT EFFORTS TO PROMOTE EE

2.1. Direct Incentives

Both Pennsylvania and New Jersey have utility ratepayer funded energy efficiency programs in place. However, the programs are structured very differently.

New Jersey has no mandatory EE requirement. However, the state collects a "Societal Benefits Charge" (SBC) of 3.8% of each utility ratepayer's utility bill. The SBC funds, among other things, a suite of EE programs for commercial buildings. The programs are provided by a third party independent contractor, overseen by the Clean Energy Program of the Board of Public Utilities.

In addition to the SBC programs, some utilities run their own EE programs. New Jersey has utility ratemaking mechanisms in place that allow utilities to recover the costs of their EE program expenditures, and realize a return on their investment in the programs.

Finally, New Jersey utilities can petition the BPU for a decoupled rate structure. Under most traditional utility rate structures, utilities earn revenue by selling additional units of energy. Thus, utilities are disincentivized from advocating for reduced energy use. Decoupling removes some of the disincentive for utilities to promote EE by allowing utilities to generate the same revenue regardless of the units of energy sold. However, New Jersey's rate decoupling also requires utilities to shed capacity so that no additional costs are passed on to ratepayers, and to date, only two natural gas utilities and no electric utilities have decoupled rates.

In Pennsylvania, Act 129 requires that utilities serving over 100,000 customers must reduce energy use by 3% by 2013 through EE and demand response programs. Unlike New Jersey, only the costs of the EE programs can be passed on to ratepayers, and Pennsylvania utilities cannot earn a revenue return on EE investments. Further, Pennsylvania does not currently have a program in place to allow for rate decoupling.

Together, Pennsylvania and New Jersey have implemented many of the utility-based policy recommendations that have been identified in prior research. Thus, the differences in the ratepayer based incentive and utility compensation structures in Pennsylvania and New Jersey provide a unique opportunity to compare their relative EE benefits. **The primary recommendation of this study is to conduct legal and market research to compare the effectiveness of the New Jersey and Pennsylvania regulatory initiatives designed to address the efficiency gap, including the incentive and ratemaking efforts.**

In addition, the effectiveness of the SBC-funded EE programs have not been evaluated since 2008, GPIC could contribute to the policy discussion currently underway in New Jersey regarding the best way to fund and deliver EE programs by providing data and analysis of the commercial and industrial programs funded by the SBC.

Finally, neither Pennsylvania nor New Jersey has implemented all of the rate-making mechanisms designed to reduce utility disincentives to EE. GPIC could contribute to policy efforts and analysis to determine whether such ratemaking efforts are feasible, educate policymakers and participate in crafting the necessary documents to implement new rate structures as appropriate.

Ratepayer Supported Energy Efficiency Incentive Programs

The role of utilities in promoting energy efficiency must not be underestimated: utilities have the most natural information gathering, management and delivery systems in place through their metering and billing functions to deliver energy efficiency program and their extensive experience managing energy delivery provides the skills that will facilitate management of energy efficiency programs and integrated energy resources planning.[6] In Pennsylvania and New Jersey the utilities already play a significant role in the EE framework through utility ratepayer supported EE programs.

Utility-sponsored energy efficiency programs first began to appear in the 1980s, when some states began to require that utilities utilize integrated resource planning (IRP).[7] In states that mandated the use of IRP, utilities were required to assess all possible supply-side and demand-side options for meeting the expected capacity load, and from those options, choose the least-cost resource.[8] In many cases, an IRP would reveal that the lowest-cost resource available was energy efficiency.[9] The cost of saving energy through energy efficiency programs today is estimated to be about one third less than the cost of any other generation resource.[10]

Utilities nationwide have significantly increased their spending on customer-targeted energy efficiency programs in recent years. Spending on these types of programs in 2009 was at $4.5 billion and is expected to rise to between $7.5 billion and $12 billion by 2020.[11]

Pennsylvania and New Jersey both have mandatory utility energy efficiency programs. In 2008, Governor Ed Rendell enacted Act 129 of 2008, designed to reduce Pennsylvania's energy demand and consumption. Act 129 requires that public utilities implement programs to reduce energy consumption by 1% by 2011 and 3% by 2013, and

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[6] Grande, Hannah, *et* al, "Unlocking Energy Efficiency in the U.S. Economy," McKinsey Global Energy and Materials at 106.

1. [7] Interactions between Energy-Efficiency Programs funded under the Recovery Act and Utility customer-funded Energy Efficiency Programs, Charles A. Goldman, Elizabeth Stuart, Ian Hoffman, Merrian C. Fuller and Megan A. Billingsley (March 2011), http://eetd.lbl.gov/ea/emp/reports/lbnl-4322e.pdf at 28.

[8] *Id*.

[9] *Id*.

[10] *Carrots for Utilities: Providing Financial Returns for Utility Investments in Energy Efficiency* (January 2011) at 2.

[11] *Interactions between Energy-Efficiency Programs funded under the Recovery Act and Utility customer-funded Energy Efficiency Programs* (March 2011) at 23.

reduce demand for electricity by 4.5% by 2013 for the 100 hours of highest use.[12] According to the plans submitted by the utilities and approved by the PUC, Pennsylvania utilities will spend over $975 million on energy efficiency and demand reduction programs from 2009 to 2012. New Jersey, by contrast, assesses a "societal benefits charge" ("SBC") of 3.8% of a ratepayer's energy bill. In 2010, New Jersey spent $229.6 million collected through the SBC to support New Jersey's Clean Energy Program ("CEP").[13]

It should be noted that the funding source for the programs is essentially the same—both states assess a charge on utility rate payers to pay for energy efficiency programs.

Under Act 129, utilities are allowed to spend up to 2% of their 2006 revenue on energy efficiency programs each year.[14] Utilities can recover the costs of creating, implementing, and administering the EE programs from ratepayers.[15] For example, PECO will spend approximately $342 million over four years.[16] PECO will recover this amount through a rate-charge directly passed on to customers, with the costs of each program will be apportioned to the targeted customer class.[17]

However, under Act 129, utilities cannot recover for decreased revenues due to reduced energy consumption or changes in demand.[18] However, decreased revenue and demand can be a components of the ordinary rate-making procedure as part of a distribution-base rate proceeding. In that case, a utility trying to make a voluntary change in distribution rates may use the decreased revenue and sales data in its calculation of required rates.[19]

In New Jersey, the NJBPU assesses a non-bypassable charge of 3.8% of energy costs to all customers of New Jersey's seven investor-owned electric public utilities and gas public utilities. The BPU determines the amount that will be collected. A total of $482 million was collected during 2001-2004 and a total of $745 million was collected from 2005-2008. In September 2008 the BPU approved a 2009-2012 budget of $1.213 billion, with approximately 80% ($950 million) of the budget devoted to energy efficiency programs and 20% ($243 million) allocated for renewable energy programs. Any unused funds from previous years are carried into the next year's budget. Because the SBC funds

[12] Pennsylvania Public Utility Commission, Act 129 Information, http://www.puc.state.pa.us/electric/Act_129_info.aspx.
[13] http://www.njcleanenergy.com/main/about-njcep/societal-benefits-charge/societal-benefits-charge-sbc last visited 8/15/2011
[14] PECO Energy Efficiency and Conservation Plan (Program Years 2009-2012), (July 1, 2009), at 209.
[15] Public Utility Code §2806.1 (k)(1).
[16] *Id*.
[17] *Id*. at 211. For example, Commercial/Industrial customers will bear the costs of creating, implementing, and administering EE programs that are solely available to Commercial/Industrial customers. Residential customers will bear the costs of programs that are solely available to residential customers. Costs of programs that are available to different customer classes will be shared by the customer classes.
[18] Public Utility Code §2806.1 (k)(2).
[19] Public Utility Code §2806.1 (k)(3).

can be accumulated, in 2010, $158 million was transferred from the BPU to the New Jersey general fund to reduce the state's budget deficit.

Program Deployment

Although similar in their source of funding, the states deploy their energy efficiency programs differently.

Act 129 programs are developed and implemented by the utilities, with the approval of the Pennsylvania Utility Commission (PUC). Act 129 required Electric Distribution Companies (EDCs) in Pennsylvania with 100,000 or more customers to adopt and implement Energy Efficiency and Conservation (EE&C) plans in 2009 (subject to approval by the PUC) in an effort to reduce demand and consumption.[20] The EE&C Plans were required to include the following elements[21]:

1. Plans addressing quality assurance, performance, measurement, and verification;
2. Estimated cost of implementation;
3. Measures to address households at or below 150% of the Federal poverty income;
4. A proposal for a cost recovery mechanism in accordance with §1307 of the Public Utility Code;
5. Demonstration of cost effectiveness through a PUC approved Total Resource Cost (TRC) test;[22]
6. Plan for independent evaluation of cost effectiveness.

All of Pennsylvania's EDCs have begun to implement their programs. PECO is the primary IOU for the Pennsylvania portion of the Greater Philadelphia Area. In order to meet the requirements of Act 129, PECO announced that it would create nine programs to meet the EE requirements. The commercial programs include:

Commercial/Industrial Equipment Incentives Program – Offer incentives to customers who install high efficiency electric equipment, while engaging suppliers and contractors to promote eligible equipment.[23]
Commercial/Industrial New Construction Program – Accelerate adoption of design/construction practices using EE by providing training, design assistance, and incentives.[24]
Government/Public/Non-Profit Facility Energy Savings Program – Provide financial and technical assistance. Identify opportunities for EE improvement while

[20] PUC Chairman James H. Cawley, Presentation, Act 129 Update, to the Association of Energy Engineers, Central Pennsylvania Chapter (January 21, 2010), http://www.puc.state.pa.us/electric/pdf/PPT-Act129_Update012110-Cawley.pdf, at 3.
[21] *Id*. at 8-9.
[22] To conduct the TRC Test, the PUC has adopted the TRC Test of California's Standard Practice Manual – Economic Analysis of Demand-Side Programs and Projects (July 2002), http://www.calmac.org/events/SPM_9_20_02.pdf.
[23] PECO Energy Efficiency and Conservation Plan (Program Years 2009-2012), (July 1, 2009), at 98.
[24] *Id*. at 115.

following the specialized planning/purchasing protocols of public/non-profit entities.[25]

PECO also created eight programs to address the demand-reduction requirements of Act 129. The commercial programs are as follows:

Commercial/Industrial Direct Load Control Program – Remotely control central air conditioners during periods of high peak demand or supply-side constraints. Participants will receive on-going financial incentives.[26]

Commercial/Industrial Super Peak Time-of-Use Program – Commercial and industrial customers voluntarily agree to decrease power usage during times of peak demand, in exchange for financial incentives.[27]

Demand Response Aggregator Contracts – PECO will establish contracts with Curtailment Service Providers, who in turn will recruit PECO customers to deliver demand reduction targets. The load reduction will be offered during the 100 top hours of peak demand.[28]

Distributed Energy Resources Program – PECO will tap backup generation systems during top 100 peak hours. Participants will be eligible to receive up to $210/kW for equipment, maintenance, upgrades, and/or installations.[29]

Permanent Local Reduction Program – Encourage customers to permanently move electricity usage from peak to off-peak times on an on-going basis. Any technology, such as energy storage systems, that permanently shift or eliminate load would be eligible.[30]

Conservation Voltage Reduction Program – Incorporate voltage regulation techniques on distribution feeders, resulting in lower service voltage levels, which in turn will reduce the associated energy consumption and demand.[31]

Using a maximum achievable potential metric (MAP),[32] PECO found that its EE&C Program would yield an average energy consumption savings of 1.8% a year, representing

[25] *Id*. at 127.
[26] *Id*. at 156.
[27] PECO Energy Efficiency and Conservation Plan (Program Years 2009-2012), (July 1, 2009), at 162.
[28] *Id*. at 168.
[29] *Id*. at 172.
[30] *Id*. at 177
[31] *Id*. at 182.
[32] MAP represents the potential energy savings from EE measures after taking into account program administration costs and customer acceptance rates. It is essentially the "theoretical upper boundary of what could be achieved vis-à-vis energy efficiency programs under ideal market conditions (e.g. maximum incentives, perfect information conveyed to customers about energy efficiency)." Other alternatives for calculating energy savings include the technical potential metric, which calculates the maximum energy savings technically possible regardless of cost and customer preference (representing the upper boundary of EE) and the economic potential metric, which calculates the energy savings potential for programs that pass an economic screen without factoring in administration costs or customer preferences. Pennsylvania Public Utility Commission, Testimony of Gregory Walker, Development of PECO's Act 129 Energy Efficiency and Conservation Plan and Summary of Principal Findings (July 1, 2009), at 5-6.

1.7% of the baseline forecast in 2009 and 7.2% of the baseline in 2012.[33] This translates to kwH savings of 38,500,000 in 2009; 486,702,402 in 2010; 818,448,533 in 2011; and 1,160,977,530 in 2012.[34]

However, PECO's Director of Energy and Marketing Services testified before the Public Utility Commission in March 2010 that although PECO's EE&C program would decrease sales and revenues by roughly $117 million over the four-year period of the program, it would ultimately yield about $523 million in net benefits through avoided supply costs.[35] Avoided supply costs arise from a reduction in distribution, generation, and lower capacity transmission costs.[36] It was estimated that the plan would increase customers' monthly bill, on average, by $8.20.[37]

In New Jersey, the SBC funds the CEP, a statewide initiative administered by the BPU, which provides energy efficiency and renewable energy programs. The programs funded by the SBC were initially managed and implemented by New Jersey's utilities, but on April 1, 2007 management was turned over to third-party "program managers" Honeywell Utility Solutions and TRC Energy Solutions. The BPU continues to act as the administrator of the CEP, and the program managers manage and implement the CEP programs. The OCE and program managers submit annual program plans for approval by the BPU. In addition to the OCE programs, some programs are developed and administered by the utilities and other New Jersey state agencies like the Economic Development Authority.

For 2011, the CEP has implemented the following programs for commercial customers:

1) NJ Renewable Energy Incentive Program
2) NJ SmartStart Buildings – Direct Install Program
3) NJ SmartStart Buildings – New Construction and Retrofit
4) NJ SmartStart Buildings – Pay for Performance
5) Renewable Energy Manufacturing Incentives

According to the CEP's published program results, the OCE spent $41,923,471 on commercial EE programs and saved 126,562 kW in 2010.[38]

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[33] *Id*. at 14. These savings only represent reduced consumption resulting from energy efficiency programs. The savings potential from demand response programs was not calculated.
[34] Pennsylvania Public Utility Commission, Testimony of Frank Jiruska, PECO's Energy Efficiency and Conservation Plan (March 31, 2010), at 6.
[35] Pennsylvania Public Utility Commission, Testimony of Frank Jiruska, PECO's Energy Efficiency and Conservation Plan (March 31, 2010), http://www.peco.com/NR/rdonlyres/A0E991AD-09AD-4F44-B78C-0D67FD6A2E67/8140/27PECOStatementNo7Jiruska.pdf, at 6.
[36] *Id*. at 7.
[37] *Id*.
[38] New Jersey's Clean Energy Program, *Clean Energy Program Financial Reports*, http://www.njcleanenergy.com/main/public-reports-and-library/financial-reports/clean-energy-program-financial-reports (last visited Sept. 9, 2011) (select 2001-2010 Program results).

New Jersey's EE programs have historically been ranked as among the best in the country.[39] However, significant changes may be made to the EE program funding through the SBC. The 2011 Draft Energy Master Plan outlines a change in the structure of the EE program structure to a self-funding program "foster[ing] the wind down and elimination of the [Clean Energy Program] portion of the SBC."[40]

In addition, the contract for the program managers is up in January 2012. Although the program managers will likely get a short contract extension, in July 2011 the OCE issued a Request for Information to solicit input for transitioning the program to a single contractor and to more self-financing programs.[41]

There are likely to be changes to the historical structure and funding models, but what the changes will ultimately be and whether the changes will have a negative impact on EE programming remains to be seen.

Section 179D Federal Tax Deduction for Energy Efficient Commercial Buildings

The Federal government offers a tax deduction for energy efficient commercial buildings, 26 U.S.C. § 179D ("179D"). 179D was enacted via section 1331 of the Energy Policy Act of 2005. Pub. L. No. 109-58, 119 Stat. 594, 1020-24 (2005). Unfortunately, due to the structure of 179D and its regulatory implementation, 179D has not been very widely utilized.

179D provides a maximum allowable tax deduction of up to $1.80 per square foot for the installation of energy efficient systems in commercial buildings, minus the aggregate amount of the 179D deductions allowed with respect to the building for all prior taxable years. A partial pro-rated deduction of between $0.30 and $0.60 per square foot is available for a 25-40 % reduction in lighting power density, or 50% in the case of warehouses.[42] For all other systems, the only guidance on reduction targets can be found in I.R.S. Notices 2006-52 and 2008-40.[43] Despite not being regulation, these Notices supply the only relevant guidance and provide that a 16 2/3 % reduction must be achieved.[44] This will result in a $0.60 per-square-foot partial deduction per system, or an overall partial deduction of $1.20 per square foot, as provided for in the statute.[45]

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[39] For example, the American Council for an Energy Efficient Economy ranked New Jersey #12 in its 2010 scorecard of energy efficient policies. See http://www.aceee.org/sector/state-policy/new-jersey

[40] 2011 Draft Energy Master Plan at 114.

[41] The Request for Information on Professional Program Management Services for New Jersey's Clean Energy Program is available at http://www.nj.gov/treasury/purchase/pdf/BPU_FINAL_RFI.pdf

[42] 26 U.S.C. § 179D(f).

[43] See Curt G. Wilson, IRS Information Letter 2009-0226, 2009 WL 5450337 (Nov. 25, 2009).

[44] I.R.S. Notice 2008-40, 2008-14 I.R.B. 725; I.R.S. Notice 2006-52, 2006-1 C.B. 1175.

[45] 26 U.S.C. § 179D(d)(1)(A)(ii).

In non-tax code language, 179D applies to commercial buildings that are not single family houses or multi-family buildings with fewer than three stories.[46] 179D also applies to property installed within commercial buildings with respect to which depreciation or amortization is allowable – which is installed as part of the interior lighting systems, heating, cooling, ventilation and hot water systems, or the building envelope systems, which encompasses insulation, exterior doors, exterior windows, and roofing material.[47] Eligible property must be constructed, remodeled, or retrofitted between December 31, 2005 and December 31, 2013.[48]

In January 2011, the IRS issued a new revenue procedure that provided an alternative accounting method for claiming the 179D deduction, prior to which claimants were limited by a three-year rolling statute to claim the deduction on amended tax returns. Pursuant to section 8.04 of Revenue Procedure 2011-14, rather than amending tax returns, taxpayers that have not already claimed the deduction may reach back to as far as 2006 and exploit the deduction on their current return. [49]

To qualify, energy-efficient improvements must reduce – or be part of a plan to reduce – total annual energy and power costs with respect to the interior lighting systems and controls, heating, ventilation, and air conditioning, hot water, and building envelope systems by 50% as compared to a reference building that meets the minimum requirements of ASHRAE Standard 90.1-2001.[50] The projected reduction is measured vis-à-vis a reference building that meets the minimum requirements of ASHRAE Standard 90.1-2001.[51] In calculating baseline building performance, the reference building must employ certain guidelines from the 2005 California Title 24 Nonresidential Alternative Calculation

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[46] In tax code language, 179D applies to "Energy efficient commercial building property" is defined in the statute as property located within the United States that is installed on or in any building that is within the scope of Standard 90.1-2001 of the American Society of Heating, Refrigerating, and Air Conditioning Engineers ("ASHRAE") and the Illuminating Engineering Society of North America (as in effect on April 2, 2003). 26 U.S.C. § 179D(c)(1). A structure within the scope of this Standard is one that is "wholly or partially enclosed within exterior walls, or within exterior and party walls, and a roof, affording shelter to persons, animals, or property; and is not a single-family house, a multi-family structure of three stories or fewer above grade, a manufactured house (mobile home), or a manufactured house (modular)." U.S. Tax Rep. P 179D4, Deduction for Energy Efficient Commercial Building Property (2011) (citing I.R.S. Notice 2006-52, 2006-26 I.R.B. 1175).

[47] 26 U.S.C. § 179D(c)(1).
[48] See Pub. L. No. 110-343, 122 Stat. 3765 (2008) (extending expiration of 179D deduction to December 31, 2013); Pub. L. 109-58, title XIII, Sec. 1331(d), 119 Stat. 1024 (2005) (providing "[t]he amendments made by this section . . . shall apply to property placed in service after December 31, 2005").
[49] Rev. Proc. 2011-14, Sec. 8.04; see also Chris Henderson, iTaxBlog, IRS Provides Alternative for EPAct §179D Filers (Feb. 14, 2011), http://www.itaxblog.com/tag/ green-building-tax-deduction/.
[50] 26 U.S.C. § 179D(c).
[51] Id.

Method Approval Manual (http://www.energy.ca.gov/title24/2005standards/nonresidential_acm/2005_NONRES_ACM_MANUAL.PDF). [52]

179D requires a certification of the energy savings to be completed by a "qualified individual," which includes an engineer or contractor – unrelated to the tax-payer – who is registered in the jurisdiction in which the building is located.[53]Additionally, these qualified individuals must use the Performance Rating Method and base their calculations on I.R.S.-approved software programs. [54]

The benefit of the 179D deduction is that instead of depreciating building improvements over a 39 or 27 ½ year term, which is standard for most building capital improvements, the entity may deduct the entire cost of the energy efficient property in the year it is placed in service, provided the amount does not exceed $1.80 per square foot.[55] If costs ultimately exceed this amount, the balance would then be capitalized and depreciated over the applicable term.[56] By way of example, for a 100,000 square foot building for which no prior deductions have been taken, the maximum allowable deduction is $180,000.[57] However, since the 179D benefit is structured as a deduction, not a tax credit, the actual benefit would be the $180,000 times the entity's tax rate.

Not only are private owners eligible for the deduction, but those commissioned to design public buildings can likewise take advantage of offsetting taxable income.[58]

Criticisms of 179D

Although 179D has been praised as a good first step in increasing energy efficiency in commercial buildings, there have been a number of criticisms of the tax deduction and

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[52] See Fed. Tax Coordinator L-3172 (2d ed. 2011) (listing requirements).

[53] Id. § 179D(d)(6)(C).

[54] See id. § 179D(d)(3)(B); 6 CHRISTOPHER M. SOVE AND JASON A. FISKE, MERTENS LAW OF FED. INCOME TAX'N § 25:97 (2011) (noting requirement of using Performance Rating Method).

[55] See Gerald J. Robinson, Fed. Inc. Tax. Real Estate ¶ 6.09 (2011) ("Owners adding permanent improvements to their buildings normally are required to recover the cost of the improvements gradually through annual depreciation deductions over the recovery period for the property. To encourage the use of energy-efficient property, the [Act] allows an immediate deduction for the costs of energy-efficient commercial building property . . . .").

[56] See Jason Deirmenjian, Plus Ultra, The EPAct 179D Energy Tax Deduction (Nov. 14, 2010), http://www.plusultracpa.com/epact-179D-energy-tax-deduction/.

[57] See 2 ALVIN L. ARNOLD, REAL ESTATE TRANSACTIONS: STRUCTURE AND ANALYSIS WITH FORMS § 20:287 (2011).

[58] See U.S. Tax Rep. P 179D4, Deduction for Energy Efficient Commercial Building Property (2011).

suggestions as to how it can be improved. There have also been claims that "179D has had an anemic effect to motivate transformation in the retrofit marketplace."[59]

According to a report from the American Council for an Energy-Efficient Economy ("ACEEE"), while no specific data is available, it appears that few full or partial deductions were taken during the period from 2005-2010.[60] The report attributes this underutilization to both the complexity of the process for claiming the deductions and a lack of guidance from the I.R.S. and Department of Energy.[61] It further notes that guidance that was eventually given was not compliant with the legislation's requirements.[62]

Other critics have states that the 50% threshold that must be attained to qualify for a deduction is believed to be too aggressive for existing buildings and a better benchmark to use would be pre- and post-retrofit energy usage. In addition, many entities that would otherwise take advantage of 179D are reluctant to do so because of its structure as a deduction rather than a credit. Finally, the tax structure of 179D makes it unattractive to certain owner sectors, like Real Estate Investment Trusts (REITs).

Recommendations for Changing 179D

The primary recommendation for changing 179D is to convert the structure from a tax deduction to a tax credit. A taxpayer realizes only the benefit adjusted by the tax rate, meaning that the $1.80 is multiplied by the tax rate (say, 35%). A tax credit, by contrast, allows a taxpayer to deduct the full dollar amount from its tax obligations.[63]

Furthermore, as it stands, certain expenditures that are in accordance with the qualifications for 179D do not garner benefits for the entity due to income tax timing issues and the deduction's effect on building cost basis.[64] Turning the incentive into a credit would likely make the benefit available during the current applicable tax year regardless of

[59] Statement of Jeffrey D. Deboer in Behalf of the Real Estate Roundtable, United States Senate Committee on Environment and Public Works and Subcommittee on Oversight Joint Hearing (March 30, 2011), http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=195f0064-cefa-4987-92a7-3adda4c9247e at 9.

[60] See RACHEL GOLD AND STEVEN NADEL, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, REPORT NO. E113, ASSESSING THE HARVEST: IMPLEMENTATION OF THE ENERGY EFFICIENT PROVISIONS IN THE ENERGY POLICY ACT OF 2005 4 (2011).
[61] Id.
[62] Id.
[63] See Oregon Tax Credits Blog, Obama's Policy of Energy Tax Credit (June 11, 2010), http://www.oregontaxcredits.com/obamas-policy-of-energy-tax-credit/.
[64] See 26 U.S.C. § 179D(e) (addressing basis reduction).

cost basis and timing factors.[65] This conversion is also expected to make the credit more widely available to real estate investment trusts, many of which have heretofore been unable to take advantage of the tax incentive due to structure of ownership and the way distributions are planned within them.[66]

Paul Naumoff, a tax expert in the field of climate change and sustainability at Ernst & Young, similarly praised the proposed conversion, stating:

> The conversion of the Section 179D deduction to a tax credit should increase the economic return on more energy efficient asset investments and thus provide further incentive for business to accelerate more investments in efficient lighting, heating, ventilation and other energy efficient assets. The current deduction requires that the basis in the assets upon which the credit is claimed must be reduced and thus the tax deduction is only an acceleration of a tax benefit, which would have been claimed over a number of years. However, conversion of the deduction to a tax credit will enhance the value of the tax benefit to many businesses.[67]

A collaboration of the U.S. Green Building Council, the Natural Resources Defense Council, Johnson Controls, and The Real Estate Roundtable has put forth a number of other suggestions as to how to improve 179D. [68] The report urges the IRS to reduce the complexity of 179D by issuing clear guidance and regulations on computing energy savings; simplify and standardize software models used to develop reference buildings; develop a partial deduction; and develop a specific form for the 179D deduction.[69]

Other recommendations include using a relative measure of efficiency, comparing the pre- and post-retrofit energy usage as measurements for 179D qualification. The Real Estate Roundtable "recommends that the minimum amount of the incentive should correspond to 20 percent total energy savings compared to the building's baseline energy consumption, and the maximum incentive should correspond to 50 percent savings. The amount of the incentive would increase for ever 5 percent increase in energy savings within this range. This will encourage ambitions building upgrades while also rewarding projects that achieve meaningful yet more moderate levels of energy savings."[70]

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[65] See John Cummings, Ask John Cummings, Obama's Better Buildings Initiative – Will 179D Deduction Become a Tax Credit for Energy Efficient Buildings, http://askjohncummings.com/2011/02/ obamas-better-buildings-initiative-will-179D-deduction-become-a-tax-credit-for-energy-efficient-buildings/ (last visited June 22, 2011).
[66] Id.

[67] Christine Grimaldi, BNA Software, Obama Energy Agenda Includes Conversion of Tax Deduction to Credit (Feb. 4, 2011), http://www.bnasoftware.com/News/Tax_News/Articles/ Obama_ Energy_Agenda_Includes_Conversion_of_Tax_Deduction_to_Credit.asp.

[68] See Energy Efficiency in Commercial Buildings: Top Priorities for the Obama Administration Using Existing Authorities (January 21, 2011), http://docs.nrdc.org/smartGrowth/files/sma_11012501a.pdf
[69] Id. at 4-6.
[70] Id.

Other proposed changes to 179D put forward by the Real Estate Roundtable include allowing both owners and tenants to claim a deduction for making energy-efficiency improvements to large spaces within a building; making 179D an optimal benefit to Real Estate Investment Trusts (REITs); and modifying 179D to include incentives to property owners that choose to renovate historic buildings and install "cool roofs" to mitigate "urban heat island effects."[71]

Policy Efforts to Change 179D

President Obama announced his five-pronged Better Buildings Initiative in his 2011 State of the Union Address, which is in part aimed at making changes to 179D.[72] The initiative seeks primarily to convert the current deduction to a credit, which will ideally be funded by eliminating the billions of dollars in taxpayer subsidies that are currently allocated to oil and gas companies.[73] In his speech, President Obama estimated that effective implementation of, and responsiveness to, the overall initiative could save our country's businesses nearly $40 billion per year in utility expenses. Id.

President Obama also included 179D changes in his Fiscal Year 2012 Budget Proposal. The Joint Committee on Taxation report "Description of Revenue Provisions Contained in the President's Fiscal Year 2012 Budget Proposal"[74] includes a summary of the proposal to convert the tax deduction to tax credit:

> The proposal would replace the existing deduction for commercial building property with a tax credit equal to the cost of property that is certified as being installed as part of a plan designed to reduce the total annual energy and power costs with respect to the interior lighting, heating, cooling, ventilation, and hot water systems by 20 percent or more in comparison to a reference building which meets the min percent or more in comparison to a reference building which meets the minimum requirements of ASHRAE/IESNA Standard 90.1-2004, as in effect on the date of enactment.
>
> The credit with respect to a building would be limited to $0.60 per square foot in the case of energy efficient commercial building property designed to reduce the total annual energy and power costs by at least 20 percent but less than 30 percent, to $0.90 per square foot for qualifying property designed to reduce the total annual energy and power costs by at least 30 percent but less than 50 percent, and to $1.80 per

[71] Id.
[72] See President Barack Obama, State of the Union Address (Feb. 3, 2011), available at http://www.whitehouse.gov/the-press-office/2011/01/25/remarks-president-state-union-address.
[73] See id.
[74] Congressional Joint Committee on Taxation, "Description of Revenue Provisions Contained in the President's Fiscal Year 2012 Budget Proposal," June 2011.

> square foot for qualifying property designed to reduce the total annual energy and power costs by 50 percent or more. In addition, the proposal would treat property as meeting the 20-, 30-, and 50-percent energy savings requirement if specified prescriptive standards are satisfied. Prescriptive standards would be based on building types (as specified by Standard 90.1-2004) and climate zones (as specified by Standard 90.1-2004). 139 Sec. 50(d)(1), incorporating sec. 46(e)(1)(B) as in effect on the day before the Revenue Reconciliation Act of 1990.
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> …
>
> Special rules would be provided that would allow the credit to benefit a REIT or its shareholders. The tax credit would be available for property placed in service during calendar year 2012….[and] applies to taxable years beginning after December 31, 2012.[75]

The Future of 179D

The revenue and taxation environment has changed significantly since President Obama announced his Better Buildings Initiative in February 2011, and even since the Joint Committee report in June, 2011. Therefore, it is unclear whether an enhanced tax incentive for energy efficient buildings will come to fruition. The future of 179D is likely to be decided by the "supercommittee" on debt reduction and 2012 budget negotiations.

Other Energy Efficiency Incentive Programs

In addition to the programs summarized above, Pennsylvania and New Jersey have numerous other programs in place at the state and local levels designed to incentive EE. Attached as Appendix A is a chart outlining the details of the currently existing programs, including the Act 129 and SBC-funded programs.

2.2. Utility Rate Cost Recovery and Return on Equity Incentives

Utilities in New Jersey are regulated by the Board of Public Utilities (NJBPU), which is a "regulatory authority with a statutory mandate to ensure safe, adequate, and proper utility services at reasonable rates for customers in New Jersey."[76] Board commissioners are appointed by the Governor to a six year term and must be confirmed by the Senate.[77]

[75] Id. at 80.
[76] *State of New Jersey*, *Board of Public Utilities – About the Board*, http://www.nj.gov/bpu/about/index.html.
[77] *State of New Jersey*, *Board of Public Utilities – Meet the Commissioners*, http://www.nj.gov/bpu/about/commissioners/,

Currently, there are four electric utilities[78] and four gas utilities[79] in New Jersey that act as transmitters and distributors for a number of gas and electric generators throughout the region.[80] The New Jersey counties included in the Greater Philadelphia Innovation Area are served by the following utilities:

County	**Electric Utilities[81]**	**Gas Utilities[82]**
Burlington County	Atlantic City Electric, Jersey Central Power & Light, PSE&G	PSE&G, South Jersey Gas, New Jersey Natural Gas
Camden County	Atlantic City Electric, PSE&G	PSE&G, South Jersey Gas
Gloucester County	Atlantic City Electric, PSE&G	PSE&G, South Jersey Gas
Mercer County	PSE&G, Jersey Central Power & Light	PSE&G
Salem County	Atlantic City Electric	South Jersey Gas

Utilities in Pennsylvania are regulated by the Public Utility Commission, which is granted "general administrative power and authority to supervise and regulate all public utilities doing business within [the] Commonwealth. The Commission may make such regulations, not inconsistent with law, as may be necessary or proper in the exercise of its powers or for the performance of its duties."[83]

There are twelve electric utilities[84] and sixteen gas utilities[85] in Pennsylvania. The Pennsylvania counties included in the Greater Philadelphia Area are served by the following utilities:

County	**Electric Utilities[86]**	**Gas Utilities[87]**

[78] Atlantic City Electric, Jersey Central Power & Light, Orange Rockland Electric; and PSE&G.
[79] Elizabethtown Gas, New Jersey Natural Gas, PSE&G, and South Jersey Gas.
[80] *State of New Jersey*, *Board of Public Utilities – Company Information*, http://www.nj.gov/bpu/assistance/utility/#1.
[81] *Electric Utilities Territory Map*, http://www.njcleanenergy.com/main/public-reports-and-library/links/electric-utilities-territory-map.
[82] *Electric Utilities Territory Map*, http://www.njcleanenergy.com/main/public-reports-and-library/links/electric-utilities-territory-map.
[83] Public Utilities, Title 66, http://www.legis.state.pa.us/WU01/LI/LI/CT/PDF/66/66.PDF (last visited Sept. 9, 2011), at 501(b).
[84] Citizens Electric of Lewisburg, Duquesne Light Company, Metropolitan Edison Company, PECO Energy Company, Pennsylvania Power Company, Pennsylvania Electric Company, Pike County Light & Power Company, PPL Electric Utilities Inc., Schuylkill Haven Borough, UGI Utilities Inc., Wellsboro Electric Company, and West Penn Power (Allegheny Power).
[85] Columbia Gas of Pennsylvania Inc, Equitable Gas Company, National Fuel Gas Distribution Corporation, North East Heat & Light Co., Orwell Natural Gas – Clarion River Gas Division, Orwell Natural Gas – Walker Gas Division, Peoples Natural Gas Company LLC, Peoples TWP LLC, PECO Gas (Exelon Corporation), Philadelphia Gas Works, Pike County Light & Power Company, Sergeant Gas Company, UGI Central Penn Gas, UGI Natural Gas Inc., UGI Utilities Inc., and Valley Energy.

Bucks County	PECO Energy Company, Metropolitan Edison Company, PPL Electric Utilities, Inc.	PECO Gas, UGI Natural Gas, Inc.
Chester County	PECO Energy Company, Metropolitan Edison Company, PPL Electric Utilities, Inc.	PECO Gas, UGI Central Penn Gas
Delaware County	PECO Energy Company	PECO Gas, UGI Natural Gas, Inc.
Montgomery County	PECO Energy Company, Metropolitan Edison Company	PECO Gas, UGI Natural Gas, Inc.

Early on it was recognized that utilities needed to be regulated to ensure that essential services were provided to the general public in a safe and effective manner.[88] Most states, including Pennsylvania and New Jersey, regulate the utilities through a separate state entity. In Pennsylvania, utilities are regulated by the Public Utilities Commission (PUC), and in New Jersey utilities are regulated by the Board of Public Utilities (BPU).

Together, the Federal Energy Regulatory Commission and the state public utility commissions regulate utilities to address issues including revenue requirements, allocating costs among customer classes, designing tariffs that will effectively collect permissible revenues, setting service quality standards and enacting consumer protection mechanisms, reviewing utilities' long-term plans, and arbitrating disputes between customers and utilities.[89]

One of the most important regulatory functions of a state public utility commissions is setting utility rates.[90] Most utilities will file with state public utility commissions every two to five years to propose new rates in what is known as a rate-case.[91] States, in general, have also given their respective utility commissions the power to initiate rate proceedings

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[86] *Pennsylvania Utility Service Territories*, http://www.appenergy.com/resources.lib/items/pa-utility-service-m/file_0.pdf.
[87] *Natural Gas Companies*, Pennsylvania Public Utility Commission, http://www.puc.state.pa.us/naturalgas/naturalgas_companies.aspx (each company must be accessed separately to determine its service area).
[88] *Id*. at 3-4.
[89] *Electricity Regulation In the US: A Guide*, Regulatory Assistance Project (March 2011) 20.
[90] Utility rates are embodied in documents known as tariffs. National Action Plan for Energy Efficiency (2009), *Customer Incentives for Energy Efficiency Through Electric and Natural Gas Design*. Prepared by William Prindle, ICF International, Inc. http://www.epa.gov/cleanenergy/documents/suca/rate_design.pdf at 1.
[91] A number of automatic adjustment clauses, based upon public utility commission-approved mathematical formulas, may be permitted by a utility commission to adjust for fluctuating costs that are beyond the control of the utility, such as the price of fuel. *See* 66 Pa.C.S.A. §1307(c), Fuel cost adjustment, which will automatically adjust utility rates to account for increases or decreases in fuel prices. These automatic rate adjustments are distinct from the ratemaking procedure used by utilities to make adjustments to the overall rate structure.

in the interests of consumers.[92] Once approved, the new terms and prices are published in a tariff.[93][94]

In setting rates, utility commissions balance several public policy considerations. Of primary importance is the delivery of safe and reliable utility services. In addition, by law, utility rates must ensure that consumers pay fair and equitable rates and that utilities can recover costs prudently expended in delivering utility services and have a fair opportunity to earn a reasonable rate of return on their capital investments.[95]

Utility rates are calculated based on a utility's rate base, its allowed rate of return, and its operating expenses. Together these determine the revenue requirement. The "rate base" is the total of all long-lived investments made by the utility to serve consumers, net of accumulated depreciation. It includes buildings, power plants, fleet vehicles, office furniture, poles, wires, transformers, pipes, computers, computer software and similar investments. Utilities are allowed to earn a regulated annual rate of return on their rate base. In addition, a utility recovers its operating expenses, including labor, fuel, taxes, and other related costs, as part of the rates.[96]

If utilities cannot recover the costs of EE programs from ratepayers, the utilities will not make investments in EE programs. In addition, if utilities cannot earn a rate of return on EE investments in the same way they earn a rate of return on other capital investments, utilities will be financially motivated to prefer investments in infrastructure.

In addition, under a traditional ratemaking scenario a utility earns additional revenue by selling more units of electricity or natural gas.

> "Because the utility's return is embedded in the rate per unit for electricity (or gas), each incremental sale brings incremental profit, and each lost sale costs the utility net income…in the short run, between rate-cases, the only significant changes in utility costs as sales go up or down is the variable cost of producing or purchasing more or less power. Because incremental sales produce revenue that usually exceeds incremental expenses in the short run, a utility has a strong motive to increase its throughput. If sales go up, the existing investment in power plants and power lines is spread

[92] *Electricity Regulation In the US: A Guide*, Regulatory Assistance Project (March 2011) at 31.
[93] Tariffs are defined as "All schedules of rates, all rules, regulations, practices, or contracts involving any rate or rates, including contracts for interchange of service, and, in the case of a common carrier, schedules showing the method of distribution of the facilities of such common carrier." Public Utilities, Title 66, http://www.legis.state.pa.us/WU01/LI/LI/CT/PDF/66/66.PDF, at 27.
[94] *Electricity Regulation In the US: A Guide*, Regulatory Assistance Project (March 2011) at 31.
[95] *Id*, at 38. A full discussion of what constitutes a "reasonable opportunity" and a "fair rate" is beyond the scope of this paper.
[96] *Id*.

> over a larger number of units, so the utility is getting more revenue out of them."[97]

Because utilities are generally incentivized to sell more units of energy, utilities are correspondingly disincentivized from putting in place programs, like EE programs, which decrease energy consumption.

There are several mechanisms which have been suggested to address the utility barriers to investment in EE. Utilities can be allowed to cover the costs associated with their EE programs from ratepayers. Utilities can be compensated according to a rate structure that "decouples" recovery of fixed costs from recovery of variable costs, like fuel. Utilities can recover the "lost revenue" attributable to decreased demand from EE.

New Jersey and Pennsylvania have put in place different variations on utility rate incentives for EE.

In New Jersey, utilities can recover the costs of their EE programs from ratepayers, earn a return on equity for the EE investments, and petition the BPU for decoupled rate structure. "All electric public utility and gas public utility investment in energy efficiency and conservation programs or Class I renewable energy programs[98] may be eligible for rate treatment approved by the NJBPU, including a return on equity, or other incentives or rate mechanisms that decouple utility revenue from sales of electricity and gas."[99]

In 2005, New Jersey Natural Gas and South Jersey Gas filed a joint decoupling proposal with NJBPU.[100] The BPU granted the decoupling request, but only partial decoupling. In order to offset the cost to ratepayers attributable to allowing utilities to earn a rate of return regardless of consumption, the utilities had to agree to shed capacity equal to the reduction in demand. To the extent that the utilities reach a point where they can no longer shed capacity, the partially decoupled rate structure may not be feasible.

The combination of incentives and the allowed use of decoupling in New Jersey should, in theory, remove most of the barriers to utility participation in energy efficiency programs. However, although New Jersey allows for decoupling, to date only two natural gas utilities and no electric utilities have petitioned for decoupling. Additional policy efforts around alternative utility ratemaking may still be needed to realize the full benefits of rate-based EE incentives.

Pennsylvania has fewer utility rate based EE incentives in place. The guidelines for cost recovery by utilities in Pennsylvania are set forth in §1307 of the Pennsylvania

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[97] *Electricity Regulation In the US: A Guide*, Regulatory Assistance Project (March 2011) at 85.
[98] "Class I renewable energy program" is defined as "any regulated program approved by the board pursuant to this section for the purpose of facilitating the development of Class I renewable energy in the State." N.J.S.A. 48:3-98.1(d).
[99] N.J.S.A. 48:3-98.1(b).
[100] *Revenue Decoupling for Natural Gas Utilities*, The National Regulatory Research Institute (April 2006), Ken Costello, http://www.nrri.org/pubs/gas/06-06.pdf at 4.

Code.[101] §1307 states that in general, utilities "…may establish a sliding scale of rates or such other method for the automatic adjustment of the rates of the public utility as shall provide a just and reasonable return on the rate base of such public utility, to be determined upon such equitable or reasonable basis as shall provide a fair return."[102] This is the general tool used by utilities to set their base rates. Utilities may try to recover expenditures not addressed under §1307 by applying for additional rate tariffs through a voluntary change in rates.[103]

To encourage greater energy efficiency in the state, the legislature passed, and Governor Rendell signed Act 129.[104] Act 129 provides that utilities may recover the general costs of creating, implementing, and administering EE programs through a sliding scale of rates under §1307 of the public utility code.[105] Pursuant to Act 129, recovery of decreased revenues due to reduced energy consumption or demand under a reconcilable automatic adjustment clause is prohibited."[106]

However, when applying to the Public Utility Commission (PUC) for a voluntary change in rates, a reduction in consumption and demand can play a role in a utility's formulation of distribution[107] rates.[108] There have been a limited number of requests for rate adjustments since October 2009 when the PUC's began to approve utilities' Energy Efficiency and Conservation (EE&C) programs. [109]

Duquesne Light Company, PPL Electric, and PECO are among the utilities that applied to the PUC for a rate adjustment since Act 129 took effect.[110] In their respective

[101] 66 Pa.C.S.A. §1307.
[102] Public Utility Code §1307 (a).
[103] Public Utility Code §1308.
[104] *Act 129 Information*, Pennsylvania Public Utility Commission, http://www.puc.state.pa.us/electric/Act_129_info.aspx.
[105] §2806.1(k)(1) – "An electric distribution company shall recover on a full and current basis from customers, through a reconcilable adjustment clause under section 1307, all reasonable and prudent costs incurred in the provision or management of a plan provided under this section. This paragraph shall apply to all electric distribution companies subject to generation or other rate caps."
[106] 2806.1(k)(2) – "Except as set forth in paragraph (3), decreased revenues of an electric distribution company due to reduced energy consumption or changes in energy demand shall not be a recoverable cost under a reconcilable automatic adjustment clause." Pennsylvania's reconcilable automatic adjustment clause, found in §1307, controls the use of a rate scale, developed using a mathematical formula to adjust utility rates based upon certain costs which can frequently change (i.e. costs for fuel and recovery of natural gas). If a utility wishes to recover costs for expenditures not provided for under §1307, it must do so using a separate rider to the general tariff. As a general rule, according to §1307 an automatic sliding scale of rates can be established to provide for a "just and reasonable return."
[107] Distribution-base rates essentially cover the cost of transporting energy from the utility to consumers. Pa PUC Approves "Distribution" Hikes for PECO - http://philadelphia.cbslocal.com/2010/12/16/pa-puc-approves-distribution-hikes-for-peco/.
[108] Public Utility Code §1308, Voluntary changes in rates, http://law.justia.com/codes/pennsylvania/2010/title-66/chapter-13/1308/.
[109] PUC Press Releases, http://www.puc.state.pa.us/General/press_releases/Press_Releases.aspx?ShowUtil=EL.
[110] *Id*.

Statements of Reason for requesting a rate adjustment, none of these companies explicitly cited a reduction in revenues stemming from EE programs as a reason to increase their electric rates.[111] In general, each utility cited increased costs, past and continuing investments, and the need to maintain financial stability as the reasons for increasing rates.[112]

In the supporting documentation the utilities provided the PUC during the rate adjustment proceedings, neither Duquesne nor PPL stated that they were considering reduced revenues due to EE into account in their request for a rate increase. PECO, however, used the anticipated reduction in revenue due to EE programs in its formulation of the required revenue to calculate its requested distribution rate.[113] PECO proposed "a pro forma revenue adjustment to its FTY [future test year ending December 31, 2010] budget of $31.5 million which will allow the Company [PECO] to recover its lost revenue for the period 2010 to 2012….[114] This adjustment would allow PECO to recoup at least a portion of its lost revenue stemming from the implementation of EE programs between 2010 and 2012.[115]

In its settlement with PECO, the PUC approved new tariff rates designed to produce an annual distribution revenue increase of $198.3 million (PECO had originally requested $289.7 million) and an annual transmission revenue increase of $26.7 million (PECO had originally requested $26.7 million).[116] However, in its Opinion and order,[117] the PUC did not specifically address PECO's assertion that its rates should be adjusted due to reduced demand caused by EE programs. PECO projects that through implementation of the EE&C program, they will derive a net benefit of $523 million.[118]

However, there is currently no explicit incentive in Pennsylvania's current rate structure for IOUs to encourage energy efficiency programs beyond the conclusion of their

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[111] *Duquesne Light Company Statement of Reasons* - http://www.puc.state.pa.us//pcdocs/1087916.pdf; *PPL Electric Utilities Corporation Statement of Reasons for the Proposed Increase* - http://www.puc.state.pa.us//pcdocs/1073864.pdf; *Statement of Reasons for PECO Energy Company's Request to Increase Electric Rates* - http://www.puc.state.pa.us//pcdocs/1073160.pdf.

[112] *See Plain Language, Statement of Reasons for PECO Energy Company's Request to Increase Electric Rates*, http://www.peco.com/NR/rdonlyres/A0E991AD-09AD-4F44-B78C-0D67FD6A2E67/8238/04PlainLanguageSOR.pdf.

[113] *Testimony of Robert O' Brien, Preventing PECO's Overall Revenue Requirement and Supporting Certain Ratemaking Adjustments*, Pennsylvania Utility Commission, (March 31, 2010), http://www.peco.com/NR/rdonlyres/A0E991AD-09AD-4F44-B78C-0D67FD6A2E67/8198/14PECOStatement3OBrien.pdf, at 32.

[114] *Id*. at 33. O'Brien testified that it was his understanding "that Act 129 specifically contemplates that revenue reductions attributable to the mandated energy efficiency programs be taken into account in establishing base rates."

[115] *Id*.

[116] *Public Meeting held December 16, 2010, Opinion and Order*, Pennsylvania Public Utility Commission, http://www.puc.state.pa.us//pcdocs/1116058.docx, at 8.

[117] *Order re: Pennsylvania Public Utility Commission v. PECO Energy Company (Docket No. R-2010-2161592)*, Pennsylvania Public Utility Commission (May 20, 2010), http://www.puc.state.pa.us//pcdocs/1079164.docx.

[118] *Testimony of Frank Jiruska, PECO's Energy Efficiency and Conservation Plan*, Pennsylvania Utility Commission (March 31, 2010), http://www.peco.com/NR/rdonlyres/A0E991AD-09AD-4F44-B78C-0D67FD6A2E67/8140/27PECOStatementNo7Jiruska.pdf, at 6.

EE&C Programs or at a cost that will exceed the amount recoverable under Act 129. The clear stance against revenue recovery, exhibited in the legislature's decision to deny utilities a mechanism to recover costs caused by decreased revenues as a result of reduced energy consumption or demand, may act as a barrier to utilities unilaterally exceeding their Act 129 requirements. A working group of the PUC reached a similar conclusion earlier this year when it evaluated Pennsylvania's energy efficiency and conservation programs in light of the American Recovery and Reinvestment Act.[119]

Recommendations

Together, Pennsylvania and New Jersey have implemented many of the utility-based policy recommendations that have been identified in prior research. Thus, the differences in the ratepayer based incentive and utility compensation structures in Pennsylvania and New Jersey provide a unique opportunity to compare their relative EE benefits. **The primary recommendation of this study is to conduct legal and market research to compare the effectiveness of the New Jersey and Pennsylvania regulatory initiatives designed to address the efficiency gap, including the incentive and ratemaking efforts.**

In addition, the effectiveness of the SBC-funded EE programs have not been evaluated since 2008, GPIC could contribute to the policy discussion currently underway in New Jersey regarding the best way to fund and deliver EE programs by providing data and analysis of the commercial and industrial programs funded by the SBC.

Finally, neither Pennsylvania nor New Jersey has implemented all of the rate-making mechanisms designed to reduce utility disincentives to EE. GPIC could contribute to policy efforts and analysis to determine whether such ratemaking efforts are feasible, educate policymakers and participate in crafting the necessary documents to implement new rate structures as appropriate.

2.3. Alternative Financing Mechanisms

Businesses often face three primary challenges when deciding to invest in energy efficient technology. Two are associated with the costs involved in undertaking EE investments and the third has to do with the competing priorities that pull at the attention of every business owner and manager.[120]

First, businesses can find it challenging to accumulate the necessary up-front capital to make large investments from internal funds. According to the McKinsey study, in order to achieve the $104 billion in savings from EE, building owners would have to make an up-

[119] *American Recovery and Reinvestment Act Investigation I-2009-2099881, Working Group Final Report*, Pennsylvania Public Utility Commission (January 24, 2011), http://www.puc.state.pa.us/general/RegulatoryInfo/pdf/ARRA_WG-Final_Report.pdf at 1-2.
[120] ConoverBrown LLC, On-Bill Financing, Helping Small Business Reduce Emissions and Energy Use While Improving Profitability (Sept. 2009), http://www.nsba.biz/docs/09OBFNSBA.pdf (last visited Sept. 13, 2011) at iii.

front investment of $73 billion.[121] The Empire State Building, which is currently going through energy efficiency renovations, will have to invest almost $107 million for $4.4 million in annual savings.[122]

If businesses cannot finance EE investments from internal capital, businesses face a second challenge—finding third party financing.[123] It is often difficult to obtain financing for EE projects from traditional capital sources.[124]

Even if a business has the financial resources to make an investment in its energy efficiency, a third challenge arises. Owners and managers often face so many competing priorities, financial and otherwise, that EE investments often fall short of other competing concerns, such as payroll, managing their supply chain and inventory levels, other capital investments and overseeing day-to-day operations.[125]

To address the financing obstacles, a few different alternative financing mechanisms have been developed. On-bill financing and Property Assessed Clean Energy (PACE) programs are two alternative financing methods that require laws or regulations to implement.

On-Bill Financing

On-Bill Financing (OBF) is a tool that can be used by utilities or other entities to provide business owners with a loan for the upfront cost of EE investments, often at a below-market interest rate, sometimes as low as 0%.[126] Monthly payments are calculated so that the required amount each month is slightly less than the amount of money saved through lower energy costs.[127] The loan is paid back as a line item on the customer's utility bill.

A typical OBF program works as follows:[128]

Owner A (A) wishes to make investments in energy efficient technologies at his chain of three local grocery stores. He estimates that the total cost of installing energy efficient refrigeration units and solar panels at each of his three stores will cost $15,000 per store, or $45,000 total. He has also hired a consultant who advised him that the new equipment would save him an average of $1,250 a month on his electricity bills, making the

[121] *Id*. at 58.
[122] Empire State Building Case Study PowerPoint Presentation, slide 39 *available at* http://www.esbnyc.com/sustainability_reports_resources.asp.
[123] *Id*.
[124] Department of Energy, Office of Energy Efficiency and Renewable Energy, Clean Energy Finance Guide, *www1.eere.energy.gov/wip/.../revfinal_v3ch14smallcommercialdec9.pdf (last visited Sept. 17, 2011).*
[125] *Id*.
[126] Small Business California, On Bill Financing, An Energy Saving Access to Capital Solution for California Small Businesses/Municipalities/Water Users (Sept. 2006), http://www.smallbusinesscalifornia.org/SB-Cal%20On%20Bill%20Financing%20Presentation.ppt#256,1,On Bill Financing (last visited Sept. 13, 2011) at 4.
[127] Small Business California, *supra* note 4, at 6-8.
[128] This hypothetical does not reflect real costs. However, it functions as a typical OBF would in operation.

pay-back period for the investments three years. Although A would like to purchase and install this new equipment, he believes that his margins are too tight at the moment to make any large capital investments.

In response to a growing demand from businesses owners such as A who wish to install energy efficient equipment but lack the capital to do so, XYZ Utility Company (XYZ) decides to launch a new on-bill financing program. XYZ receives $2 million in state and Federal funding and secures an additional $2 million from private lenders. XYZ then commits to provide qualifying customers who take advantage of its OBF program with up to $50,000 at 0% financing for up to ten years. XYZ will pay all associated costs of the program through a tariff to ratepayers.

When A hears about the OBF program, he applies and is approved for a $45,000 loan. XYZ then hires and pays a contractor who installs the necessary equipment. XYZ agrees with A's assessment that the savings realized by the new energy efficient equipment would amount to $1,250 per month. After the installation of the equipment, a new energy service charge appears on A's monthly utility bill for $1,200 per month, allowing A to fully pay back XYZ for the equipment and installation over thirty eight months. During that time, A will still realize a fifty dollar per month decrease in his average utility bill and after the equipment is fully paid back, he will benefit from the full savings of $15,000 per year.

However, there are obstacles to implementing a successful OBF program. Due to budget constraints at the Federal and state level, as well as a diminishing availability of credit in private markets and capital from private investors, it may be challenging for a funding entity to raise the necessary capital to maintain an OBF program.[129] Extending credit to businesses also comes with a certain amount of default and credit risk. It could be difficult to raise capital without clearly defining that will bear the bulk of those risks, and there are also concerns related to utilities acting as lending entities.[130] (Similar concerns exist regarding PACE financing, which is discussed elsewhere in this paper.)

In addition, legislation or regulation is often required for OBF.

Currently, Pennsylvania does not offer any OBF programs. Two of New Jersey's utility efficiency programs offer OBF. Public Service Electric & Gas' (PSE&G's) Small Business Direct offers customers a free energy audit.[131] If a customer chooses to implement any of the recommended energy efficiency measures, PSE&G will fully cover the costs of the equipment and installation. Customers will are responsible for paying 20% of the total costs over two years as additional charges added to their monthly bill.[132] The second OBF program in New Jersey is operated by New Jersey Natural Gas (NJNG). The SAVEGREEN On-Bill Financing Program allows qualified customers to borrow up to

[129] *Id*. at iv.
[130] *Id*.
[131] PSE&G, *PSE&G Direct Install Program for Small Business*, http://www.pseg.com/business/small_large_business/save_energy/efficiency.jsp (last visited Sept. 13, 2011).
[132] *Id*.

$10,000 at a 0% APR fixed rate for up to ten years with no additional costs.[133] Customers may also borrow up to $5,000, repayable over five years, for the installation of a high-efficiency furnace or boiler.[134]

PACE

Property Assessed Clean Energy (PACE) programs are local government programs designed to increase property owner investment in energy efficiency and renewable energy. PACE programs allow local governments to provide financing to property owners who wish to make energy efficiency or clean energy improvements to their property. These loans are then paid back as an additional line item on the owner's property taxes.

Like OBF, PACE loans are designed to address the upfront cost and lack of financing obstacles to EE. PACE programs remove two important obstacles to owner investment in energy efficiency. In addition, PACE addresses another obstacle to investment in energy efficiency property improvements--the uncertainty that the original investor will realize the long-term savings of the energy efficiency improvements given the amount time required to recoup the investment.

By achieving repayment as an additional line item on the property tax associated with the building, upon sale, both the benefits associated with the energy efficiency improvements and the burden of repaying the PACE loan are transferred to the new building owner. Ideally, the new owner will pay a premium for an energy efficient building, allowing the original investor to recoup the money already paid for the EE improvements.

PACE requires enabling legislation at the state level, and local government authorization and financing. Enabling legislation at the state level authorizes local governments to assess additional property taxes on individual properties based on participation in the PACE program. PACE enabling legislation has been quickly adopted across the country. Since the first state bills were adopted in California[135] and Colorado[136] in 2008, PACE enabling laws have expanded to 25 states and the District of Columbia.[137]

Local governments need some way of providing the initial capital required for commercial PACE projects, generally by issuing bonds. The authority to issue bonds generally comes from the state in PACE enabling legislation. Boulder, Colorado has issued bonds backed by moral obligation[138] from the County. Sonoma and Placer Counties in

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[133] DSIRE, *New Jersey Natural Gas – SAVEGREEN On-Bill Financing Program*, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NJ43F&re=1&ee=1 (last visited Sept. 13, 2011).
[134] *Id*.
[135] *See* A.B. 811, 2008 Reg. Session. (Cal. 2008).
[136] *See* H.B. 08-1350, 2008 Reg. Session, (Co. 2008).
[137] *PACE Financing Map*, Database of State Incentives for Renewables & Efficiency, http://www.dsireusa.org/summarymaps/index.cfm?ee=1&RE=1; (then follow "PACE Financing" hyperlink), (Last visited June 27, 2011) (PACE programs are also authorized under existing Hawaii law).
[138] *PACE Financing Map*, Database of State Incentives for Renewables & Efficiency, http://www.dsireusa.org/summarymaps/index.cfm?ee=1&RE=1; (then follow "PACE Financing" hyperlink), (Last visited June 27, 2011) (PACE programs are also authorized under existing Hawaii law) at 5.

California have relied on the County treasury for initial funding, although Sonoma County is exploring other options.[139] PACE programs currently in development in Los Angeles, California and Cleveland, Ohio plan to use Federal American Recovery and Reinvestment Act (ARRA) funds to fund their initiatives.[140]

Whatever the source of funds, PACE programs must contain an initial loan and tax assessment payback mechanism. Enabling legislation must also authorize local governments to assess additional property taxes on individual properties based on participation in the programs. Often the legislation will give local governments the ability to create special assessment districts wherein participating properties can be taxed individually.[141] Other legislation more directly authorizes such assessments upon consent of the owner.[142] Finally, authorizing legislation will also define what types of improvements local governments are allowed to fund, and may set procedures by which local governments approve projects.

Enthusiasm for PACE programs has somewhat stalled because of concerns raised by mortgage lenders and concerns over financing for local governments. While a typical home equity loan would have priority inferior to any mortgage outstanding on a property, municipal liens get senior priority above that of the property's mortgage. As a result, in the event of a foreclosure, the local government will be repaid first out of available funds, and mortgage lenders will have to take what is left over. Although PACE loans are typically for a small fraction of the value of the property,[143] mortgage lenders have expressed serious concerns about taking an inferior status.

These mortgage concerns came to a head in the spring and summer of 2010. On May 5, the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) each issued letters stating that homeowners participating PACE programs with loans secured with liens with priority over mortgages violated the Fannie Mae/Freddie Mac Uniform Security Instruments.[144] In July, both the Federal Housing Finance Agency (FHFA) and the Office of the Comptroller of the Currency (OCC) issued statements raising serious concerns about PACE financing for both residential and commercial PACE programs.[145]

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[139] *Id.* at 4.
[140] *Id.* at 7.
[141] *See*, *e.g.* H.B. 1388, 151st Gen. Assemb., (Ga. 2010); S.B. 224, 2009 Reg. Session, (La. 2009); H.B. 2695, 86th Leg., (Minn. 2010).
[142] *See*, *e.g.* H.B. 1937, 81st Leg., (Tex. 2009).
[143] In Boulder, for example, more than 90% of commercial property assessments were for less than 10% of the value of the property, and the one project with an assessment significantly exceeding 10% of the property value was on a property without a mortgage. *See Policy Brief: Property Assessed Clean Energy (PACE) Financing: Update on Commercial Programs*, Lawrence Berkeley National Laboratory, March 2011, page 5, *available at* http://eetd.lbl.gov/EA/EMS/reports/pace-pb-032311.pdf.
[144] *See* Lender Letter LL-2010-06, Senior Vice President Marianne Sullivan, May 5, 2010, available at https://www.efanniemae.com/sf/guides/ssg/annltrs/pdf/2010/ll1006.pdf; Industry Letter, Freddie Mac, Vice President Patricia McClung, May 5 2010, available at http://www.freddiemac.com/sell/guide/bulletins/pdf/iltr050510.pdf.
[145] *See* Federal Housing Finance Authority, FHFA Statement on Certain Energy Retrofit Loan Programs, July 6 2010, available at http://www.fhfa.gov/webfiles/15884/PACESTMT7610.pdf

The OCC's Supervisory Guidance stated that "PACE or PACE-like (PACE) programs use the municipal tax assessment process to ensure repayment. Under most of these programs, such loans acquire priority lien, thereby moving the funds advanced for energy improvements ahead of existing first and subordinate mortgage leans. This lien infringement raises significant safety and soundness concerns that mortgage lenders and investors must consider."[146] The agency expressed its support for commercial and residential energy lending, but concluded by stating that programs that do not comply with existing lien preferences, prudent underwriting principles, and appropriate consumer protections, would "pose significant regulatory and safety and soundness concerns."[147]

The July FHFA statement has all but shut down residential PACE programs. The agency found that liens with priority of mortgage liens violated lending guidelines, and required Fannie Mae and Freddie Mac to stop accepting mortgages on homes with PACE financing into their mortgage securities.[148]

Lawsuits were filed by the state of California and local governments in New York and Florida regarding this action by the FHFA at the end of 2010.[149] These lawsuits argue that the FHFA violated the National Environmental Policy Act (NEPA) by failing to complete an environmental assessment when making policy that significantly affected the environment, that the FHFA did not undergo the proper rulemaking process as required by the Administrative Procedures Act, and that the FHFA's decision is an overextension by the FHFA into state and local domains.[150] As of June 27, 2011 only the lawsuit in New York has been resolved. The case was dismissed for lack of jurisdiction and standing. The decision has not yet been appealed.[151]

Though the mortgage concerns primarily affect residential, rather than commercial PACE programs, these unresolved issues have significantly slowed these initially fast-expanding policies. Commercial PACE programs are not directly affected by home mortgage institutions like Fannie Mae and Freddie Mac. However, on the same day that the FHFA issued its letter, the OCC issued its own statement specifically mentioning concerns about commercial PACE programs, noting that priority municipal liens raise "significant safety and soundness concerns that mortgage lenders and investors must consider."[152]

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[146] *Supervisory Guidance re: Property Assessed Clean Energy Programs (PACE)*, Office of the Comptroller of the Currency (July 6, 2010), http://www.occ.treas.gov/news-issuances/bulletins/2010/bulletin-2010-25.html.
[147] *Id*.
[148] *Id*.
[149] *See* First Amended Complaint for Declaratory and Equitable Relief, *California v. FHFA*, No. 4:10-cv-03084-CW (N.D.Ca. Sept. 15, 2010) available at http://pacenow.org/blog/wp-content/uploads/09-15-2010-CA-vs-FHFA-PACE-Lawsuit.pdf; Complaint for Declaratory and Injunctive Relief, *Leon Cnty., Fl. v. FHFA*, No. 4:10-cv-00436-RH (N.D.Fl. Oct. 8, 2010) available at http://pacenow.org/blog/wp-content/uploads/Leon-County-Complaint.pdf; Complaint, *Town of Babylon v. FHFA*, No. 10-04916 (E.D.N.Y. Oct. 26, 2010) available at http://pacenow.org/blog/wp-content/uploads/Babylon-v-FHFA-complaint-final_10-26-10.pdf
[150] *Id*.
[151] Memorandum and Order, *Town of Babylon v. FHFA*, No. 10-04916 (E.D.N.Y. June 13, 2011) (finding lack of jurisdiction against the FHFA, Fannie Mae and Freddie Mac and lack of standing against the OCC because the OCC letter was merely advisory and Babylon could not show that it had been harmed by the OCC rather than lenders).
[152] Office of the Comptroller of the Currency, Supervisory Guidance Letter to the CEOs of All National Banks, July 6, 2010, *available at* http://www.occ.treas.gov/news-issuances/bulletins/2010/bulletin-2010-25.html.

The OCC letter instructs lenders to take steps to mitigate exposure to risk and protect collateral positions, possibly by securing additional collateral.[153] The OCC's statement is somewhat ambiguous, as it could be interpreted to mean that lenders should collect additional collateral for those individual properties with senior liens, or it could mean that lenders increase lending standards throughout the communities with commercial PACE programs.[154] After Virginia passed PACE authorizing legislation, Arlington, Virginia stated that for PACE financing to work, "realtors, mortgage lenders, and mortgage underwriters would need to be comfortable with its application in the housing market.[155] Additionally, the County suggested that for PACE to be successful, it would need to be operated on a large scale and it would take leadership from the states to move the program forward.[156]

Litigation against the FHFA is unlikely to directly impact commercial PACE programs because the FHFA's ruling only directly affects home mortgages. However, to the extent that rulings favorable to the FHFA limit the proliferation of PACE programs generally, the results of suits against the FHFA may have indirect consequences for commercial litigation. While the Sonoma County Energy Independence Program and the City of Palm Desert Energy Independence Program are still in operation; the PACE programs in Placer County, California and Boulder County, Colorado have been suspended, citing issues with the FHFA, Fannie Mae, and Freddie Mac.[157]

Currently, despite the rapid enactment of PACE enabling legislation across the country, only eight local governments currently have or have had actual PACE programs in operation.[158] Of these, only four offer financing to commercial, rather than residential, property owners.[159]

PACE in Pennsylvania and New Jersey

Although there are no current PACE programs in Pennsylvania or New Jersey, both have bills currently pending to enable PACE programs.

On June 20, 2011, Rep. John Galloway (D-Bucks) introduced legislation to the Pennsylvania House Committee on Environmental Resources and Energy that would allow

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[153] *Id.*
[154] *See* Clean Energy Financing Policy Brief, August 11, 2010 PACE Status Update by Mark Zimring, et. Al. Lawrence Berkeley National Laboratory.
[155] Arlington Virginia Memorandum on PACE Financing, http://www.arlingtonva.us/departments/DES-CEP/CommunityEnergyPlan/Project%20Documents/page78427.aspx (follow hyperlink for "PACE Financing").
[156] *Id.*
[157] *See* http://www.sonomacountyenergy.org/. ; http://www.cityofpalmdesert.org/Index.aspx?page=484; http://pacenow.org/blog/wp-content/uploads/LBL-RF-PACE-Commercial-Policy-Brief.pdf; and http://climatesmartloanprogram.org/.
[158] *Incentives/Policies for Renewables & Efficiency*, Database of State Incentives for Renewables & Efficiency, http://dsireusa.org/incentives/index.cfm?EE=1&RE=1&SPV=0&ST=0&searchtype=PTFAuth&sh=1, (last visited June 27, 2011).
[159] *Policy Brief: Property Assessed Clean Energy (PACE) Financing: Update on Commercial Programs*, Lawrence Berkeley National Laboratory, March 2011, *available at* http://eetd.lbl.gov/EA/EMS/reports/pace-pb-032311.pdf.

municipalities to provide low-interest PACE loans to residential and commercial property owners to finance energy efficiency upgrades.[160] The energy efficiency improvements would be financed through a voluntary property assessment that would be repaid as part of the property tax bill.[161]

The legislation, known as the Property Assessed Clean Energy Program Act (the Act), states that financing cleaning energy improvements serves a public purpose as energy efficiency "will continue to play a central role in the future of [the] Commonwealth and the nation as a whole."[162] The Act attempts to achieve seven goals:[163]

1) Provide capital at the lowest possible cost for the purposes of supporting conservation, implement energy efficiency and water efficiency improvements, make wet weather infrastructure improvements, and create renewable energy projects for residential and commercial structures;

2) Expand and simplify the process of obtaining financing for small-scale local energy projects;

3) Leverage private and public capital through a unified funding mechanism;

4) Provide technical and financing information to the public and businesses;

5) Increase energy savings;

6) Stimulate job growth; and,

7) Reduce carbon emissions.

Under the authority of the PACE legislation, municipalities and municipal authorities (municipalities) would have the power to create a PACE financing program, available to homeowners and commercial property owners within the municipality, through the passage of a local ordinance or resolution.[164] Financing of PACE programs could be provided through debt or municipalities could utilize other resources, such as general funding.[165] Residential property owners would be able to use PACE financing for energy efficiency improvements, water efficiency improvements, wet weather infrastructure improvements, and renewable energy projects.[166] Commercial property

[160] PA Environment Digest, *Bill Authorizes Low Interest Loans for Energy Improvements* (June 20, 2011), http://www.paenvironmentdigest.com/newsletter/default.asp?NewsletterArticleID=19436&SubjectID (last visited August 18, 2011)
[161] *Id*.
[162] Pa. H.B. 1667, Property Assessed Clean Energy Program Act, *available at* http://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?syear=2011&sind=0&body=H&type=B&BN=1667 (last visited August 18, 2011).
[163] *Id*.
[164] *Id*.
[165] *Id*.
[166] *Id*.

owners could utilize PACE financing for similar improvements, but financing for renewable energy projects would be limited to those under one hundred kilowatts.

To recover the costs of implementing a PACE program, the Act allows municipalities to assess properties and impose a lien that would include the principal spent on energy efficiency improvements, a reasonable rate of interest, and an amount to recover administrative costs.[167] All parties would be required to agree to the assessment in writing, and then the loan could then be repaid to the municipality as an addition the property owner's property tax bill.[168]

New Jersey has bills pending in both its state Senate[169] and General Assembly.[170] The Senate bill has passed through the Committee on the Environment and Energy and is currently before the Senate Committee on Budget and Appropriations. The Assembly Bill is still before the Telecommunications and Utilities Committee.

A2502 would establish the New Jersey Property Assessment Clean Energy (NJPACE) Municipal Financing Program. The program is intended to "provide financing for municipalities that wish to facilitate the purchase of renewable energy systems or energy efficiency improvements by individual property owners or by groups of property owners who wish to participate jointly in a community renewable energy project."

NJPACE would be established by the New Jersey Economic Development Authority (NJEDA) in consultation with the New Jersey Board of Public Utilities (NJBPU). NJEDA would be responsible for establishing the low-cost sources of financing, such as bonds and private investments that would provide funding for the program. NJEDA and NJBPU would work together to promulgate any necessary rules for the administration of the program.

While the bill instructs NJEDA to coordinate its efforts with NJBPU to ensure that the financing provided is in accordance with "limits set from time to time" by NJBPU and to ensure that NJPACE "furthers the goals of the Office of Clean Energy," it is unclear which agency would actually appoint the administrator/director of the program. The bill itself provides that NJEDA would appoint an administrator of the program, in consultation with NJBPU. However, an attached Statement to the bill states that "the bill requires the BPU to appoint a manager to manage all of the logistics of the "NJ PACE Municipal Financing Program." This conflict is not resolved anywhere in the bill.

NJPACE grants municipalities the authority to adopt an ordinance to establish a financing program that would facilitate the purchase of solar energy systems. R.S. 40:56-1 (governing local improvements by municipalities) would also be amended to allow municipalities to finance, contract for, and install renewable energy systems and energy

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[167] *Id*.
[168] Pa. H.B. 1667, Property Assessed Clean Energy Program Act, *available at* http://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?syear=2011&sind=0&body=H&type=B&BN=1667 (last visited August 18, 2011).
[169] *See* S.B. 1406, 214th Leg. (N.J. 2010).
[170] *See* A.B. 2502, 214th Leg. (N.J. 2010).

efficiency improvements that are approved by NJBPU, for both private and community projects.

Once a municipality chooses to finance a program and it receives approval from NJBPU, financing will be provided by NJEDA. If the project involves a solar installation, homeowners will also receive a solar renewable energy credit (SREC) through the NJBPU. The loans will be secured through a special assessment on the homeowner's property, or in the case of a community project, on a special assessment on all participating homeowners' property in proportion to the benefits they receive.

Payments to the municipality by homeowners would be due quarterly. The interest rate on the borrowed funds would be jointly determined by NJEDA and NJBPU. Additionally, any funds received by the homeowner in compensation for their SREC would be assigned to the municipality to repay a portion of the borrowed funds. The municipality, in turn, would assign the SREC and the quarterly payments to NJEDA, who then use that funding to repay bondholders and investors. The bill's attached statement also provides that funding may be used "to provide financial incentives to municipalities to participate," in NJPACE.

The Senate PACE bill, S1406, is substantially similar to A2502. However, in addition to the NJPACE program description contained in the Assembly legislation, S1406 directs the NJEDA to establish a special revolving fund to be known as the "Renewable Energy and Energy Efficiency Loan Fund," which will take in any public or private funding directed towards NJPACE, and be a source of financing for municipalities who choose to finance projects under NJPACE. The bill also authorizes NJEDA to set the terms of any financing agreements between the property owner and the municipality, the municipality's obligations to NJEDA, repayment procedures, "and any other conditions the authority deems necessary."

Recommendations

Alternative financing mechanisms are designed to address financial barriers to EE investments. Prior research varies regarding the degree and extent to which financial barriers prevent commercial EE investments. GPIC could provide insight into the role of financial barriers in commercial EE, and whether alternative financing mechanisms help to overcome such financial barriers. Because two New Jersey utilities already have OBF programs in place, data may be available to provide insight into the effectiveness of OBF.

GPIC could provide funding to develop and pilot other alternative financing programs and address the policy and market constraints that have hamstrung PACE.

To the extent that OBF and PACE programs can be used to effectively address the financial barriers, GPIC could contribute to policy efforts and analysis by educating policymakers and participate in crafting the necessary documents to implement alternative financing mechanisms as appropriate.

2.4. Building Codes

According to the Department of Energy's Office of Energy Efficiency and Renewable Energy, residential and commercial buildings will account for 73.2% of total electricity consumption[171] and 40.1% of the nation's total energy consumption in 2011,[172] with approximately half of those totals attributable to commercial buildings alone.[173] Furthermore, unlike other wide-scale consumers of energy (i.e. cars and appliances), buildings are designed for a much lengthier life-cycle, which means that "a building built today will have an impact on our energy use for 50 to 100 years or more."[174]

As a result, one of the most effective mechanisms for increasing the energy efficiency of commercial buildings is through the enactment and enforcement of more stringent commercial building energy codes. It has been stated that building energy codes are the "quickest, cheapest and cleanest way to improve energy efficiency in the building sector."[175] However, for commercial building energy codes to succeed in reducing energy consumption, such codes must be both adopted and effectively enforced,[176] as a "[l]ack of compliance with the energy code undermines the potential energy savings of a code."[177]

Both Pennsylvania and New Jersey have relatively up-to-date building and energy codes for commercial buildings. As of the date of the publication of this study, Pennsylvania adopted the 2009 UCC (the most recent version as of the writing of this study) including the 2009 International Energy Conservation Code (IECC)[178] with reference to ASHRAE[179] 90.1-2007.[180] New Jersey has adopted the ASHRAE/IESNA 90.1-2007 code. However, not all building projects need to comply with the building and energy codes.

In Pennsylvania, the building code and energy code is applicable to new buildings and renovations. However, existing buildings and structures receive separate treatment.

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[171] Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, Buildings Energy Data Book, Table 1.1.1, http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.1.1 (last visited June 27, 2011).
[172] *Id.* at Table 1.1.3, http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.1.3 (last visited June 27, 2011).
[173] *Id.* at Table 1.1.1, 1.1.3 (last visited June 27, 2011).
[174] Building Energy Codes Policy Project, Northeast Energy Efficiency Partnerships (NEEP), *Model Progressive Building Energy Codes Policy for Northeast States*, at p.8 (March 2009) (available at http://neep.org/uploads/NEEPResources/id187/neep_building_energy_codes_policy_march%202009.pdf).
[175] The Online Code Environment and Advocacy Network, Building Codes Assistance Project, *Why Adopt Energy Code?*, http://bcap-ocean.org/resource/why-adopt-energy-codes (last visited June 27, 2011).
[176] Zing Communications, *2007 Commercial Energy Code Compliance Study*, at p.4 (Jan. 2007) (available at http://www.energycodes.gov/publications/research/documents/codes/2007CommercialEnergyCodeComplianceStudy.pdf).
[177] Building Energy Codes Policy Project, Northeast Energy Efficiency Partnerships (NEEP), *Model Progressive Building Energy Codes Policy for Northeast States*, at p.6 (March 2009) (available at http://neep.org/uploads/NEEPResources/id187/neep_building_energy_codes_policy_march%202009.pdf).
[178] 34 Pa. Code § 403.21(8).
[179] American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), http://www.ashrae.org (last visited June 27, 2011).
[180] Building Codes Assistance Project – Online Code Environment & Advocacy Network, http://bcap-ocean.org/code-information/pennsylvania-uniform-construction-code-ucc (last visited June 27, 2011).

For example, certain existing materials do not have to be replaced during renovations and when constructing additions or alterations, the portion of the structure which is not being renovated need only be no less conforming to the code than it was prior to the addition.

In New Jersey, the building code and energy code is applicable to new buildings. There is also a rehabilitation subcode which applies to the repair, renovation, alteration, reconstruction, change of use and additions of existing structures. The building code also provides that ordinary maintenance may be performed without any permits or notice. This type of work includes the replacements of any windows or doors, repairs to air conditioning and heating equipment and systems, and replacements of clothes dryers.

Therefore, the up-to-date nature of the building and energy codes will not govern all retrofits and renovations of commercial facilities that could generate energy savings if EE construction practices were applied.

To the extent that the building and energy codes are applicable, training of code inspectors on energy efficiency and enforcement of the energy provisions of the codes by code officials is also a factor in realizing the energy efficiency benefits of up-to-date building and energy codes. Some studies have questioned the efficacy of the implementation and enforcement of the energy portions of the codes at the municipal level nationwide, and in Pennsylvania and New Jersey.

The authors of this study recommend further analysis of the training, implementation and enforcement of the building and energy codes in commercial buildings. Depending on the study findings, GPIC may be able to help develop or deploy tools for enhancing code training and enforcement on energy efficiency.

Another opportunity for GPIC involvement is in further developing retrofit codes. New Jersey has a retrofit building code in place which has been recognized nationwide as a catalyst for retrofitting existing buildings. However, the retrofit code does not explicitly address energy efficiency issues. Pennsylvania does not currently have a retrofit building code, so this may be another opportunity for policy development.

Finally, recent changes to Pennsylvania's building code adoption procedures, discussed in detail in Section 1 below, are predicted to have a negative impact on the adoption of future model building and energy code provisions. The first test of the new code adoption procedures will occur in late 2011 and early 2012 when the Pennsylvania code adoption authority considers the 2012 updates to the ICC model codes. GPIC can work with other stakeholders to monitor and evaluate the impact of the revised code adoption procedure on EE.

This section discusses the current state of commercial building energy codes in Pennsylvania and New Jersey. It is intended to provide an overview of the applicable codes, the process of updating and adopting new codes, and the interaction between states and their municipalities regarding changes to their respective codes and enforcement. The section concludes with a statement on the potential energy savings achievable by adopting

the newest versions of commercial building energy codes, the policy implications of the current procedure for doing so, the possible effect of national legislation in this arena, and a discussion of the effectiveness of code enforcement.

Commercial Building Codes In Pennsylvania

Pennsylvania enacted a Uniform Construction Code (UCC), based on national models, in order to provide uniform state-wide standards and requirements for residential and commercial buildings. In November, 1999, the Pennsylvania Legislature passed Act 45, known as the Pennsylvania Construction Code Act (PCCA),[181] which mandated a statewide building code.[182] The purpose of the act was to "ensure uniform, modern construction standards and regulations throughout [the] Commonwealth" by adopting a Uniform Construction Code (UCC) for the State.[183] The UCC applies to the "construction, alteration, repair, movement, equipment, removal, demolition, location, maintenance, occupancy or change of occupancy of every building or structure which occurs on or after April 9, 2004" in Pennsylvania,[184] with certain exclusions and exemptions.[185]

The Pennsylvania UCC is made up of various model codes[186] promulgated by the International Code Council (ICC), a membership association which develops codes and standards used in the construction of residential and commercial buildings. [187] In December 2009, Pennsylvania adopted the 2009 UCC (the most recent version as of the writing of this study) including the 2009 International Energy Conservation Code (IECC)[188] with reference to ASHRAE[189] 90.1-2007.[190] The 2009 IECC provides standards for commercial buildings regarding a building's envelope,[191] HVAC (heating, ventilation, and air conditioning) systems,[192] Mechanical and Service Water Heating systems, and Electrical Power and Lighting systems.[193] The purpose of the IECC is to establish an energy conservation code that effectively conserves energy, allows the use of new materials, products or methods of construction, minimizes increases in construction costs, and

[181] 35 Pa. Cons. Stat. Ann. §§ 7210.101-7210.1103 (West 2011).
[182] 1999 Pa. Legis. Serv. Act 1999-45 (S.B. 647) (West); 35 Pa. Cons. Stat. Ann. §§ 7210.101, 7210.102.
[183] 35 Pa. Cons. Stat. Ann. § 7210.102(a)(3).
[184] 34 Pa. Code § 403.1(a)(1) (2011).
[185] *Id.* at §§ 403.1(b)(1)-(13).
[186] 34 Pa. Code § 403.21 (2011).
[187] International Code Council, *About ICC*, http://www.iccsafe.org/ABOUTICC/Pages/default.aspx (last visited June 27, 2011).
[188] 34 Pa. Code § 403.21(8).
[189] American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), http://www.ashrae.org (last visited June 27, 2011).
[190] Building Codes Assistance Project – Online Code Environment & Advocacy Network, http://bcap-ocean.org/code-information/pennsylvania-uniform-construction-code-ucc (last visited June 27, 2011).
[191] The physical separator between the interior and the exterior environments of a building. http://en.wikipedia.org/wiki/Building_envelope (last visited June 27, 2011).
[192] http://en.wikipedia.org/wiki/HVAC (last visited June 27, 2011).
[193] Building Codes Assistance Project – Online Code Environment & Advocacy Network, *DOE Comparison of 2009 IECC Chapter 5 and ASHRAE Standard 90.1-2007*, http://bcap-ocean.org/news/2010/january/06/doe-publishes-comparison-2009-iecc-chapter-5-and-ashrae-standard-901-2007 (last visited June 27, 2011).

eliminates preferential treatment for particular industries or types or classes of materials, products or methods of construction.[194]

Code Update Procedure

The codes promulgated by the ICC are updated every three years.[195] The PCCA requires that by December 31 of the year in which new triennial ICC codes are issued, the Department of Labor and Industry (DLI) issue regulations adopting the new codes, or provisions thereof.[196] The UCC is, therefore, also reviewed every three years upon publication of the ICCs updated model codes.[197]

Review of the new versions of the ICC codes and the current UCC is conducted by the Uniform Construction Code Review and Advisory Council (RAC).[198] In October, of 2008, former Governor Ed Rendell signed into law Act 106,[199] which established the RAC.[200] The RAC consists of 19 members appointed by the Governor, representing various construction industry trades/professions, as well as local government.[201] The RAC's duty is to "[g]ather information from municipal officers, building code officials, construction code officials, licensed design professionals, builders and property owners concerning issues with the Uniform Construction Code raised by council members or changes proposed by members of the General Assembly"[202] and to report that information, along with the council's recommendations, to various government officials.[203] The RAC is required to hold at least three public hearings during the code review process; one in Harrisburg, one in the eastern region of the State, and one in the western region.[204]

The RAC examines the code revisions based on the impact on the health, safety and welfare of the public, the economic and financial impact, and technical feasibility.[205] Only code provisions recommended for adoption by two-thirds of the RAC membership are to be included in the report to the Secretary.[206] If a triennial ICC code revision is not recommended for adoption by the required two-thirds majority, the relevant provisions of the prior version of the UCC remains in effect.[207]

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[194] The International Energy Conservation Code, *What is the International Energy Conservation Code?*, http://reca-codes.org/pages/current_code.html (last visited June 27, 2011).
[195] International Code Council, Code Development, *ICC Code Development Process*, at slide 15 (available at http://www.iccsafe.org/cs/codes/Documents/misc/CodeDevelopmentProcess.pdf).
[196] *See* 35 Pa. Cons. Stat. Ann. §§ 7210.301(a), 7210.304(a)(1), (3); 34 Pa. Code § 403.1(a).
[197] 35 Pa. Cons. Stat. Ann. § 7210.304(a)(1); 34 Pa. Code § 403.1(a).
[198] 35 Pa. Cons. Stat. Ann. § 7210.107.
[199] 2008 Pa. Legis. Serv. Act 2008-106 (H.B. 1096) (West).
[200] 35 Pa. Cons. Stat. Ann. § 7210.107.
[201] *Id.* § 7210.107(c)(1)-(19).
[202] *Id.* § 7210.107(b)(1).
[203] *Id.* § 7210.107(b)(2)(i)-(vi).
[204] *Id.* § 7210.107(b.1)(2).
[205] *Id.* § 7210.107(b.1)(4)(i)-(iii).
[206] *Id.* § 7210.107(b.1)(5).
[207] *Id.* § 7210.304(a.1).

Prior to 2011, the RAC was responsible for reviewing the new ICC codes and informing the DLI of any code provisions contained in the new model codes that should be *excluded* from the UCC by May 1 of the year of issuance of the new ICC codes.[208] Pursuant to HB 377, recently signed into law by Governor Tom Corbett as Act 1 of 2011, the RAC maintains responsibility for reviewing the latest triennial ICC code revisions[209] and, within twelve months of the official publication of the code revisions, reporting to the Secretary their recommendations.[210] However, the RAC now reports to the Secretary the provisions of the ICC codes that are specified for adoption, as opposed to exclusion.[211]

Because there is no longer an automatic adoption of the new ICC codes,[212] and unless provisions of the new ICC codes are recommended for adoption by the RAC, the corresponding provisions of the prior code versions will remain in effect.[213] Essentially, Act 2011-1 has significantly inhibited the progressiveness of the PCCA and the UCC by foreclosing automatic adoption of the new, updated ICC codes. Now, provisions of the new ICC codes must go through a review process to be included in the UCC, which will make adoption of significant portions of the new codes more difficult, especially considering that each code provision must be recommended by a two-thirds majority of the RAC..[214] The PCCA previously required only a simple majority for a change to be made.[215] A two-thirds majority, however, is likely to make adoption of any provision extremely difficult.

In his written testimony for the Pennsylvania House Labor and Industry Committee on HB 377,[216] Donald J. Vigneau (AIA / Building Codes Project Manager representing the Northeast Energy Efficiency Partnerships (NEEP)) succinctly put forth the proposition that HB 377 (Act 2011-1) "hamstrings the Review and Advisory Council's (RAC) ability to accomplish its mandate to revise and update codes that best serve the health, safety and energy interests of the Commonwealth of Pennsylvania,"[217] and that if passed it would

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[208] *See* H.B. 377, 195th Gen. Assemb., Reg. Session. (Pa. 2011) http://www.legis.state.pa.us/CFDOCS/Legis/PN/Public/btCheck.cfm?txtType=PDF&sessYr=2011&sessInd=0&billBody=H&billTyp=B&billNbr=0377&pn=1520) (last visited June 27, 2011).
[209] *Id.* § 7210.107(b)(3)
[210] *Id.* § 7210.107(b.1)(3).
[211] *Id.* § 7210.107(b.1)(3).
[212] *Id.* at p.4, lines 11-22.
[213] 35 Pa. Cons. Stat. Ann. § 7210.304(a.1).
[214] *See* H.B. 377, 195th Gen. Assemb., Reg. Session. at p.3, lines 16-18 (Pa. 2011) http://www.legis.state.pa.us/CFDOCS/Legis/PN/Public/btCheck.cfm?txtType=PDF&sessYr=2011&sessInd=0&billBody=H&billTyp=B&billNbr=0377&pn=1520) (last visited June 27, 2011); 35 Pa. Cons. Stat. Ann. § 7210.107(b.1)(5).
[215] H.B. 377, 195th Gen. Assemb., Reg. Session. at p.3, lines 27-29 (Pa. 2011) http://www.legis.state.pa.us/CFDOCS/Legis/PN/Public/btCheck.cfm?txtType=PDF&sessYr=2011&sessInd=0&billBody=H&billTyp=B&billNbr=0377&pn=1520) (last visited June 27, 2011)
[216] *HB 725 was proposed along with HB 377 and was effectively absorbed into HB 377. Citations to items regarding HB 725 are intended, therefore, to be illustrative of HB 377.
[217] Written Testimony of Donald J. Vigneau for the House Labor and Industry Committee Regarding HB 725 / HB 377 – An Act Amending the Pennsylvania Construction Code Act, at p.2 (April 6, 2011) (available at http://neep.org/uploads/NEEPResources/id674/NEEPtestimonyprop_HB725_%20FINAL.pdf).

"effectively weaken Pennsylvania's reputation as a national leader in energy efficiency and building safety, as well [as] deter economic growth and job creation for the Commonwealth."[218] Vigneau specifically pointed out the that new two-thirds majority requirement "[e]ssentially removes rights from expert decision makers in the code amendment process (i.e. design professionals and local officials) and allows a minority vote (i.e. building owners) to block safety, technology and advanced energy efficient code changes in future adoptions."[219]

Similar testimony was given before the House Labor and Industry Committee by Elam M. Herr, Assistant Executive Director of The Pennsylvania State Association of Township Supervisors.[220] Herr stated that the concern with HB 725 (incorporated into HB 377)[221] was that "the two-thirds rule for recommendations could impede the adoption process and lead to a failure to adopt the updated codes," which, therefore, "would effectively eliminate valuable provisions that would reasonably improve safety."[222]

During the third consideration hearing and final passage of HB 377 in the State Senate, many senators voiced concerns similar to those of the experts mentioned above, with one stating that "for it to be a two-thirds vote, nothing would be able to get passed in that committee."[223] Another senator commented that "going to a two-thirds requirement will really be a stretch and put out of reach changes that may be important to various regions of our State in the future as we look at each and every successive update of the international code."[224] Analogizing to their own process in the State Senate, one senator stated that "if we do have a consensus on this floor, the votes are not two-thirds votes in order to pass a bill or pass something into law,"[225] with another senator adding that a two-thirds majority is "crazy… [w]e do not even require a two-thirds vote in this Chamber."[226]

The changes made to the PCCA which affect the process for updating the UCC may have a stifling effect on the progressivity of the Pennsylvania UCC in years to come. It will now be highly challenging to adopt new, more stringent ICC model codes for incorporation as the Pennsylvania UCC. The 2012 code adoption cycle will be the first test of the impact of the new code adoption process.

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[218] *Id.* at p.1.
[219] *Id.* at p.2.
[220] Testimony of Elam M. Herr for the House Labor and Industry Committee Concerning HB 725, at p.3 (March 23, 2011) (available at http://psats.org.s97340.gridserver.com/ckfinder/userfiles/files/UCC%20--%20ICC%20Adoption%20Process%20_3-23-11_.pdf).
[221] *See* fn.106.
[222] Testimony of Elam M. Herr for the House Labor and Industry Committee Concerning HB 725, at p.3 (March 23, 2011).
[223] Senate, Commonwealth of Pennsylvania, Legislative Journal, 195th Gen. Assemb., Reg. Sess. 2011, at p. 306 (Sen. Tartaglione) (April 12, 2011) (available at http://www.legis.state.pa.us/WU01/LI/SJ/2011/0/Sj20110412.pdf).
[224] *Id.* (Sen. Waugh).
[225] *Id.* at 307 (Sen. McIlhinney).
[226] *Id*. (Sen. Waugh).

Potential Energy Efficiency Gains from Adopting the 2012 IECC

Based on the triennial schedule, the next update to the code, and subsequent review by the RAC for adoption, is expected to occur sometime in late 2011 and become active beginning in 2012.[227] Although studies specifically estimating the energy savings for commercial buildings in Pennsylvania if the 2012 IECC is adopted are limited, the DOE has estimated that the 2012 IECC will achieve a 30% energy savings in residential and commercial buildings over the 2006 version.[228] Prior research has shown that the 2009 IECC was able to provide energy savings of approximately 12-15% compared to the 2006 IECC.[229] This indicates that the 2012 IECC is expected to achieve anywhere from a 15-18% improvement in energy savings over the 2009 IECC.[230] The DOE has further estimated that savings from ASHRAE 90.1-2010, compared to ASHRAE 90.1-2004, are close to 25% for commercial buildings.[231] However, the DOE also determined that ASHRAE 90.1-2007 provided savings of only 4.4% over ASHRAE 90.1-2004; indicating that there is a large gap in savings to be made up between the 2010 standard and the 2007 standard, and that estimates of energy savings may not correlate well with actual commercial building energy code performance.[232]

Most Pennsylvania-specific research has focused on residential building energy savings. However, since residential buildings account for similar percentages of electricity consumption and total energy consumption nationwide,[233] such research can provide some indication of potential energy savings for commercial buildings.[234] The Building Codes Assistance Project Online Code Environment & Advocacy Network (BCAP-OCEAN),[235] utilizing date from the DOE,[236] has produced estimated energy savings for residential buildings in Pennsylvania as a result of adopting the 2009 IECC and ASHRAE 90.1-2007

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[227] International Code Council, Code Development, *ICC Code Development Process*, at slide 20 (available at http://www.iccsafe.org/cs/codes/Documents/misc/CodeDevelopmentProcess.pdf).
[228] Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, *DOE Announces Historic Strides in Energy Efficiency for Residential and Commercial Building Codes* (November 15, 2010), http://apps1.eere.energy.gov/news/progress_alerts.cfm/pa_id=437 (last visited June 27, 2011); *see also* Alliance to Save Energy, *The Alliance 2010 Year-End Review*, at slide 4 (available at http://ase.org/sites/default/files/YearEndReview_2010.pdf).
[229] Energy Codes Efficiency Coalition, *Energy & Cost Savings Analysis of 2009 IECC Efficiency Improvements* (available at http://www.thirtypercentsolution.org/solution/EECC-Savings_Analysis-Jan-2009.pdf); *see also* Paul Karrer, *2009 IECC Published, Expected to be 15% More Energy Efficient*, Building Codes Assistance Project (Feb. 6, 2009), http://www.bcap-energy.org/node/330 (last visited June 27, 2011).
[230] Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, *2010 Building Energy Codes Annual Report*, at slide 4 (available at http://www.energycodes.gov/publications/general/BECP_FY10_AnnualReport.pdf).
[231] *Id.* at slide 6.
[232] *Id.* at slide 7.
[233] *See* fn. 1-3.
[234] Impact studies of IECC 2012 at the state level have not yet been produced.
[235] Building Codes Assistance Project – Online Code Environment & Advocacy Network, http://bcap-ocean.org (last visited June 27, 2011).
[236] *See* Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, *Impacts of the 2009 IECC for Residential Buildings at State Level*, at slides 157-161, (Sept. 2009) (available at http://www.iccsafe.org/Communities/Energy/Documents/IECC2009_Residential_Nationwide_Analysis1.pdf).

statewide. BCAP-OCEAN estimates that businesses and homeowners would save approximately $101 million annually by 2020 and $203 million annually by 2030 in energy costs (assuming 2006 prices).[237] BCAP-OCEAN additionally estimates that implementing the latest model codes (2009 IECC and ASHRAE 90.1-2007 for the purposes of the study) would help avoid approximately 21.6 trillion Btu of primary annual energy use by 2030 and annual emissions of more than 1.5 million metric tons of CO2 by 2030.[238]

Furthermore, a 2010 BCAP analysis indicated that the weighted average incremental construction cost of upgrading to the 2009 IECC in Pennsylvania was $697.79 per home.[239] The average annual energy savings per home would be $240.50, meaning that the simple payback for homeowners would take, on average, 2.9 years. BCAP- OCEAN notes that these estimates are conservative and represent the upper bound on incremental cost.[240] It would stand to reason that adoption by Pennsylvania of the 2012 IECC with reference to ASHRAE 90.1-2010 would produce similar, and likely better, results for commercial buildings in the State. This energy code research ultimately concludes that "recovery of the often-modest costs of updated code compliance is possible within a fraction of the useful life of [a] building, after which the occupant enjoys an on-going avoided-cost dividend"[241] and, further, that "[a]dopting and effectively implementing energy efficient statewide building energy codes represents one of the most cost-effective ways of reducing building energy."[242] However, estimated savings for commercial buildings as a result of any new IECC version, whether accurate or not, will only have the potential for realization in Pennsylvania if the new code is adopted, consistently implemented, and strictly enforced throughout the State.

Municipalities and Code Adoption / Enforcement

Under the PCCA the DLI is granted overall authority to review "municipalities, municipal code officials, third-party agencies, construction code officials and code administrators concerning the enforcement and administration of [the] act."[243] Municipalities, however, are the primary enforcement agents of UCC requirements, although they may opt out of such responsibility.[244]

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[237] Building Codes Assistance Project – Online Code Environment & Advocacy Network, *Pennsylvania BCAP Estimated Energy Savings*, http://bcap-ocean.org/state-country/pennsylvania (last visited June 27, 2011).
[238] *Id.*
[239] *Id.*
[240] *Id.*
[241] Thomas Hutton, Note, *Toward Better and More Uniform Building Efficiency Codes*, 28 Va. Envtl. L.J. 121, 148 (2010).
[242] Building Energy Codes Policy Project, Northeast Energy Efficiency Partnerships (NEEP), *Model Progressive Building Energy Codes Policy for Northeast States*, at p.8 (March 2009) (available at http://neep.org/uploads/NEEPResources/id187/neep_building_energy_codes_policy_march%202009.pdf).
[243] 35 Pa. Cons. Stat. Ann. § 7210.105(a)(1); *see also* 34 Pa. Code §§ 401.1-401.16, 403.1-403.142.
[244] Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, *Status of State Energy Codes Pennsylvania*, http://www.energycodes.gov/states/state_info.php?stateAB=Pennsylvania (last visited June 27, 2011).

In order to administer and enforce the PCCA, municipalities are required to enact ordinances adopting the current version of the UCC as their municipal building code.[245] Municipalities have ninety days following the promulgation of regulations by the DLI incorporating the selected provisions of the updated ICC codes in which to enact such ordinances.[246] Once an ordinance is enacted, a municipality is required to provide the DLI with certain specific information regarding their selected building code official(s).[247] As of January 1, 2011, 2,396 (94.5%) municipalities have elected to administer and enforce the UCC (are "opt-ins") and 166 (5.5%) have elected not to administer and enforce the UCC (are "opt-outs").[248]

"Opt-in" municipalities may enforce the UCC in a variety of ways: they may employ their own code officials, they may retain one or more third-party agencies to enforce the UCC on their behalf, they may utilize an inter-municipal agreement that allows multiple municipalities to provide code enforcement services through a single agency, and they may contract with a neighboring municipality to utilize its code enforcement officers.[249] In "opt-out" municipalities, the DLI performs all commercial building energy code enforcement.[250] Municipalities are further required to establish a board of appeals to hear appeals from decisions of the code administrator in that locality.[251]

The DLI is responsible for establishing a program for required training and certification of all categories[252] of code administrators,[253] and is further required to review each municipality's enforcement program at least once every five years to ensure adequate administration and enforcement of the UCC.[254] The DLI is granted authority to decertify any code administrator for just cause.[255]

In Pennsylvania, municipalities are prohibited from proposing or enacting any ordinance which is less than the minimum requirement of the UCC.[256] Municipalities may, however, enact ordinances which "equal or exceed the minimum requirements" of

[245] 35 Pa. Cons. Stat. Ann. § 7210.501(a)(1); 34 Pa. Code § 403.102(a) (2011).
[246] 35 Pa. Cons. Stat. Ann. § 7210.501(a)(1)
[247] 34 Pa. Code § 403.102(c)(1)-(5).
[248] Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, *Status of State Energy Codes Pennsylvania*, http://www.energycodes.gov/states/state_info.php?stateAB=Pennsylvania (last visited June 27, 2011).
[249] Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, *Status of State Energy Codes Pennsylvania*, http://www.energycodes.gov/states/state_info.php?stateAB=Pennsylvania (last visited June 27, 2011); 35 Pa. Cons. Stat. Ann. § 7210.501(b)(1)-(4); 34 Pa. Code § 403.102(g)(1)-(4).
[250] Office of Energy Efficiency and Renewable Energy, U.S. Dep't of Energy, *Status of State Energy Codes Pennsylvania*, http://www.energycodes.gov/states/state_info.php?stateAB=Pennsylvania (last visited June 27, 2011); 35 Pa. Cons. Stat. Ann. § 7210.501(b)(5); 34 Pa. Code § 403.102(g)(5).
[251] 35 Pa. Cons. Stat. Ann. § 7210.501(c)(1).
[252] *See* Pa. Code §§ 401.6 and 401.7.
[253] 35 Pa. Cons. Stat. Ann. § 7210.701(a).
[254] 34 Pa. Code § 403.104(b).
[255] 35 Pa. Cons Stat. Ann § 7210.701(h); 34 Pa. Code § 403.104(c)(2).
[256] 35 Pa. Cons Stat. Ann § 7210.503(b).

provisions of the UCC.[257] However, a specific process must be follow in order for such an ordinance to be enacted and enforceable, which includes: a public hearing,[258] a notice of the hearing, [259] the filing of the proposed notice and ordinance with the DLI,[260] appropriate municipal action,[261] and review by the DLI.[262] A proposed ordinance may be challenged by aggrieved parties.[263] Challenges to a proposed ordinance are ruled on by the Secretary,[264] with such rulings being subject to further appeal.[265]

When reviewing a proposed ordinance to determine if it equals or exceeds the UCC, the DLI is to consider whether: (1) "certain clear and convincing local climatic, geologic, topographic or public health and safety circumstances or conditions justify the exception;" (2) the exception is "adequate for the purpose intended and shall meet a standard of performance equal to or greater than that" of the UCC; (3) "the exception would not diminish or threaten the health, safety and welfare of the public;" and, (4) "the exception would not be inconsistent with the legislative findings and purpose"[266] regarding the PCCA.[267]

In practice, the standards of review enumerated above are utilized with a high degree of scrutiny. In *Schuylkill Township v. Pennsylvania Builders Association*, the builders association had challenged an ordinance mandating installation of automatic sprinkler systems in certain construction projects.[268] The Secretary of Labor and Industry invalidated the ordinance, and the Court of Common Pleas of Chester County affirmed the Secretary's ruling.[269] On appeal, the Commonwealth Court of Pennsylvania concluded that the Secretary properly "required the Township to show that conditions there were so different from the statewide norm that the uniform standards were not appropriate to use in the Township,"[270] and held that although sprinkler systems are clearly an effective fire suppression tool, the Township failed to offer clear and convincing evidence of local conditions justifying a deviation from the minimum standards of the UCC.[271]

The court noted two examples of successful sprinkler implementation deviating from the standards of the UCC, one in Marcus Hook and the other in Carroll Valley Borough.[272] The court explained that in Marcus Hook, the existence of large oil refineries,

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[257] 35 Pa. Cons. Stat. Ann. § 7210.503(a)(1); 34 Pa. Code § 403.102(1)(1)-(16).
[258] 35 Pa. Cons. Stat. Ann. § 7210.503(d).
[259] *Id.* § 7210.503(e).
[260] *Id.* § 7210.503(f).
[261] *Id.* § 7210.503(g).
[262] *Id.* § 7210.503(i).
[263] *Id.* § 7210.503(j)(1)-(2).
[264] *Id.* § 7210.503(k).
[265] *Id.* § 7210.504(a)-(b).
[266] *Id.* § 7210.503(j)(2)(i)-(iv).
[267] *See id.* § 7210.102.
[268] 935 A.2d 575 (Pa. Commw. Ct. 2007).
[269] *Id.*
[270] *Id.* at 583.
[271] *Id.* at 585.
[272] *Id.* at 582.

pipelines traversing the township, and the world's largest propane storage tank being located under the town hall constituted clear and convincing evidence of local conditions requiring the ordinance.[273] The court further stated that in Carroll Valley Borough, the unique geographical circumstances (the borough was built into the side of a mount, with over half of all slope angles in the borough exceeding 12%, and many reaching 70-80%) combined with a lack of a public water supply, fire hydrants, or a volunteer fire company provided similarly sufficient circumstances for allowing the deviation.[274] Therefore, from a practical standpoint, municipalities are highly constrained from imposing building code standards which deviate from the UCC.

Efficacy of UCC Administration and Enforcement in Pennsylvania

> *"Lack of compliance with the energy code undermines the potential energy savings."*[275]
>
> *"The most direct and comprehensive way to drive greener building is through changing energy and building codes… [h]owever, developing supplemental code provisions requires… training of municipal staff so that lack of enforcement does not defeat the objective."*[276]

These statements reflect the major hurdle standing in the way of effective commercial building energy codes: the lack of proper enforcement of the codes once they have been adopted. Even the most up-to-date, advanced, and stringent commercial building energy codes can only be as effective at increasing energy efficiency as their enforcement. Studies of commercial building energy code compliance and enforcement in Pennsylvania are limited, but studies of residential building code enforcement in Pennsylvania and of commercial building energy codes nationwide are illustrative of the issue.

In 2008, the Pennsylvania Housing Research Center (PHRC) conducted a state-wide energy code enforcement and compliance study.[277] A team of PHRC staff and senior building code officials visited municipal and third-party code offices across the state and joined code officials on inspection visits to develop a better understanding of residential

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[273] *Id.*
[274] *Id.* at 582-583.
[275] Building Energy Codes Policy Project, Northeast Energy Efficiency Partnerships (NEEP), *Model Progressive Building Energy Codes Policy for Northeast States*, at p.6 (March 2009) (available at http://neep.org/uploads/NEEPResources/id187/neep_building_energy_codes_policy_march%202009.pdf).
[276] Edna Sussman, *Reshaping Municipal and County Laws to Foster Green Building, Energy Efficiency, and Renewable Energy*, Practicing Law Institute, Real Estate Law and Practice Course Handbook Series, PLI Order No. 16007, at 120 (March, 2008).
[277] Mike Turns, The Pennsylvania Housing Research Center, *Energy Code Enforcement and Compliance in Pennsylvania: Lessons from the Field* (July 2008) (available at http://www.engr.psu.edu/phrc/Publications/106EnergyCodeEnforcementTurns.pdf).

energy code enforcement and compliance in Pennsylvania.[278] The findings of the study calls into question whether commercial building energy codes are being enforced in a manner which will ensure full realization of the EE benefits of up-to-date codes.

The study noted that, as participation in the study was voluntary, "regulatory laggards" were unlikely to participate.[279] The study found that there were virtually no quality assurance measures regarding code office administration,[280] indicating a lack of continuity in overall process. The study concluded that, although the period of project planning and review is one of the optimal times to address energy codes, little attention is paid to energy-related issues during this phase.[281] The PHRC team found that approved plans often lacked sufficient detail regarding energy-related items as a result of inadequate plan submittal requirements and inadequate enforcement of those requirements.[282]

Furthermore, mechanical inspections, duct leakage tests, framing inspections, and air sealing and infiltration tests were all found to be inadequately administered to enforce the building energy requirements of the code.[283] It was also determined that ambiguity in the requirements of the code compounded the issue of inconsistent code administration.[284] The study proposed that simple checklists for building energy code-related items could help improve enforcement and compliance, and that improved training and education were paramount needs.[285]

A 2007 study conducted by Zing Communications yielded similar results.[286] In the Zing study, a survey was sent to over 10,000 architects, engineers, lighting designers and building contractors regarding various aspects of commercial building energy code compliance.[287] The study found that, while most jurisdictions did require some documentation of intent to comply with the applicable commercial building energy code as a prerequisite to obtaining a building permit, in a significant number of jurisdictions, the local authority responsible for enforcement did not inspect projects to verify commercial energy code compliance.[288] Tellingly, the survey generated only 431 responses (a 4.3% response rate),[289] many of which answered "don't know" to the questions asked.[290]

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[278] *Id.* at 1.
[279] *Id.* at 47.
[280] *Id.*
[281] *Id.* at 48.
[282] *Id.*
[283] *Id.* at 49.
[284] *Id.* at 50.
[285] *Id.* at 51.
[286] Zing Communications, *2007 Commercial Energy Code Compliance Study* (Jan. 2007) (available at http://www.energycodes.gov/publications/research/documents/codes/2007CommercialEnergyCodeComplianceStudy.pdf).
[287] *Id.* at 4-5.
[288] *Id.* at 8.
[289] *Id.* at 5.
[290] *See generally* Zing Communications, *2007 Commercial Energy Code Compliance Study* (Jan. 2007) (available at

Furthermore, the study found it was more common that the organization with authority to interpret the commercial energy code, approve its application, and inspect the project to verify compliance is the local building department—specifically, an individual who also handles structural, plumbing, and other category-specific compliance,[291] implying that code officials were often more focused on areas of construction other than energy-related items. It was also determined that: (1) project engineers consider lack of strict code enforcement to be a significant barrier to energy code compliance; (2) value engineering (a focus on initial cost that can result in the removal of critical choices) is the most significant barrier to code compliance; and, (3) a lack of awareness or knowledge of energy code (in this case specifically lighting) requirements and the code approval process is another significant barrier to compliance.[292]

The reason these studies are particularly concerning is that they were conducted on a voluntary basis, a context within which one would assume the respondents were particularly confident in their enforcement/compliance. It appears that the efficacy of enforcement in Pennsylvania and subsequent compliance levels may be less than desirable, and thus even adopting more stringent codes may not achieve the estimated energy savings and increased efficiency expected.

The study conducted by the PHRC recommended that improved and additional training for builders, subcontractors, and code officials on energy-specific building requirements would help improve energy efficiency, and that heightened attention should be given to the fact that "training programs are likely to be most effective if they are tailored to a specific audience."[293] It has also been noted that it is often a single individual that is responsible for all categories of building code inspection and compliance.[294] It would seem to follow that, where possible, requiring a municipality to have a different code official responsible for each category of certification and inspection (i.e. building, electrical, energy, plan review, etc.) could help ensure greater compliance, as each official could focus directly on the requirements of their area of expertise.

The Northeast Energy Efficiency Partnership recommended that one of the best ways to improve code enforcement and compliance is to regularly track and report on both compliance rates and subsequent energy-specific performance of the buildings

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http://www.energycodes.gov/publications/research/documents/codes/2007CommercialEnergyCodeComplianceStudy.pdf).

[291] *Id.*

[292] *Id.* 8-9.

[293] Mike Turns, The Pennsylvania Housing Research Center, *Energy Code Enforcement and Compliance in Pennsylvania: Lessons from the Field*, at p.51-52 (July 2008) (available at http://www.engr.psu.edu/phrc/Publications/106EnergyCodeEnforcementTurns.pdf).

[293] *Id.* at 1.

[294] Zing Communications, *2007 Commercial Energy Code Compliance Study*, at p.8 (Jan. 2007) (available at http://www.energycodes.gov/publications/research/documents/codes/2007CommercialEnergyCodeComplianceStudy.pdf).

themselves.[295] The general lack of available data on commercial building energy code compliance rates and energy-related performance in Pennsylvania supports this proposition. Further, "[k]nowing the actual numbers of compliant buildings as well as the specific requirements that builders do and do not comply with will help state agencies continually modify and improve their training programs.[296]

Therefore, at the state-level in Pennsylvania, the key to maximizing the positive effect of commercial building energy codes is gathering data on the issues with common energy code enforcement, and improved training and education of code officials on energy-specific requirements, with an eye towards consistency and quality assurance.

Pennsylvania has received a total of $9,507,919,477 in funding from the American Recovery and Reinvestment Act (ARRA).[297] The funding included $12 million for a revolving loan fund, which could be used to fund energy-construction and $5 million for the Keystone HELP Loan program, which provides financing to Pennsylvanians who wish to make efficiency improvements to their homes.

Retrofit Code

Over 230 commercial buildings in Pennsylvania, representing over 12% of commercial space in the Commonwealth, are excellent retrofit candidates.[298] Thus, Pennsylvania could benefit from a rehabilitation code or subcode, similar to New Jersey's.[299] The New Jersey rehabilitation subcode has been cited as an example for state construction codes across the country[300] and is a promising first step towards expanding energy efficiency requirements from construction codes for new buildings to construction codes for rehabilitation projects. Although the New Jersey rehabilitation subcode could still be adjusted to achieve further gains in energy efficiency, the adoption of a similar standard in Pennsylvania could be beneficial to realizing greater existing building EE.

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[295] Building Energy Codes Policy Project, Northeast Energy Efficiency Partnerships (NEEP), *Model Progressive Building Energy Codes Policy for Northeast States*, at p.6 (March 2009) (available at http://neep.org/uploads/NEEPResources/id187/neep_building_energy_codes_policy_march%202009.pdf).

[296] *Id.* at 24.

[297] Recovery.gov, *Track the Money*, http://www.recovery.gov/Pages/TextViewProjSummary.aspx?data=recipientAwardsList&State=PA (last visited Sept. 9, 2011).

[298] *See* Econsult Corporation, The Market for Commercial Property Energy Retrofits in the Philadelphia Region (Draft Report – Sept. 19, 2011) at 12. Econsult Corporation estimates that 232 commercial buildings in Pennsylvania are retrofit candidates using the most rigorous threshold, the Composite Index. These buildings are more than twenty years old, have above-average energy bills, stand less than six stories tall, have envelopes that are not steel-and-glass, have below-average daylight penetration, and are owned by one of the top twenty-five largest commercial landlords in the region. Using other indices, estimates of commercial retrofit candidates in the region can rise to 1,976 (Property Type Index), 6,962 (Age Index), or 7,138 (Retrofit Index).

[299] *See* N.J.A.C. § 5:23-6.2.

[300] *See* NAHB RESEARCH CENTER, INC. (PREPARED FOR THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT), INNOVATIVE REHABILITATION PROVISIONS (March 1999), http://www.huduser.org/Publications/PDF/innrehab.pdf (last visited August 16, 2011); and THE APOLLO ALLIANCE, NEW ENERGY FOR STATES, ENERGY-SAVING POLICIES FOR GOVERNORS AND LEGISLATORS, http://www.apolloalliance.org/downloads/resources_apollostate_report.pdf (last visited August 16, 2011).

Reducing rehabilitation costs can be a key incentive to encouraging developers to rehabilitate existing structures in place of undertaking new construction projects, which demand greater resources and additional land.[301] New Jersey's rehabilitation subcode has reduced rehabilitation costs for many projects by approximately 25%.[302] In many instances today, it may be more economically attractive to neglect, abandon, or demolish a building, rather than redevelop a property in Pennsylvania.[303] Only two years after the adoption of New Jersey's rehabilitation subcode, rehabilitation projects in that State increased by 62.5%.[304] Pennsylvania could capitalize on the opportunity to achieve similar gains in building reuse by enacting a rehabilitation construction code.

Recommendations

Pennsylvania has benefitted from an automatically updated construction code which incorporates progressive improvements in commercial building EE. The recent changes to the code adoption process, however, may prevent Pennsylvania from adopting the 2012 code, which promises a significant improvement in EE, and any subsequent code improvements. However, the actual, as opposed to theoretical impact of the process changes will be better understood as the 2012 code analysis process gets underway. In addition to adoption of new building codes, Pennsylvania could benefit from adopting a retrofit code which would apply specifically to retrofitting buildings. This would be especially beneficial from an EE perspective if the retrofit code encouraged EE retrofits, and potentially included requirements to enhance the EE of existing buildings.

Finally, Pennsylvania could benefit from greater analysis of the enforcement of current building codes to ensure that the benefits of the currently enacted codes are being realized. Such study and analysis should focus on opportunities for additional training and process which would enhance code enforcement

Commercial Building Energy Codes In New Jersey

Like Pennsylvania, New Jersey has a state-wide building code. New Jersey's Uniform Construction Code was enacted pursuant to the State Uniform Construction Code Act,[305] which authorized the Department of Community Affairs of the State of New Jersey to adopt rules and regulations related to the construction, alteration, renovation, rehabilitation, maintenance, occupancy and use of all buildings and structures.[306] The State Uniform Construction Code Act requires that the New Jersey Uniform Construction Code be divided

[301] *See* National Trust for Historic Preservation, Smart Codes – Smart Growth Tools for Main Street (2002), http://www.preservationnation.org/issues/smart-growth/additional-resources/toolkit_codes.pdf (last visited August 17, 2011), at 1.
[302] *Id*. at 2
[303] *See generally id*. at 1.
[304] *Id*. at 2.
[305] N.J.S.A. § 52:27D-119.
[306] N.J.S.A. § 52:27D-123.

up into individual subcodes that are either adoptions of, or based on,[307] model codes designed by model code agencies. The subcodes address specific areas, like fire protection, plumbing, etc., and also include an energy subcode.

Code Status

The current New Jersey building subcode is the 2009 International Building Code (IBC/2009) with certain revisions and alterations.[308] The IECC/2009 is the current energy subcode for New Jersey, with ASHRAE Standard 90.1-2007 applying to commercial buildings.[309] Both the current IECC/2009 and ASHRAE Standard 90.1-2007 standards became effective on September 7, 2010, when the New Jersey Department of Community Affairs final rule adopting new state building codes was published in the New Jersey Register.[310] Prior to the most recent code update, New Jersey's energy subcode was based on the 2006 IECC standard, with the 2004 version of ASHRAE Standard 90.1 applying to commercial buildings.[311] Although New Jersey has yet to adopt it, the 2010 version of ASHRAE Standard 90.1 has been published and will be eligible for adoption during the next code adoption cycle.[312]

The current ASHRAE Standard 90.1-2007 adopted by New Jersey contains a number of improvements in energy efficiency compared to the section of the old New Jersey energy subcode applicable to commercial buildings, ASHRAE Standard 90.1-2004.[313] In studying the differences between the 2004 and 2007 standards, the Department of Energy Determined that ASHRAE Standard 90.1-2007 produced an approximately 4.4% site energy savings when compared to ASHRAE Standard 90.1-2004.[314] In updating ASHRAE Standard 90.1-2004 to the newer ASHRAE Standard 90.1-2007, the regulation notes that although some of the revisions to the code would result in higher construction costs, the energy efficiency improvements resulting from the code would reduce costs associated with energy consumption.[315] Although commercial building specific statistics were not available, New Jersey's findings were predicated at least in part on a Department of Energy study that estimated that suggested the 2009 IECC, the greater energy subcode of which ASHRAE 90.1-2007 commercial building standard is a part, was at least fifteen percent, and

[307] Certain government agencies and actors retain limited powers to revise or eliminate provisions from model subcodes that are otherwise adopted in full. The specific processes by which revisions are made, and the resulting policy impacts of the revision process itself, are addressed in Part II Section D(2)(b).
[308] N.J.A.C. § 5:23-3.14.
[309] N.J.A.C. 5:23-3.18.
[310] 42 N.J.R. 2043(a) (Sept. 7, 2010).
[311] 39 N.J.R. 633(a) (Feb. 20, 2007).
[312] American Soc'y of Heating, Refrigerating and Air-Conditioning Eng'rs Standard 90.1/2010 (2010).
[313] U.S. Dep't of Energy, Impacts of Standard 90.1-2007 on Commercial Buildings in New Jersey 1 (2009).
[314] Building Energy Standards Program: Preliminary Determination Regarding Energy Efficiency Improvements in the Energy Standard for Buildings, Except Low-Rise Residential Buildings, ANSI/ASHRAE/IESNA Standard 90.1-2007, 75 Fed. Reg. 54,117 (Sept. 3, 2010).
[315] Building, Plumbing, Fire Protection, Energy, Mechanical, and Fuel Gas Subcodes, 41 N.J.R. 3140(a) (Sept. 8, 2009).

possibly even eighteen to twenty percent, more energy efficient than its 2006 predecessor.[316]

Looking forward, if New Jersey to adopts ASHRAE Standard 90.1-2010, the energy savings is estimated to be around 30% as compared to ASHRAE Standard 90.1-2004.[317] However, insofar as the actual energy savings New Jersey experienced as a result from switching from ASHRAE Standard 90.1-2004 to ASHRAE Standard 90.1-2007 were much smaller (only 4.4%)[318] than earlier estimates (at least 15%),[319] the estimated savings that New Jersey would experience as a result of adopting the new ASHRAE Standard 90.1-2010 may not be as high as anticipated.

In addition to the energy subcode, the UCC also has a rehabilitation subcode that applies specifically, "to all matters concerning the repair, renovation, alteration, reconstruction, change of use, and addition to all buildings and structures and their service equipment . . . and shall apply to all existing buildings and structures in the State of New Jersey."[320] While the UCC requirements were historically only applicable to new buildings and to existing buildings undergoing rehabilitation if a certain monetary threshold was reached, the rehabilitation subcode determines what requirements will be extended based upon the type of work being done.[321] The six construction areas that the rehabilitation subcode applies to are repair work, renovation work, alteration work, reconstruction work, change of use, and additions.[322] Builders and designers have responded to the rehabilitation subcode positively because it has generally reduced the costs of performing construction work on existing buildings.[323]

The subcode was developed by DCA with guidance from a committee under the coordination of the Center for Urban Policy Research at Rutgers University.[324] A draft proposal was published in the New Jersey Register in August 1997 and a final version was adopted and published in January 1998.[325] While the rehabilitation subcode has been

[316] Id.
[317] *Setting the Standard*, ENERGY EFFICIENCY AND RENEWABLE ENERGY (U.S. Department of Energy, Washington, D.C.), April 2011, at 1.
[318] Building Energy Standards Program: Preliminary Determination Regarding Energy Efficiency Improvements in the Energy Standard for Buildings, Except Low-Rise Residential Buildings, ANSI/ASHRAE/IESNA Standard 90.1-2007, 75 Fed. Reg. 54,117 (Sept. 3, 2010).
[319] Building, Plumbing, Fire Protection, Energy, Mechanical, and Fuel Gas Subcodes, 41 N.J.R. 3140(a) (Sept. 8, 2009).
[320] N.J.A.C. § 5:23-6.2.
[321] *Id*.
[322] *See* N.J.A.C. 5:23-6.3 (2011) for definitions.
[323] *See* NAHB RESEARCH CENTER, INC. (PREPARED FOR THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT), INNOVATIVE REHABILITATION PROVISIONS (March 1999), http://www.huduser.org/Publications/PDF/innrehab.pdf (last visited August 16, 2011), at 10.
[324] State of New Jersey, Department of Community Affairs, Rehabilitation Schedule, http://www.state.nj.us/dca/divisions/codes/offices/rehab.html (last visited August 16, 2011).
[325] *Id*.

praised as a model code to other states because of its ability to lower costs and the barriers to rehabilitation,[326] the subcode does not explicitly promote energy-efficient retrofits.

The rehabilitation subcode encourages the redevelopment of existing structures and reduces sprawl, which can be environmentally-friendlier than constructing projects from scratch. However, to take full opportunity of the energy efficiency gains that could be made through the rehabilitation code, DCA should consider proposing rules that would require the use of energy-efficient building materials and the installation of energy-efficient equipment.

Code Adoption

The State Uniform Construction Code Act gives the Commissioner of the Department of Community Affairs (the "Commissioner") authority to adopt a State Uniform Construction Code consistent with the intent and purpose of the State Uniform Construction Code Act.[327]

In its original form, the State Uniform Construction Code act provided for automatic adoption of updated codes once a particular model code or standard had been adopted as a subcode.[328] However, the State Uniform Construction Code Act was revised in 1996, eliminating the automatic update procedure by "freezing" the provisions of the Uniform Construction Code to contain only those subcodes in effect as of July 1, 1995.[329] In reporting favorably on the bills that enacted these changes, the New Jersey Senate Community Affairs Committee stated that the process alteration was needed because recent editions of the model codes incorporated in the Uniform Construction Code had "incorporated provisions which are inconsistent with the balanced intent and purpose of the Uniform Construction Code Act."[330] In making such a declaration, the Senate Community Affairs Committee argued that the code updates had increased construction costs without consequent benefits.[331]

In lieu of the previous practice of automatic new code adoption, the State Uniform Construction Code Act now requires the Commissioner, after consulting with the Code Advisory Board (the "Board), to find that the text of a revised or updated model code is "essential to carry[ing] out the intent and purpose of [the State Uniform Construction Code Act]" before adopting such revisions or updates as a new official code.[332] The Board is a special advisory board composed of government, industry and public representatives tasked with, among other duties, assisting and advising the Commissioner in the

[326] *See generally* WILLIAM M. CONNOLLY, PIONEER INSTITUTE, RULES THAT MAKES SENSE, NEW JERSEY'S REHABILITATION SUBCODE, http://www.pioneerinstitute.org/pdf/bgc_rulesmake.pdf (last visited August 16, 2011); THE APOLLO ALLIANCE, NEW ENERGY FOR STATES, ENERGY-SAVING POLICIES FOR GOVERNORS AND LEGISLATORS, http://www.apolloalliance.org/downloads/resources_apollostate_report.pdf (last visited August 16, 2011).
[327] N.J.S.A. § 52:27D-123.
[328] N.J.S.A. § 52:27D-123.
[329] N.J. S. Comm. State., A.B. 1708 (June 3, 1996).
[330] Id.
[331] Id.
[332] Id.

assessment of proposed model code updates and revisions.[333] The Board is composed of 15 members appointed for terms of 4 years.[334] In addition to directly assisting in the Commissioner's assessment of model code updates and revisions, the Board is also responsible for appointing a committee for each individual subcode, assisting the Board with its responsibilities as they relate to each subcode.[335] Each subcommittee consists of one member of the Board, who serves as chairman, and at least four citizens who are experienced and knowledgeable in matters related to the particular subcode.[336]

The State Uniform Construction Code Act provides that if the Commissioner, after consultation with the Board, determines that a provision of a model code currently in effect is less consistent with the intent and purpose of the State Uniform Construction Code than a previously adopted edition of the same model code, the Commissioner has authority to delete the current provision and substitute in the corresponding provision from the previously adopted edition of the model code.[337] Furthermore, unless the Commissioner finds that an amendment or revision must be adopted due to an imminent peril to the public health, safety or welfare, updates to existing model codes may not be adopted more frequently than once every three years.[338]

However, in August, 2009, then New Jersey Governor Jon Corzine signed Senate Bill No. 702 into law, altering the process for amending and updating the energy subcode.[339] Predicated on the finding that energy efficient construction, although increasing construction costs, has a short payback period and usually results in net savings,[340] the new law permitted the energy subcode to be amended or supplemented by the Commissioner at any time without regard to the intervals between the initial adoption of the energy subcode and subsequent year revisions of that subcode.[341]

Furthermore, the amendments and supplements to the energy subcode are allowed to actually exceed the standard of the national model codes upon which they were based.[342] However, amendments which exceed the standards of the model energy code are only allowed if the payback period for the energy savings associated with the increased costs of the heightened standard was seven years or less.[343]

The Commissioner exercised this authority in adopting the IECC/2009 energy subcode with ASHRAE Standard 90.1-2007 for commercial building on September 7, 2010.[344] Following the official adoption of ASHRAE Standard 90.1-2007, builders had a six

[333] N.J.S.A. § 52:27D-125.
[334] Id.
[335] Id.
[336] Id.
[337] Id.
[338] Id.
[339] 2009 NJ Sess. Law Serv. Ch. 106 (Senate 702) (West).
[340] N.J.S.A. § 52:27D-122.2.
[341] 2009 NJ Sess. Law Serv. Ch. 106 (Senate 702) (West).
[342] N.J.S.A. § 52:27D-122.2.
[343] 2009 NJ Sess. Law Serv. Ch. 106 (Senate 702) (West).
[344] N.J.A.C. § 5:23-3.18.

month grace period during which plans for permit approval based on the old ASHRAE Standard 90.1-2004.[345]

Although New Jersey relatively recently replaced the old ASHRAE Standard 90.1-2004 with the updated ASHRAE Standard 90.1-2007,[346] that update was adopted during the tenure of former Governor Jon Corzine, whose commitment to improving energy efficiency via updated building codes was evidenced by his support for Senate Bill No. 702, temporarily eliminating the three-year mandatory interval between updates to the energy subcode, and permitting the Commissioner of the Department of Community Affairs to adopt certain energy subcode requirements that exceeded the national model codes.[347]

Although the generational admin has changed, it is worth noting that the 2011 Draft New Jersey Energy Master Plan[348] appears to treat the recent adoption of the IECC 2009 (incorporating ASHRAE Standard 90.1-2007 for commercial buildings) and the possibility of later adoptions of future model energy code updates favorably. [349]Although the Energy Master Plan does not explicitly endorse either the recent update to the energy subcode or potential future updates, it notes the past and future energy savings that such code updates are estimated to yield, at one point specifically highlighting that, although code updates tend to increase building construction costs, the payback period in energy savings for these increased costs is relatively short (less than 7 years).[350]

Code Enforcement

The relationship between construction codes and energy efficient commercial building construction is largely a three party affair. First is the substance of the codes themselves; the myriad number of provisions specifying what contractors are required or prohibited from doing when constructing a new commercial building. Second is statutory or regulatory process that determines the substance of the applicable codes. The third, and often neglected component, is the enforcement of the codes. The end goal of code enforcement is code compliance.[351] Regardless of how up-to-date the codes are, the improvements in energy efficient commercial building construction that such codes may achieve in the abstract will fail to materialize if they are not complied with. Whether construction codes are actually followed, and if so, to what degree and why, important in determining whether the predicted energy efficiency gains will be realized.

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[345] N.J.A.C. § 5:23-1.6.
[346] N.J.A.C. § 5:23-3.18.
[347] 2009 NJ Sess. Law Serv. Ch. 106 (Senate 702) (West).
[348] The New Jersey Energy Master Plan is a comprehensive plan outlining the current administration's "strategic vision for the use, management, and development of energy in New Jersey over the next decade." The Energy Master Plan is drafted by an "Energy Master Plan Committee" composed of the heads of various state agencies or their designees. State law requires a new version of the plan to be published once every three years, and requires that the plan include both long-term objectives and interim measures consistent with and necessary to achieving those objectives.
[349] New Jersey Energy Master Plan Committee, 2011 Draft Energy Master Plan (2011).
[350] Id.
[351] Northeast Energy Efficiency Partnerships, Model Progressive Building Energy Codes Policy for Northeast States (2009).

Although New Jersey is a "home rule" state that generally grants its municipalities a great deal of independence,[352] New Jersey law prohibits municipalities from modifying the substance of its codes contained within the State Uniform Construction Code Act.[353] Municipalities derive their authority from a grant by the State itself, meaning that powers and authority imbued in each municipality exist only to the extent that the State permits. Therefore, although New Jersey municipalities have extensive legislative and police powers, these powers cannot intrude into fields that the State has reserved for itself, such as code adoption and alteration. Although New Jersey municipalities do not have the power to alter existing State codes or enact additional codes themselves, they do have the power to recommend alterations and revisions to existing codes that the Commissioner, in consultation with the Code Advisory Board, may adopt or reject.[354]

Although municipalities are not permitted to make alterations to the official state codes, they are accorded the power to enforce those codes.[355] If a municipality chooses to enforce the building and energy codes, it must appoint a construction official as well as any additional subcode officials or technical assistants that may be necessary to assist such officials to administer and enforce the code.[356] If, however, a municipal enforcing agency is found to be failing to carry out its responsibilities under the State Uniform Construction Code Act, the Commissioner of the Department of Community Affairs may step in and supplant the municipality's normal power of enforcement.[357] If a municipality's failure to fulfil its responsibilities is confined to a specific project, the Department of Community Affairs may only supplant the municipality's code enforcement with respect to that specific project.[358] If, however, the Commissioner finds that the municipality has habitually failed to enforce its responsibilities under the State Uniform Construction Code Act, the Department of Community Affairs may order the local enforcing agency dissolved and take over its responsibilities.[359]

The Department of Community Affairs also has code enforcement authority in municipalities that have not established a code enforcement agency.[360] However, most municipalities choose to conduct their own code enforcement, because municipal code enforcing agencies are permitted to impose certain permitting and enforcement fees that provide an important stream of revenue and employment.[361] Furthermore, municipalities opting not to conduct code enforcement on their own are also responsible for paying the State fees in the amount necessary to defray any costs incurred by the State from enforcing

[352] Andrew J. Bruck & H. Joseph Pinto III, Overruled by Home Rule: The Problems with New Jersey's Latest Effort to Consolidate Municipalities, 32 Seton Hall Legis. J. 287 (2008).
[353] N.J.A.C. § 5:23-3.2 (stating that standards other than those incorporated in the New Jersey Administrative Code are void and have no effect).
[354] N.J.S.A. § 52:27D-123.
[355] N.J.S.A. § 52:27D-126.
[356] Id.
[357] N.J.S.A. § 52:27D-124.
[358] Twp. of Edison v. Coleman, 239 N.J. Super. 301, 310, 571 A.2d 312, 317 (N.J. Super. Ct. App. Div. 1990).
[359] In re Dep't of Cmty. Affairs Order of March 15, 1988 Regarding Burlington County Recycling Facility, 232 N.J. Super. 136, 142, 556 A.2d 807, 810 (N.J. Super. Ct. App. Div. 1989).
[360] N.J.S.A. § 52:27D-128.
[361] N.J.S.A. § 52:27D-126a.

the Uniform Construction Code in that municipality.[362] As of the writing of this study, thirty-six out of 566 (6.36%) New Jersey municipalities have opted not to enforce the UCC. Notwithstanding any other provisions in the State Uniform Construction Code Act, the Department of Community Affairs also has sole authority to enforce and administer the code in regard to State owned buildings and structures.[363]

Regardless of what entity may be acting as the enforcing authority, new building code compliance is checked during both the permitting and construction stages.[364] In order to obtain the building permits necessary to begin construction, the party seeking the building permits must submit an application containing plans for the proposed building to the appropriate enforcing authority.[365] The enforcing agency reviews the submitted application and issues a building permit if it determines that the plan conforms to all applicable codes.[366] After a construction permit has been issued, the enforcing agency then has authority to periodically inspect all construction undertaken pursuant to that permit in order to ensure that all such construction is in conformance with both the permit and all applicable codes.[367] If, during such an inspection, the enforcing agency determines that construction is being undertaken contrary to either the building permit or any applicable code, the enforcing agency has the authority to issue a stop construction order stating the violation and the conditions under which construction may be resumed.[368]

In most cases, properties do not need to be physically reviewed by an inspector for building code compliance before a certificate of occupancy is issued.[369] Officials are only required to inspect "the property and available municipal records" of existing buildings to determine that "the alleged use of the building or structure has lawfully existed." However, the issuance of the certificate of continued occupancy only shows that a "general inspection of the visible parts of the building has been made," and that there are no blatant violations requiring work or causing unsafe conditions.[370]

In all other instances, a property's owner or his agent need only file a written application for a certificate of occupancy, which includes a "statement by the responsible person in charge of work, that to the best of his or her knowledge all work has been completed in accordance with the permit and the regulations."[371] If a building has met the requirements based on the written application, the construction official is supposed to

[362] N.J.S.A. § 52:27D-128.
[363] N.J.S.A. § 52:27D-129.
[364] N.J.S.A. § 52:27D-131; N.J.S.A. § 52:27D-132.
[365] N.J.S.A. § 52:27D-131.
[366] Id.
[367] N.J.S.A. § 52:27D-132 (the owner of any premises upon which a building or structure is being constructed is deemed to have consented to the enforcing agency's inspection of said premise).
[368] Id.
[369] *See* N.J.A.C. 5:23-2.23, *available at* http://www.njpermits.com/faqs.asp#Text19_Anchor (last visited Sept. 13, 2011).
[370] *Id*.
[371] *Id*.

issue a certificate of occupancy within 10 business days of receiving the written application.[372]

New Jersey exercises oversight over the actual code enforcement process largely by means of a statutory provision that gives the State explicit permission to "monitor the compliance" of municipal enforcing agencies with the State Uniform Construction Code Act (in particular, its enforcement provisions), and order corrective action up to an including taking over the municipal enforcement agency's authority if it fails to enforce the provisions of the State Uniform Construction Code Act.[373]

In addition, with the exception of individuals who occupied governmental positions analogous to a code enforcement official prior to the enactment of the State Uniform Construction Code, New Jersey law requires that prospective subcode enforcement officials demonstrate that they have had prior experience in the construction and/or engineering industries,[374] and complete an approved subcode official educational program.[375] In addition, New Jersey conditions code enforcement license renewal, a process that must take place every three years, on a code enforcement official obtaining a certain number of Continuing Education Units.[376] Although the specific quality of the required training programs and the varying-year experience requirement are by no means guarantees that individuals successfully satisfying them will properly the code provisions they are tasked with enforcing, they nonetheless establish an important minimum degree of enforcement official qualification that can only help to improve effective code enforcement and the energy savings achieved thereby.

Although the more state specific data on New Jersey appears to indicate that it has devoted at least a moderate amount of resources to providing continuing education and training programs for code enforcement officials, the BCAP study nonetheless found that code enforcement officials reported a deficit in both the amount of training offered, as well as the specific ways in which training was offered.[377] Although it is unclear if such a finding applies to New Jersey, 37% of survey respondents indicated that continuing education on energy was not included in the state-mandated recertification/licensing program.[378]

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[372] *Id*.
[373] N.J.S.A. § 52:27D-124; N.J.A.C. § 5:23-4.3.
[374] N.J.S.A. § 52:27D-126; (The amount of experience required to be certified as a subcode enforcement official varies based on the type of experience possessed. In order to be certified, a prospective code enforcement official must have had at least three years' experience in construction, design or supervision as a licensed engineer or registered architect; or five years' experience in construction, design, or supervision as an architect or engineer with a bachelor's degree from an accredited institution of higher education; or ten years' experience in construction, design or supervision as a journeyman in a trade or as a contractor).
[375] N.J.A.C § 5:23-5.7 (the specific educational requirements vary according to the specific subcode an individual is seeking certification to enforce).
[376] N.J.A.C. § 5:23-5.21 (A Continuing Education Unit, or CEU, is awarded for every ten hours of training undertaken. The specific number of CEUs required for relicensing varies according to the license sought, with the licenses granting more authority requiring greater numbers of CEUs for relicensing).
[377] Id. at 15.
[378] Id. at 16.

Ensuring adequate staffing, training and time for code enforcement seem to be the biggest hurdles to effective code enforcement and compliance. Although it is unclear to what extent these specific issues can be directly applied to enforcement of the energy subcode for commercial buildings in NJ, they should nonetheless be at the forefront of policy efforts to increase commercial building EE. Allocating additional funds to hire more code enforcement officials and improving their training with respect to energy could give code enforcement officials both the time they need to fully inspect a building, and the knowledge they need to enforce the applicable codes.

Proposed Federal Legislation on Building Codes

On May 12, 2011 the Energy Savings & Industrial Competitiveness Act (ESICA) of 2011 was introduced by Sens. Jeanne Shaheen (D. N.H.) and Rob Portman (R. OH). The Act creates a national strategy to increase use of energy efficiency technologies.[379]

The new legislation would amend the Energy Conservation and Production Act (ECPA)[380] to direct the DOE to support development of national model building energy codes, state and local adoption of the codes, and full compliance with the codes.[381] The DOE would essentially establish and regularly update national model building energy codes for residential and commercial buildings from baselines of the 2009 IECC and ASHRAE Standard 90.1-2010.[382] The DOE would establish goals of zero-net-energy for new residential and commercial buildings by 2030. Energy savings targets would be set at the maximum level of energy efficiency that is technologically feasible and life-cycle cost effective, taking into account economic considerations.

Within one year of any revisions to the IECC or ASHRAE Standard 90.1, the DOE would be directed to determine whether the revisions improve energy efficiency and meet the targets. If so, then the revisions would be established as the national model building energy code. If not, the DOE would recommend changes to improve the codes to meet the target, and IECC or ASHRAE would have 180 days to incorporate changes to meet the targets. If the revision still did not meet the target, then the DOE would establish a modified national model building code that does, based on the latest edition of the IECC or ASHRAE Standard 90.1.

This bill will not directly impact the procedure by which Pennsylvania or New Jersey update and revise their building codes, but it will alter the considerations taken into account when doing so.

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[379] Alliance to Save Energy, *Sens. Shaheen, Portman to Announce Major Bipartisan Energy Bill*, http://ase.org/efficiencynews/sens-shaheen-portman-announce-major-bipartisan-energy-efficiency-bill (last visited June 27, 2011).
[380] 42 U.S.C.A. § 6831 *et seq.* (West 2011).
[381] *Id.*
[382] Alliance to Save Energy, *The Energy Savings and Industrial Competitiveness Act of 2011*, (available at http://shaheen.senate.gov/imo/media/doc/FINAL%20TEXT1.pdf) (all subsequent discussion of the ESICA refers to this document).

At DOE's discretion, the states would need to implement a revised UCC that meets the revised national model or achieves equivalent or greater energy savings to be eligible for certain grant money and other funding from DOE. Within two years of the establishment of a national model building energy code, states would be required to certify whether they have updated their codes. Within three years of certification, the state would certify whether or not they either:

1. Achieved compliance: at least 90% of building space covered by the code substantially meets code requirements, or excess energy use for non-compliant buildings is not greater than 5% of energy use of all covered buildings; or

2. Made significant progress: the state has developed and is implementing a plan for achieving compliance within 8-years of enactment, and is meeting compliance targets under the plan.

If a state does not meet the requirements, it must submit a report to the DOE explaining the status of the state's efforts to reach compliance and a plan to do so. In states out of conformance, localities would be allowed to meet the certification requirements themselves. Conformance may be required by the DOE as a prerequisite for grants or other support for code adoption/compliance activities. The DOE would provide technical assistance and incentive funding to states on building energy codes, and additional funding would be provided by the DOE to states or local governments in conformance to improve compliance. Up to $750,000 per state could be used to train state and local building code officials.

Although the ESICA of 2011 will not directly change the actual procedure by which states reviews, revises, or adopts new code provisions, if enacted, it would become the standard to which the state must compare its building code and would establish minimum compliance targets the state must adopt to be eligible for certain grant money and other funding.

Recommendations

First, recent changes to Pennsylvania's building code adoption procedures, discussed in detail in Section 1(c), are predicted to have a negative impact on the adoption of future model building and energy code provisions. The first test of the new code adoption procedures will occur in late 2011 and early 2012 when the Pennsylvania code adoption authority considers the 2012 updates to the ICC model codes. GPIC can work with other stakeholders to monitor and evaluate the impact of the revised code adoption procedure on EE.

Another opportunity for GPIC involvement is in further developing retrofit codes. New Jersey has a retrofit building code in place which has been recognized nationwide as a catalyst for retrofitting existing buildings. However, the retrofit code does not explicitly address energy efficiency issues. Pennsylvania does not currently have a retrofit building code, so this may be another opportunity for policy development.

Finally, the authors of this study recommend further analysis of the training, implementation and enforcement of the building and energy codes in commercial buildings. Depending on the study findings, GPIC may be able to help develop and pilot tools for enhancing code training and enforcement on energy efficiency.

2.5. Appliance Standards[383]

Beginning with the adoption of the 1987 National Appliance Energy Conservation Act (NAECA),[384] the Federal government has established minimum energy efficiency standards for certain residential and commercial appliances. Products regulated by Federal efficiency standards range from boilers and metal halide lamp fixtures in the commercial sector to dishwashers and toilets in the residential sector.[385]

Appliance standards are considered necessary to address the "demand side" and "supply side" barriers that impede advances in appliance and equipment efficiency. "Demand-side barriers" include lack of awareness among consumers regarding the economic and environmental benefits of energy efficient appliances and an imbalance in the costs and benefits of investing in higher efficiency appliances and equipment between owners/landlords and tenants .[386] Meanwhile, a key "supply-side" barrier is manufacturer price competition. A company that manufactures more energy efficient products and charges a higher price risks losing a portion of its market share to equivalent products that are less energy efficient, but have lower upfront costs.[387]

Appliance standards aim to eliminate these barriers by ensuring "that the playing field is level for all manufacturers" of regulated products.[388] By facilitating manufacturing and procurement of energy efficient products, these standards have lowered the cost of energy efficient technologies due to economies of scale and companies seeking to comply at a minimum cost.[389] As a result, these standards have generated energy and economic savings for commercial, industrial, and residential consumers. Specifically, 3.6% of energy use has been saved due to appliance standards enacted between 1987 and 2010.[390]

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[383] An in-depth review of appliance standards related to electric motors, lighting systems, and commercial refrigeration equipment is included as Appendix B.
[384] Gold et al., 1. "Appliance and Equipment Efficiency Standards: A Money Maker and Job Creator," ACEEE and ASAP." January 2011. http://www.appliance-standards.org/sites/default/files/Appliance-and-Equipment-Efficiency-Standards-Money-Maker-Job-Creator.pdf
[385] Id, 13.
[386] Nadel et al., 5. "Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards," ACEEE and ASAP. January 2005. http://www.clasponline.org/files/a051.pdf
[387] Neubauer et al., 6. "Ka-BOOM! The Power of Appliance Standards: Opportunities for New Federal Appliance and Equipment Standards," American Council for an Energy Efficient Economy (ACEEE) and Appliance Standards Awareness Project (ASAP). July 2009. http://www.appliance-standards.org/sites/default/files/A091_0.pdf
[388] Neubauer et al., 6.
[389] Id, 6.
[390] The Gold et al. report is the most recent joint ACEEE and ASAP study (January 2011) on appliance standards, and it is updated to assume that 5% of annual procurement of energy efficient products would occur without appliance standards. This "decay rate" is incorporated into the calculation and therefore lowers the amount of savings created by the standards. In turn, incorporation of the decay rate ensures a more accurate determination of standards' impact on energy savings. (Gold et al., 5)

Moreover, standards have reduced peak capacity[391] by 2.8% in 2000 and approximately 7.3% in 2010.[392] Energy savings from more efficient appliances is anticipated to save consumers in all three categories approximately $300 billion through 2030.[393] Equally important, appliance standards are estimated to have eliminated more than 241 million metric tons of carbon dioxide, matching the output of 96 coal-fired power plants.[394]

NAECA authorized the Department of Energy to establish new requirements and deadlines in order to incorporate additional appliances and strengthen preexisting standards.[395] As a result, twenty-three new appliance standards are due by January 1, 2013.[396] Despite its statutory mandate, however, the DOE has faced criticism regarding its promulgation of new appliance standards. On February 5, 2009, President Obama sent a public memo requesting that the DOE speed up its rulemaking process[397], and on November 16, 2010 the DOE announced a plan to implement changes to accelerate the rulemaking process.[398]

The overall impact of new appliance standards on energy efficiency depends on "a range of possibilities in future legislative and regulatory standards" that will determine to what extent standards apply to products that are already energy efficient, such as those rated by ENERGY STAR, as well as new products.[399] Under a suite of more "aggressive" efficiency standards that includes standards for previously unregulated products, electricity savings could reach 14% by 2025, which would "completely offset the anticipated growth in demand" in all three sectors and eliminate the need to construct any new power plants.[400]

Without new standards, the commercial sector is expected to experience the largest increase in electricity consumption, rising 19.5% between 2008 and 2025.[401] Although the impact of new standards will depend on the scope of standards included, research suggests that new requirements for products in the commercial sector would yield significant reductions in electricity consumption. The impact ranges from a collection of appliances that could save 0.1 quadrillion Btu (quads)[402] to fluorescent lamps that could save 4.3 quads.[403]

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[391] "Peak capacity": The constant output of electricity that generation equipment supplies to the system load. The term is also called net summer capacity. (Neubauer et al., 9)
[392] Id, 10.
[393] "Net benefit": Based on standards enacted between 1987 and 2009. (Id, 12)
[394] Id, 11.
[395] US Department of Energy, 18. "Multi-Year Program Plan for Energy Efficient Buildings." October 2010. http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/regulatory_programs_mypp.pdf
[396] Neubauer et al., 17.
[397] http://www.whitehouse.gov/the_press_office/ApplianceEfficiencyStandards/
[398] http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/changes_standards_process.pdf
[399] Rohmund et al., 2-3.
[400] Id, 17.
[401] Id, 13.
[402] "Quad": 1 quad equals the amount of energy needed for approximately 5.2 million homes. (Gold et al., 4)
[403] Neubauer, 13.

In particular, new lighting standards have substantial efficiency potential by decreasing electricity usage between 64 to 128 TWh[404] depending on the strength of the efficiency requirements. Meanwhile, efficiency benchmarks for office equipment would play an important role in generating new savings for businesses because this category of appliances is "currently not subject to any standards."[405] Proposed standards, such as those that require computers and servers to achieve energy performance levels equal to or 15% higher than ENERGY STAR, are predicted to save between 16 to 47 TWh.[406]

While the new standards raise upfront costs for commercial products, the long term financial savings and increased availability of energy efficient appliances improves the overall cost effectiveness of these products. Specifically, an energy efficient appliance's annual savings and payback period corresponds to the product's current average price and variability in energy consumption caused by fluctuations in the weather.[407] In periods with higher average prices, the payback period will be shorter; and where average prices are lower, the payback period will be longer.[408] The payback for other devices whose energy consumption varies according to the weather, such as heaters, furnaces, and boilers, will vary according to their actual use.

The states can also set appliance standards where the Federal government does not have the sole authority to regulate. As discussed in Part III Section A(1)(a), however, issues of Federalism and Constitutionality come into play with respect to state appliance standards. Federal standards generally prohibit states from setting standards higher than the Federal standards for regulated appliances. However, where no Federal regulation exists, states may set standards. At least thirteen states established their own state level appliance standards between 2003 and 2008.[409]

Pennsylvania and New Jersey Appliance Standards

New Jersey has the legislative authority to set state appliance standards, although no New Jersey standards are currently in force. Previously, New Jersey set state standards for commercial clothes washers, commercial refrigerators and freezers, illuminated exit signs, large packed AC greater than 20 tons, low-voltage dry-type transformers, vehicular traffic signals, and unit heaters, which have since been preempted by the Federal standards. Pennsylvania does not currently have authority in place to set state appliance standards.

The Federal appliance standards currently regulate beverage vending machines, commercial boilers, clothes washers, fluorescent ballasts, fluorescent lamps, incandescent reflector lamps, BR/exempted reflector lamps, liquid-immersed transformers, low-voltage

[404] "TWh": One terawatt hour equals one billion kWh. (Nadel et al., iv)
[405] Rohmund et al., 14.
[406] Id, 14.
[407] Neubauer, 23.
[408] *Id*.
[409] *Ka-Boom! The Power of Appliance Standards*, 1, Neubauer, Max, et al, American Council for an Energy Efficient Economy, July 2009.

dry type transformers, metal halide lamp fixtures, reach-in refrigerators and freezers, small electric motors, and walk-in refrigerators and freezers.[410] It is estimated that in Pennsylvania by 2020, these standards will result in 4,205 GWh of saved electricity, or a reduction of electricity bills by $571 million.[411] New Jersey is expected to realize savings of 2,705 GWh of electricity by 2020 and avoid $487 million in electricity bills.[412]

Recommendations

The government has an opportunity to compensate for all or a significant amount of expected escalations in commercial energy use through stronger appliance standards. The economic and environmental success of existing appliance standards predict that enhanced commercial appliance standard will generate increased energy and long term financial savings for commercial consumers. Meanwhile, the entire nation may benefit from decreased emissions both directly and through decreased need for additional power generation.

However, some have noted that with increasing levels of energy efficiency, technical issues regarding the impact of appliances on the whole structure and the other systems become more acute. As a result, at higher levels of efficiency, there may need to be additional flexibility built in to allow for different technical, building and climate issues.

GPIC could play a variety of roles in facilitating additional appliance standards. GPIC could develop or test the impact, both technical and financial, of additional appliance standards. GPIC could also work with state regulators and stakeholders to identify potential opportunities for state specific standards. Finally, GPIC could explore the opportunity for enabling legislation in Pennsylvania for state appliance standards.

2.6. Demand Response

Proponents of energy efficient buildings have repeatedly noted the importance of demand response—allowing the energy customer to manage consumption of electricity in response to supply conditions. To do so, consumers of energy must be able to have information about their energy use in sufficient time and detail to respond to market conditions. Demand response technology, particularly in the form of "smart meters," is designed to provide energy use information to consumers.

Smart meters are computerized energy meters that record consumption of energy at regular intervals, and communicate energy use information back to the utility for monitoring and billing purposes, and to the consumer for demand response. Thus, smart meters enable two-way communication between the consumer and the utility, enabling

[410] Appliance Standards Awareness Project, *State-Level Benefits from Potential Federal Appliance Standards – Pennsylvania*, http://www.appliance-standards.org/sites/default/files/fedappl_pa.pdf (last visited August 16, 2011).
[411] *Id*.
[412] [412] Appliance Standards Awareness Project, *State-Level Benefits from Potential Federal Appliance Standards – New Jersey*, http://www.appliance-standards.org/sites/default/files/fedappl_nj.pdf (last visited August 16, 2011).

utilities to implement pricing structures which vary according to supply conditions, and theoretically allowing real time customer response to supply conditions.

The value of implementation of smart meters is not universally accepted, however. Criticism levied against smart meter implementation primarily concerns cost, privacy, and social justice.

Critics of the implementation of smart meters maintain that it increases costs to ratepayers without the guarantee of any economic benefit from reduced energy use, requires unknown overall cost when the grid system improvements necessary to implement demand pricing are considered, and increased cost to consumers from purchasing related smart appliances.[413]

Critics also contend that customers' time-of-use billing remains unpopular, even with customers who already have the ability to manage demand. Meanwhile, low energy users, who do not have as much flexibility in shifting their energy use habits (or who have already implemented energy efficiency measures) will be saddled with higher energy costs.

Further, critics have concern that time-of-use rate structures will disproportionately affect elderly customers, people vulnerable to heat, or cold, the disabled, and families with young children.[414] The ability to disconnect users remotely may cause utilities to disconnect low income users who have difficulty paying their bills more readily.[415]

With respect to commercial customers, energy cost factors are certainly a concern, as investment in smart metering infrastructure is generally passed on to ratepayers, increasing energy bills. Concerns over cost to residential ratepayers, privacy and social justice may impact owners of multi-family and mixed use facilities, as well.

Opponents to smart meter deployment have filed lawsuits and effectively slowed- or derailed smart meter deployment.

In Bakersfield, California, a homeowner sued Pacific Gas and Electric on behalf of himself and a class of smart meter recipients. The original plaintiff, Bakersfield resident Pete Flores, filed the suit after his electric bill tripled fro $200 to $600 a month — right after having a new smart meter installed in his home. Objecting that PG&E described the meter as a money-saving device, he decided to sue for fraudulent advertising, negligence and unjust enrichment. Other smart meter lawsuits have been filed in Texas.

Public opposition to smart meters has also led public utility commissions to scrutinize and reject utility smart meter plans. Despite the promise of $200 million Smart Grid stimulus grant to Baltimore Gas & Electric (BGE) in 2009, the Public Service Commission of Maryland rejected implementation of BGE's "smart grid" metering in June

[413] Energy Bar Association Panel Discussing the Smart Grid, 31 ENERGY L.J. 81, 100-103 (Dec. 4, 2009).
[414] Id. at 103.
[415] Id. at 103.

2010 in response to public concerns that rate increases and tiered pricing that would increase costs for consumers.

Others critics suspect a more nefarious purpose for smart meters. The MasterResource Blog, which bills itself as a "A free-market energy blog" had this objection to the proposed Maryland smart meters:

> And last but not least, smart meters are intrusive. Big Environmental Brother lurks behind each smart meter to tell you what to do and when to do it. Civil libertarians take note of this government-dependent machine.

Pennsylvania is leading implementation of smart metering, while New Jersey has been reluctant to allow utilities to implement (and recover the cost of) smart meter deployment. The difference in adoption of smart meters between Pennsylvania and New Jersey is another area where comparative study on consumer energy management behavior may be fruitful.

Smart Metering in Pennsylvania

Pennsylvania is one of the leaders in smart meter deployment. Act 129 of 2008 In Pennsylvania required EDCs with more than 100,000 customers to furnish smart meter technology upon request; in new building construction; and have a full deployment schedule in less than fifteen years. Each smart meter plan must include:

- A summary of the EDC's current deployment of smart meter technology, if any;
- A plan for future deployment, complete with dates for key milestone and measurable goals;
- A proposal for access to data for third parties including electric generation suppliers and providers of conservation and load management services; and
- A plan for cost recovery either through base rates or a reconcilable automatic adjustment clause.

Act 129 also directed that smart meter technology must provide customers with direct access to and use of price and consumption information, such as hourly consumption; the ability to support time-of-use rates and real-time price programs; and automatic control of electric consumption by the customer.

Although some EDCs have progressed further in smart meter deployment than others, the PUC has approved procurement and implementations from all of the Pennsylvania EDCs that will achieve deployment within the fifteen year mandate.

PECO, Pennsylvania's largest utility company, and the primary EDC in the Pennsylvania portion of the Greater Philadelphia Area, expects to initiate installation of smart meters and their peripheral support and enabling technology by August 2012 and

finish within ten years.[416] Originally PECO planned to deploy about 100,000 smart meters in its initial phase of deployment, but a Department of Energy matching stimulus grant via the American Recovery and Reinvestment Act of 2009 allowed PECO to accelerate deployment, increasing the estimated number of smart meters to 600,000 during its initial phase and completing universal deployment in 10 years rather than the mandated 15 years.[417]

PECO plans to deploy smart meters in two phases.[418] In the first and currently ongoing phase of development, PECO will select and develop technology and infrastructure as well as deploy up to 600,000 smart meters.[419] This phase will include smart meter purchase and installation, network communications system, information technology applications and support, and customer acceptance testing.[420] Smart meters will be deployed as the technology is tested, its infrastructure developed, and the system allows.[421]

Once PECO completes its first phase of deployment, PECO will submit another plan to the PUC detailing projected universal smart meter deployment to its remaining customers. Id. PECO plans to initiate complete deployment of smart meters in Phase Two, expected to begin by August 2012.

In addition to the requirements enumerated by the Implementation Order, PECO plans to equip each smart meter with a home area network radio that will make possible future implementation of load control interventions of high-energy consuming devices like air conditioning units and hot water heaters. This added feature will also allow for real time pricing, critical peak pricing, and peak time rebate programs. Id. at 41-42.

Although the PECO Plan filed with the PPUC initially estimates costs at $500 million to $550 million, PECO now estimates the total project cost at $650 million, making it one of the largest investments in the company's 100 year history.[422] These costs were supplemented, in part, by a $200 million Department of Energy stimulus grant that goes toward developing the meter data management system, advanced meter network, and initial meter deployment. The remaining costs will be recovered from ratepayers through a reconcilable surcharge in accordance with Act 129 This charge will initially apply to all

[416] Smart Grid/Smart Meter, PECO, www.peco.com/aboutpeco/smartmeterssmartfuture/ (last accessed July 22, 2011).
[417] Smart Grid/Smart Meter, PECO, www.peco.com/aboutpeco/smartmeterssmartfuture (last accessed July 22, 2011).
[418] Petition of PECO Energy Company for Approval of its Smart Meter Technology Procurement and Installation Plan (hereinafter PECO Plan), PECO, Docket No. M-2009-2123944 (submitted Aug. 14, 2009), p. 2, *available at:* www.peco.com/NR/rdonlyres/9D8E9E91-7D41-487F-B884-7A30213812D2/7663/PECOSmartMeterPlan.pdf.
[419] Smart Grid/Smart Meter, PECO, www.peco.com/aboutpeco/smartmeterssmartfuture/ (last accessed July 22, 2011).
[420] PECO Plan at 24-25.
[421] Id.
[422] Smart Grid / Smart Meter, PECO, www.peco.com/aboutpeco/smartmeterssmartfuture/ (last accessed July 22, 2011).

ratepayers in the PECO distribution network regardless of the electric generation supplier.[423]

Smart Metering in New Jersey

New Jersey has a completely different regulatory environment for demand response through utility-deployed smart meters. Utility regulators in New Jersey have been reluctant to allow utilities to pass the costs of smart meters on to ratepayers. As a result of the regulatory obstacles, planned smart meter deployments by PSE&G and Atlantic City Electric were dropped in 2009.[424]

Very large commercial and industrial customers already have two-way metering communication in place. All commercial and industrial customers with demand of 1,000 kW and above have interval meters that store power use data at regular intervals and two-way communications that support dynamic pricing. Customers with demand above 750 kW have interval meters, but are not required to have two-way communications. This customer class is quite small, however, about 700 customers statewide.

Despite prior reluctance, the 2011 Draft Energy Master Plan calls for New Jersey to "expand implementation of smart meters and gradually expose customers with lower energy demands who wish to take advantage of dynamic pricing to encourage wiser energy use and reduce retail prices for all residents," indicating that the regulatory and political climate may be more receptive to smart meter efforts now than in the recent past. However, regulatory opposition to smart meter deployment is still active. According to New Jersey Spotlight, at a recent hearing on New Jersey's Energy Master Plan"

> New Jersey Division of Rate Counsel Director Stefanie Brand cautioned the state Board of Public Utilities (BPU) to move very slowly on advanced meters for all customers, saying that while it may make sense for some ratepayers, it could force small businesses, such as a bodega in Newark with huge refrigeration needs, out of business. The smaller grocery stores would face steep charges if they had to pay higher electricity costs at peak demand times during the summer. For residents, Brand said "the cost of the meter may be more than what they would save on energy bills." In addition, she noted there was an issue revolving around awarding utilities "stranded costs" to recover their investment in the old meters, some of which would not have been fully paid off by the customer.[425]

3. DIRECT AND INDIRECT BARRIERS TO ENERGY EFFICIENCY

[423] PECO Plan at 43-45.
[424] Gruen, A., "In N.J., smart meter program stymied by cost concerns," New Jersey Star-Ledger, October 3, 2010, available at http://www.nj.com/business/index.ssf/2010/10/in_nj_smart_meter_program_stym.html.
[425] Johnson, T., "Utilities Say They Can Help State Cut Power Consumption, Boost Reliance on Renewables," New Jersey Spotlight, July 28, 2011 available at http://www.njspotlight.com/stories/11/0727/2153/.

3.1. Government Structure

One of the key findings in the comprehensive McKinsey Company study on "Unlocking Energy Efficiency in the U.S. Economy" was to "Forge greater alignment across utilities, regulators, government agencies, manufacturers and energy consumers."[426] This is a tall order.

In the Greater Philadelphia Area alone there is the Federal government, two state governments, ten counties, 369 municipalities and four electric and five natural gas utilities, not to mention countless authorities and quasi-governmental agencies. Each of these governmental units has some involvement in commercial building energy efficiency.

Historically, there has always been conflict over the scope of the regulatory authority of the Federal government versus that of the state governments, and correspondingly, with state governments versus that of municipal governments. In addition, different regulatory entities have different areas of authority—like energy or construction or economic development—which may work at cross-purposes.

Therefore, in addition to specific policies and processes which impact EE, it is critical to recognize the impact the system as a whole has on effectively regulating and incentivizing EE construction.

As in the McKinsey study, a primary recommendation of the authors of this study is for GPIC to advocate for comprehensive and consistent policy development across governmental silos, and provide the catalyst for such intergovernmental communication and collaboration. If regulators and politicians in New Jersey and Pennsylvania, and the various municipalities, counties, etc. therein can forge alliances for a common effort to promote EE, it can serve as a model for other jurisdictions to do the same. Although there will never be complete alignment in a system with so many players, the goal is well worth promoting and striving for.[427]

Federalism

Historically, there has always conflict over the scope of the regulatory authority of the Federal government versus that of the state governments. The Constitution established various mechanisms for determining the scope and extent of each level of governmental authority. With state governments, local governments and now the Federal government seeking to regulate energy efficiency, Federalism conflicts have been swift to arrive. Indeed, in 2008, the Air Conditioning, Heating and Refrigeration Institute and other heating/ventilation/air conditioning and water heating equipment trade organizations, contractors and distributors sued the City of Albuquerque in Federal district court to stop

[426] Unlocking at xiii.
[427] Much of the section on Federalism was drawn from Shari Shapiro, *Who Should Regulate? Federalism and Conflict in Regulation of Green Buildings*, 34 Wm. & Mary Envtl. L. & Pol'y Rev. 257 (2009), http://scholarship.law.wm.edu/wmelpr/vol34/iss1/8

components of the city's high performance building code from taking effect, arguing that the local government's authority to regulate was expressly preempted by Congressional action. Constitutional Federalism considerations, including Federal preemption, state preemption and Commerce Clause restrictions, all impact energy efficiency regulation.

Federal Preemption

Article VI of the Constitution established the supremacy of Federal laws over conflicting state laws. The Supremacy Clause provides:

> This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding.

Thus, conflicting state laws are "preempted" by Federal action in a given regulatory arena. There are two types of preemption, both of which impact energy efficiency regulation—express preemption and implied preemption. Express preemption exists where Congress "expressly" chooses to prohibit states from regulating a particular area. The only legal question which remains when Congress expressly preempts state regulation is whether the challenged state law is one that the Federal law is intended to preempt. Implied preemption exists where the Federal government "dominates the field" of regulation, where Congress has left "no room" for state regulation. In a case of implied preemption, the courts must analyze the pervasiveness of the Federal scheme of regulation, the Federal interest at stake, and the danger of frustration of Federal goals in making the determination as to whether a challenged state law can stand.[428]

At least two prominent cases of direct preemption have already emerged challenging local government energy efficiency regulation: *AHRI v. City of Albuquerque*[429] and *BIA v. State of Washington*.[430] Both cases involve challenges to the extent of a local government's authority to regulate energy efficiency. Both the state of Washington and the city of Albuquerque enacted energy codes that aimed to decrease the energy use of their building stock. Albuquerque's code offered a choice of compliance options including both a set of prescribed measures and an option permitting developers to demonstrate compliance with a performance-based standard, such as LEED. Washington's code limited developers to a choice among performance-based measures. At the heart of the controversies was the Federally-mandated appliance efficiency standards for air conditioners, furnaces, heat pumps and water heaters established by the Energy Policy and

[428] See Pennsylvania v. Nelson, 3560 U.S. 497 at 502-505 (1956).

[429] *Air Conditioning, Heating, and Refrigeration Institute v. City of Albuquerque*, 2008 U.S. Dist. LEXIS 106706 (D.N.M. Oct. 3, 2008) (hereinafter "AHRI").

[430] *Bldg. Indus. Ass'n of Wash. v. Wash. State Bldg. Code Council*, 2011 U.S. Dist. LEXIS 12316 (W.D. Wash. Feb. 7, 2011) (hereinafter "BIA").

Conservation Act of 1975 (EPCA).[431] A more detailed analysis of appliance efficiency standards is included in Part II Section E.

The EPCA was enacted during the fossil fuel crisis of the 1970s to reduce petroleum usage. It created, among other features, the national petroleum reserve and vehicle fuel economy standards. The EPCA also established energy efficiency standards for certain equipment, including air conditioners, furnaces, heat pumps and water heaters.

The plaintiffs in both the *AHRI* and *BIA* cases were building industry trade associations. The plaintiffs argued that the EPCA preempts local governments' ability to regulate the energy efficiency of heating, ventilation, and air-conditioning (HVAC) products. Therefore, the plaintiffs alleged, local energy reduction requirements mandating energy-efficient HVAC equipment or requiring a reduction in energy use that could not be achieved without installing HVAC equipment that was more efficient than the Federal standards, were beyond the local governments' jurisdictional authority.

On October 3, 2008, the judge assigned to the *AHRI* case, Chief District Court Judge Martha Vazquez, not only granted the preliminary injunction, but opined that the Albuquerque Code was indeed preempted. Several aspects of Judge Vazquez's opinion were very significant. First, of course, is the conclusion that the plaintiffs were likely to prevail on the merits of their claim that the Code was preempted. After analyzing the provisions of the EPCA, Judge Vazquez concluded:

> "[t]here is no doubt that Congress intended to preempt state regulation of the energy efficiency of certain building appliances in order to have uniform, express, national energy efficiency standards."[432]

Perhaps more significant in terms of the risks associated with new green building regulations, the judge noted in her opinion an astonishing fact: "[a]t the time the Code was drafted, the Green Building Manager, by his own admission, was unaware of Federal statutes governing the energy efficiency of HVAC products and water heaters and the City attorneys who reviewed the Code did not raise the preemption issue."[433]

In September, 2010, Judge Vazquez granted partial summary judgment to the plaintiffs, which left some essential questions unanswered. The Court held that the prescriptive compliance paths in the Albuquerque Code were expressly preempted by applicable Federal legislation. In other words, the parts of the code which required HVAC

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[431] EPCA, 42 U.S.C. 6201, *et seq.*, as amended by the National Appliance Energy Conservation Act (NAECA), Pub. L. No. 100-102 (1987) (codified as amended as 42 U.S.C. §§ 6291-6293, 6295-6297, 6305-6306, 6308 (2006)), and the Energy Policy Act of 1992 (EPACT), 42 U.S.C. § 6311-17.

[432] *AHRI*, 2008 U.S. Dist. LEXIS 106706, at *13.

[433] *Id*.

equipment exceeding the Federal standards were explicitly preempted as a matter of law by EPCA.

However, Judge Vazquez declined to grant summary judgment on the preemption of the performance paths of the Albuquerque code. The Court concluded:

> "[t]he preemption statute applies to 'products.' Plaintiffs state that LEED Silver and Build Green New Mexico . . . are regulations concerning energy efficiency or energy use of covered products but do not point to the relevant provisions of LEED Silver or Build Green New Mexico."[434]

In other words, Judge Vazquez declined to rule on whether LEED or other compliance options allowing flexibility in reaching the prescribed energy efficiency requirements (here, 30% reduction) were preempted by the EPCA. However, she did not deny summary judgment based on facts. Rather, in denying summary judgment, she merely stated that there was still an open factual question as to whether the performance paths were preempted by the EPCA. In the end, Judge Vazquez may conclude that the only way to meet the criteria of these compliance options is to install HVAC equipment that exceeds the EPCA. In that case, Judge Vazquez may decide that even Albuquerque's performance options are preempted.

While the *AHRI* case was pending, in May, 2010, the Building Industry Association and other plaintiffs sued the State of Washington on similar grounds. Unlike the signals from Judge Vazquez, the Court in the Washington case concluded that Washington's compliance options did not violate the EPCA, distinguishing the preliminary injunction granted the City of Albuquerque plaintiffs on the grounds that:

> "In that case, the District Court found, at that stage, that the plaintiff had shown that Albuquerque's code's 'performance-based alternatives, as a practical matter, cannot be met with products that meet, but do not exceed' the Federal standards. Plaintiffs here have not made any such showing. Further, there appear to be substantial differences in the Albuquerque code and Washington's code."[435]

Courts are often influenced by their sister court's analyses and conclusions, and the decision in *BIA* may set a precedent that performance-based standards do not violate the EPCA. If, however, Judge Vazquez determines that the performance paths in the Albuquerque codes *do* violate the EPCA, there will be a split between the District of New Mexico and the Western District of Washington, complicating matters further for local

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[434] *AHRI v. City of Albuquerque*, No. 08-633-MV-RLP, slip op. 10 (D.N.M. Sept. 30, 2010), *available at* http://www.greenrealestatelaw.com/wp-content/uploads/2010/10/https___ecf.nmd_.uscourts.gov_cgi-bin_show_temp.pl_file3347820-0-12413.pdf

[435] *BIA*, 2011 U.S. Dist. LEXIS 12316, at *26.

governments seeking to implement energy efficient building codes. Finally, the plaintiffs in the *BIA* case have appealed the decision upholding the Washington code.

Although the AHRI and the BIA case present examples of express Federal preemption, the cases could easily have been subject to an implied preemption analysis if the EPCA did not contain an express preemption provisions, posing a harder case. If the EPCA had simply regulated the energy efficiency of heating and air conditioning equipment, the courts would have had to determine if Congress intended to dominate the field with its regulation. If Federal regulation of energy efficiency becomes more pervasive, the courts will doubtless be called on to make this type of determination.

Beyond the specifics of the cases, at heart they demonstrate the complexity of energy efficiency regulation. Regulators seeking to enact energy efficiency regulations must address the interplay between local, state and Federal jurisdictional authority over sites, construction, electricity, water and products, and recognize that such regulations may be challenged in court.

State Preemption

In addition to Federal preemption, another layer of intergovernmental conflict impacts energy efficiency regulation—state preemption. State preemption works like Federal preemption, except that the regulatory authority of local governments is constrained by regulation taken at the state level.

A great example of the impact of state preemption on building regulation comes out of Pennsylvania. In 2004, Pennsylvania adopted the Uniform Construction Code (UCC), a common building code for all municipalities in Pennsylvania, discussed in further detail in Part II Section D. The UCC in itself does not prevent local governments from passing green building regulations related to the building code as long as:

- the requirements are equal to or more stringent than the UCC,
- the local government secures approval from Pennsylvania's Department of Labor and Industry,
- the local government provides appropriate public notice

Pennsylvania's Department of Labor and Industry will evaluate the proposed change based on the following criteria:

(i) that certain clear and convincing local climatic, geologic, topographic or public health and safety circumstances or conditions justify the exception;

(ii) the exception shall be adequate for the purpose intended and

shall meet a standard of performance equal to or greater than that

prescribed by the Uniform Construction Code;

(iii) the exception would not diminish or threaten the health, safety

and welfare of the public; and

(iv) the exception would not be inconsistent with the legislative

findings and purpose described in section 102.

In *Schuylkill Twp. v. Pa. Builders Ass'n*, 935 A.2d 575 (Pa. Commw. Ct. 2007), the Commonwealth Court held that townships must prove that "the conditions there were so different from the statewide norm that the uniform standards were not appropriate to use in the Township," in order to satisfy the "clear and convincing" standard for an exception to the UCC.

In October, 2010, the Pennsylvania Supreme Court upheld the Commonwealth Court's decision, holding:

> The [Pennsylvania Construction Code Act] led to the adoption of uniform standards for Pennsylvania's 2,566 municipalities. The concepts of uniformity and public health are underlying principles of the [Uniform Construction Code]…The burden of proving local circumstances and conditions justifying a UCC exception is high…[436]

The Supreme Court's decision that atypicality is required means that local governments will have a very difficult time enacting energy efficiency standards which require building practices different from those in the UCC. It is very hard to argue that the benefits of energy efficient construction are different in one township than any other in Pennsylvania. The UCC has essentially preempted local governments from developing independent energy efficient building requirements.

Commerce Clause

In addition to the Supremacy Clause, the Commerce Clause also poses significant Federalism concerns for energy efficient building regulation. The Commerce Clause provides:

[436] Schuylkill Tp. v. Pennsylvania Builders Ass'n, 7 A.3d 249, 253-254 (Pa. 2010).

> The Congress shall have Power... To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes.

As with the Supremacy Clause, the Commerce Clause established the supreme authority of the Federal government to control regulation of commerce "among the several states." Over the past two hundred years, the Courts have establish a complex jurisprudential framework to determine the extent and nature of states' authority to regulate commerce when it impacts interstate commerce.

Most broadly, the current jurisprudential position has three basic tenets: where a state attempts to discriminate against interstate commerce, the law is per se unconstitutional. Where a state acts as a market participant—for example, by sourcing exclusively in-state materials for its own construction projects—the regulation is not restricted by the Commerce Clause. Finally, the remaining cases are judged under a balancing test which seeks to balance legitimate state interests with those of protecting interstate commerce.

Energy efficiency regulations may run afoul of the Commerce Clause very readily. For example, the *AHRI* plaintiffs specifically alleged that the Albuquerque green building regulations violated the Commerce Clause, claiming:

> Distributors and Contractors in nearby cities and States which have not adopted the same regulatory provisions challenged in this action will not suffer the same or similar adverse effects on their business, nor will distributors in any other city or State which has not adopted those same regulatory provisions. Those effects place the distributor Plaintiffs and all other Albuquerque distributors within a uniquely affected class harmed by the regulatory provisions challenged in this action.

Thus, state or local regulations that attempt to mandate energy efficiency through higher appliance standards for HVAC and other regulated equipment may run into Commerce Clause objections.

Where higher levels of government act to regulate, as in the case of the EPCA or the Pennsylvania UCC, lower levels of government can be constrained in their ability to regulate, and face stiff Constitutional challenges. However, with the many, often conflicting, priorities of the Federal government, it is often desirable for states and localities to act. As with any Federalist system, there is no perfect solution. However, the Federalism conflict inherent in American governance, and particularly applicable to energy efficiency regulation, must be addressed.

Government Fragmentation

Americans have a lot of government. Taking the Greater Philadelphia Area as an example, the people are governed by:

1. Federal government
2. Two state governments
3. Ten county governments
4. Three hundred ninety three municipal governments
5. Five electric utilities
6. Six natural gas utilities
7. Countless quasi-governmental authorities and agencies

Energy efficient buildings are impacted by all Federal, state and local government entities regulating both energy and buildings. In the Federal government alone this includes at least fifteen agencies, including, but not limited to:

With respect to energy:

(1) Department of Energy

(a) Energy Information Administration

(b) Federal Energy Regulatory Commission

(2) Environmental Protection Agency

(3) Commerce Department

(a) Patent & Trademark Office

(4) Nuclear Regulatory Commission

(5) Federal Trade Commission

(6) Office of Management and Budget

With respect to buildings:

(1) Department of Energy

(2) Environmental Protection Agency

(3) General Services Administration

(4) Occupational Health and Safety Administration

(5) Department of Homeland Security (DHS)

(6) Department of Housing and Urban Development (HUD)

(7) Commerce Department

(a) National Institute of Standards and Technology

(8) Federal Deposit Insurance Corporation

(9) Federal Housing Finance Administration

With respect to incentives, the Department of Treasury and the Internal Revenue Service must be added to the list.

Both the New Jersey and Pennsylvania state governments have similar structures of authority. In addition, most building decisions, including zoning and code compliance, are administered at the municipal level.

Finally, utilities also play a key role in energy efficient construction issues. There are multiple utilities servicing the Greater Philadelphia Area, and state utility boards which govern their operations.

Needless to say, each government entity has its own area of specialization, goals, regulated communities and constituents. Often the different government entities work at cross purposes, defeating regulatory efforts to promote energy efficiency. The derailing of Property Assessed Clean Energy financing (PACE), described above in Part II Section C(2) provides a particularly relevant example.

PACE is a local government program that allows property owners to finance energy efficiency and renewable energy projects for their homes and commercial buildings. Property owners receive upfront financing for energy efficiency improvements through a local government financed mechanism (a bond or other financing source). The property owner repays the financing through a property tax assessment. PACE financing spreads the cost of energy improvements over the expected life of the measures, and allows for the repayment obligation to transfer automatically to the next property owner if the property is sold. However, like all municipal assessments, PACE assessments have a senior lien priority to private mortgage payments in the event of a default.

Many states and local governments initiated PACE programs, and they were initially quite popular. In addition to the state and local funds, the American Recovery and

Reinvestment Act ("ARRA") allocated another $150 million for PACE programs. Also, on October 18, 2009, the White House issued a policy framework for PACE programs.[437]

On July 6, 2010, the Federal Housing Finance Authority (FHFA), released guidance advising Fannie May and Freddie Mac not to work with loans that took advantage of PACE financing because of the risk associated with senior property liens. This essentially ground all PACE programs to a halt. If the main mortgage lenders would not lend to properties with PACE assessments, no property owner (or local government) would assume a PACE loan.

Although the majority of commercial mortgages are not backed by Fannie Mae and Freddie Mac, and therefore PACE financing for commercial properties could have continued, "Commercial PACE has been developing slowly . . . due to concern that a statement from a governing body could freeze commercial PACE . . . "[438]

This is a prime example of how lack of governmental coordination can impact implementation of energy efficiency programs. On the one hand, the White House and state and local governments were promoting PACE. On the other hand, FHFA and associated organizations refused to finance PACE-assessed properties. As of the date of this study, at least three different pieces of legislation had been introduced in Congress to resolve the dispute about PACE.

As in the McKinsey study, a primary recommendation of the authors of this study is **for GPIC to advocate for comprehensive and consistent policy development across governmental silos, and provide the catalyst for such intergovernmental communication and collaboration.** If regulators and politicians in New Jersey and Pennsylvania, and the various municipalities, counties, etc. therein can forge alliances for a common effort to promote EE, it can serve as a model for other jurisdictions to do the same. Although there will never be complete alignment in a system with so many players, the goal is well worth promoting and striving for.[439]

3.2. Utility Rate Structuring

As discussed above in Part II Section B, utility rate structures can be a significant regulatory barriers to fully investing utilities in EE. First, the regulatory structure that governs how utilities are compensated and the return utilities earn on their capital investments at best renders the utilities neutral regarding EE, and at worst actively disincentivizes EE investment. In addition, EE is only one of the factors that goes into

[437] Policy Framework for PACE Financing Programs, October 18, 2009 available at http://www.whitehouse.gov/assets/documents/PACE_Principles.pdf.
[438] Joey Christiano, *Can Commercial PACE Financing Drive $2.5 Billion in Energy Efficiency Investments?*, TriplePundit.com (May 11, 2011), http://www.triplepundit.com/2011/05/commercial-pace-financing-drive-25-billion-energy-efficiency-investments/ (last visited Sept. 9, 2011).
[439] Much of the section on Federalism was drawn from Shari Shapiro, *Who Should Regulate? Federalism and Conflict in Regulation of Green Buildings*, 34 Wm. & Mary Envtl. L. & Pol'y Rev. 257 (2009), http://scholarship.law.wm.edu/wmelpr/vol34/iss1/8

setting utility rates, and it is not even in the top five considerations for utilities, utility regulators and customer interest groups. Utilities and regulators place higher priority on providing safe and reliable utility service, keeping rates fair and reasonable to ratepayers, earning a reasonable return on utility investment, covering the costs of maintaining and upgrading utility infrastructure and addressing the needs of utility employees. EE must compete with these priorities as a consideration in the ratemaking process. Thus, even if the regulations allow for reasonable return on equity for investments in EE, regulators must also place a priority on promoting EE in balancing the factors involved in setting utility rates.

As part of the GPIC efforts, further work should be done on the practicality and opportunity to promote EE through ratemaking changes. Some possibilities include:

- Analyzing the EE results of rate decoupling at South Jersey Gas and New Jersey Natural,
- Piloting ratemaking structures which allow utilities to recover lost revenues resulting from EE;
- Incentivizing utilities for exceeding the EE targets in Act 129;
- Allowing decoupled rates in Pennsylvania, and allowing for decoupling for electric utilities in New Jersey.

3.3. Prevailing Wage

In general, prevailing wage laws require contractors engaged in publicly funded projects to pay their workers at least the same amount that is commonly paid for similar labor in the geographic area where the project is occurring.[440] The Davis-Bacon Act[441] sets prevailing wages[442] for Federally funded projects[443] while thirty-two states, including New Jersey and Pennsylvania, have enacted legislation requiring prevailing wages for state funded projects.[444] Most state prevailing wage statutes are triggered by a pre-determined contract value of publicly funded projects.[445] "Publically funded" often includes private projects that receive state or Federally funded incentives, including incentives for energy efficiency.

Prevailing wage can act as a barrier to energy efficiency projects. Most analysis of the impact of prevailing wages estimate an increase of 10% of project costs. For large projects, where union labor would normally be required regardless, the prevailing wage

[440] Hansen, Lee. Prevailing Wage Contract Thresholds in Other States. OLR Research Report (December 23, 2010). http://www.cga.ct.gov/2010/rpt/2010-R-0526.htm at 1.
[441] *See* Davis-Bacon Wage Determination Reference Material. http://www.gpo.gov/davisbacon/referencemat.html.
[442] Federal prevailing wage determinations reflect state determinations (where applicable) and are issued by the United States Department of Labor. http://www.gpo.gov/davisbacon/allstates.html.
[443] Many Federal programs, such as the American Recovery and Reinvestment Act, also state that all recipients of Federal funds must adhere to prevailing wage standards. American Recovery and Reinvestment Act, §1606, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf at 189.
[444] Hansen at 1.
[445] *Id*.

requirements do not generally cause a problem. However, for smaller projects, the cost increase associated with prevailing wage: (i) makes projects less financially desirable and increases the payback period; (ii) requires higher upfront investment, and, (iii) the increase in project costs often outstrips the value of incentives that trigger the prevailing wage requirements. In addition, some contractors are unwilling to undertake the reporting and administrative requirements associated with prevailing wage regulations.

Prevailing wage represents a phenomenon known as "policy stacking." Originally, the Davis-Bacon Act, the Federal prevailing wage law, stems from a Depression-era practice of transporting workers from lower-paying areas to bypass local workers who would demand a higher wage. The prevailing wage requirement was meant to prevent this practice by ensuring that workers on Federal projects were paid at least the locally prevailing wage.[446] Now, prevailing wage laws are meant to provide workers with a fair wage for the labor they perform, and prevent workers from being exploited by a race to the bottom for labor rates.

Obviously, energy efficiency projects and incentives for commercial buildings are meant to save energy. Both saving energy and providing fair wages are important policy considerations. However, by applying prevailing wages to highly price sensitive energy efficiency projects, policy stacking can have the perverse effect of reducing the number of projects, thereby reducing both construction jobs and energy savings. A recent report by the Government Accountability Office regarding the impact of Davis-Bacon requirements on ARRA funded projects found that prevailing wage policy stacking had a significant impact on weatherization programs, especially in urban areas:

> Federal officials from four programs—the Weatherization Assistance Program, State Energy Program, Energy Efficiency and Conservation Block Grants, and Correctional Facilities on Tribal Lands Program—noted that the Davis-Bacon requirements could have a large impact on their ability to support the Recovery Act goal of preserving or creating new jobs. For example, Weatherization Assistance Program officials said that Davis-Bacon requirements will have a large impact in urban areas because they have to pay commercial construction rates to weatherize buildings over four stories tall. These commercial construction wage rates are higher than the wage rates officials were expecting to pay and officials said program goals would be affected because they will have to reduce the number of homes weatherized. [447]

However, it should be noted that the GAO Study reported mixed experiences with prevailing wage requirements. For example, Ohio respondents stated that the prevailing

[446] GAO Report on Prevailing Wage at 5, http://www.gao.gov/new.items/d10421.pdf
[447] GAO Prevailing Wage at 17.

wage requirements did not affect their weatherization program.[448]

Federal Prevailing Wage Requirements

The Davis-Bacon Act (DBA) requires contracts with the Federal government (and District of Columbia) in excess of $2,000 for the construction, alteration, and/or repair (including painting and decorating) of public buildings or public works, to pay all workers prevailing wages.[449] The American Recovery and Reinvestment Act (ARRA), signed into law by President Obama in 2009, injected billions of dollars into energy efficiency projects across the country.[450]

ARRA §1606 requires all contractors and subcontractors employed on any project "funded directly by or assisted in whole or in part by" ARRA funds be paid prevailing wages.[451]

ARRA energy efficiency programs that require prevailing wages, according to §1606, include block grants involving residential weatherization work,[452] all state energy programs,[453] and energy efficiency and conservation block grants.[454] However, individual homeowners who receive rebates for energy efficiency and renewable energy improvements to their home are not subject to the DBA's prevailing wage requirements.[455]

New Jersey's State Energy Program must meet the requirements of §1606.[456] The New Jersey Board of Public Utility's Clean Energy Program, a number of NJEDA programs, and other solar programs have all received ARRA funding. Pennsylvania's use of ARRA funds includes over $250 million dollars for weatherization projects, almost $5 million for a clean diesel program, and $23 million for energy efficiency programs.[457] These would all be subject to the DBA's prevailing wage requirements.

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[448] Id.
[449] 40 U.S.C. 3141 *et seq*.
[450] H.R. 1-24, Department of Energy, Energy Programs, Energy Efficiency and Renewable Energy. http://www.energy.gov/recovery/documents/RecoveryActCropped_24-34.pdf.
[451] Wage Requirements under Section 1606 of the American Recovery and Reinvestment Act of 2009. http://ndep.nv.gov/recovery/davis_bacon_grant_condition-section_1606-arra.pdf.
[452] Department of Energy, Davis-Bacon Act Wage Rates for ARRA-Funded Energy Efficiency and Conservation Block Grants Program Projects Involving Residential Weatherization Work (May 6, 2010), http://www1.eere.energy.gov/wip/pdfs/eecbg_guidance_not_using_wap_rates_05062010.pdf.
[453] Department of Energy, State Energy Program Formula Grants, American Recovery and Reinvestment Act, Financial Assistance Funding Opportunity Announcement (March 12, 2009), http://bcap-energy.org/files/DOE_Grant_Guidelines_for_ARRA_March13_2009.pdf.
[454] Department of Energy, Energy Efficiency and Conservation Block Grant Program, http://www1.eere.energy.gov/wip/eecbg.html.
[455] Department of Energy, Guidance on Implementation of the Davis-Bacon Act Prevailing Wage Requirements for State Energy Program Grant Recipients under the American Recovery and Reinvestment Act of 2009 (December 30, 2009), http://www.energy.wsu.edu/Documents/SEP%20DBA%20Program%20Notice%2010-003%20123009.pdf.
[456] For overview of plan, *see* State of New Jersey, Programs Proposed for the State Energy Program Funds Provided by ARRA, http://www.nj.gov/recovery/infrastructure/sep_program_criteria.html.
[457] The Recovery Act in Pennsylvania, Energy and Environment, http://www.recovery.pa.gov/portal/server.pt/community/impact/5996/energy___environment/505976.

New Jersey Prevailing Wage Requirements

New Jersey's Prevailing Wage Law (NJPWL)[458] applies to "any public work[459] paid for in whole or in part out of the funds of a municipality in the State of New Jersey or done on property or premises owned by a public body or leased or to be leased by the municipality," when the project's value exceeds $14,187.[460] For any project funded by a public entity other than a municipality or the state, prevailing wage rates[461] will apply if the project's value exceeds $2,000.[462]

New Jersey's prevailing wage laws can be applicable to utility and energy efficiency projects taking place in the state under a number of different scenarios. N.J.S.A. 34:1B-5.1 requires that any workers employed by the New Jersey Economic Development Authority (NJEDA) in the construction of any of its projects, or school facilities projects, or projects receiving financial assistance[463] from the NJEDA be paid prevailing wages. The NJEDA offers efficiency incentive programs such as the Edison Innovation Clean Energy Manufacturing Fund[464] and the Clean Energy Solutions Capital Investment (CESCI)

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[458] N.J.S.A. 34:11-56 et seq., Wage and Hour Law, http://lwd.dol.state.nj.us/labor/wagehour/lawregs/nj_state_wage_and_hour_laws_and_regulations.html.

[459] A "public work" is defined as "construction, reconstruction, demolition, alteration, custom fabrication, or repair work, or maintenance work, including painting and decorating, done under contract and paid for in whole or in part out of the funds of a public body, except for work under a rehabilitation program." Any of the preceding type of projects, whether paid for from public funds or not, would be considered a public work if "at the time of the entering into the contract the property or premises is owned by the public body or: (a) Not less than 55% of the property or premises that is leased or subject to an agreement to be subsequently leased by the public body; and (b) The portion of the property or premises that is leased or subject to an agreement to be subsequently leased by the public body measures more than 20,000 square feet." 34:11-56.23(5)(a-b).

[460] 34:11-56.26(11)(a-b). This amount was set at $9,850 on July 1, 1994, and is adjusted every five years to reflect the United State Department of Labor's latest Consumer Price Indices for Urban Wage Earners and Clerical Workers for the New York and Philadelphia metropolitan regions.

[461] Prevailing wage rates are set a county level by the Commissioner of the State of New Jersey Department of Labor and Workforce Development, http://lwd.dol.state.nj.us/labor/wagehour/wagerate/prevailing_wage_determinations.html.

[462] 34:11-56.26(11)(b).

[463] "Financial Assistance" is defined as "any loan, loan guarantee, grant, incentive, tax exemption, or other financial assistance approved, funded, authorized, administered, or provided by the authority to any entity, including but not limited to, all authority financial assistance received by the entity pursuant to P.L. 1996, c.26 (C.34:1B-124 et seq.) that enables the entity to engage in a construction contract, but this shall not be construed as requiring the payment of the prevailing wage for construction commencing more than two years after the assistance is received." N.J.S.A. 34:1B-5.1.

[464] Edison Innovation Clean Energy Manufacturing Fund. To be used for project assessment and design, and project construction and operation, associated with a new manufacturing line or the expansion of an existing manufacturing line in a New Jersey facility. Available to manufacturers that manufacture energy efficiency equipment and technology that reduces electric or natural gas consumption (furnaces, boilers, air conditioners that exceed efficiency required by New Jersey building codes or New Jersey or Federal appliance standards; and lighting systems), products manufactured for Class I renewable energy (photovoltaic, solar, wind energy, renewably fueled fuel cells, wave, tidal, renewably generated hydrogen, sustainable harvested biomass, methane gas from landfills), and other technology and equipment that can demonstrate its "integral nature to the development of Class I renewable energy and energy efficiency technologies." Funding is available as a grant (of up to $300,000, not to exceed 10% of total CEMF requested funds) to assist with site identification, procurement, design, and permits; or as a loan (up to $3 million as a ten-year loan, while one-third of the loan, up to $1 million, may convert to a performance grant if certain technology-based and business objectives are achieved during the first three years) for project construction

Loan/Grant.[465] Energy efficiency projects taking place at schools would also need to comply with the NJPWL if the cost threshold was met.[466]

Effective July 13, 2008, New Jersey also established that the wages paid to any construction contractor engaged in construction[467] on a public utility[468] must meet the prevailing wages determined by the Commissioner of Labor and Workforce Development.[469] New Jersey's Prevailing Wage Law was extended again in 2010 when Governor Christie signed P.L. 2009, c. 203 (hereinafter referred to as "the Act") into law.[470]

The Act requires that prevailing wages be paid to workers "employed in the performance of any construction undertaken in connection with Board of Public Utilities (BPU) Financial assistance,[471] or undertaken to fulfill any condition of receiving Board of Public Utilities financial assistance, including the performance of any contract to construct, renovate or otherwise prepare a facility, the operations of which are necessary for the receipt of Board of Public Utilities financial assistance," unless the value of the project falls below the threshold of $14,187.[472] This regulation essentially requires that prevailing wages be paid in any instance where a project is receiving any type of financial assistance from the Board of Public Utilities.

Commercial, industrial, and local government programs promoted by the Board of Public Utilities that could require prevailing wages include New Jersey SmartStart

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and operations.
http://www.njeda.com/web/Aspx_pg/Templates/Npic_Text.aspx?Doc_Id=1085&menuid=1287&topid=718&levelid=6&midid=1175.

[465] Clean Energy Solutions Capital Investment (CESCI) Loan/Grant. To be used for the purchase of fixed assets or real estate. Available to "commercial, institutional, or industrial [entities] (which meet N.J.A.C. 7:27D-2.2 regulatory requirements) with end-use energy efficiency projects, combined heat and power (CHP or cogen) production facilities, or new state-of-the-art electric generation facilities, including Class I and Class II renewable energy." Funding is available as an interest-free loan (up to $5 million), a portion of which may be issued as a grant. http://www.njeda.com/web/Aspx_pg/Templates/Npic_Text.aspx?Doc_Id=1078&menuid=1360&topid=722&levelid=6&midid=1357.

[466] While some states may choose to exempt school districts from prevailing wage requirements, New Jersey does not. The NJPWL applies to "the State of New Jersey, any of its political subdivisions, any authority created by the Legislature of the State of New Jersey and any instrumentality or agency of the State of New Jersey or any of its political subdivisions." 34:11-56.25(4).

[467] "Construction work on a public utility" is defined as "construction, reconstruction, demolition, restoration, and alteration of facilities of the public utility," in connection with the construction of any public utility in New Jersey. N.J.S.A. 34:13B-2.1(g).

[468] Public utilities include bridge companies; canal companies; electric heat and power companies; ferries and steamboats; gas companies; pipeline companies; railroads; sewer companies; steam and water power companies; street railways; telegraph and telephone companies; tunnel companies; and water companies. N.J.S.A.34:13B-16(a)

[469] N.J.S.A. 34:13B-2.1

[470] P.L. 2009, Chapter 203, approved January 14, 2010. http://www.njleg.state.nj.us/2008/Bills/AL09/203_.PDF.

[471] Financial assistance includes "any tax exemption, abatement, or other incentive or any rebate, credit, loan, loan guarantee, expenditure, investment, grant, incentive, or other financial assistance which is, in connection with construction, approved, funded, authorized, administered, or provided by the Board of Public Utilities, whether the assistance is received before, during, or after completion of the construction. N.J.S.A. 48:2-29.47(1).

[472] N.J.S.A. 48:2-29.47(1)

Buildings,[473] Pay for Performance,[474] the Local Government Energy Audit,[475] Direct Install,[476] the Renewable Energy Incentive Program (REIP),[477] the Renewable Energy Manufacturing Incentive,[478] (REMI), the Utility Financing Programs,[479] and the NJEDA programs (discussed above).[480] Both public and private projects that receive financial incentives from any of these programs (and meet the project cost threshold) would need to meet the requirements of the NJPWL, unless the assistance is being provided directly to a residential homeowner.[481]

When these prevailing wage requirements for BPU-assisted projects were first introduced by Governor Corzine in 2009, some in the environmental and solar communities were critical of the added costs that they believed would slow the expansion of energy efficiency programs.

Pennsylvania Prevailing Wage Requirements

The Pennsylvania Department of Labor and Industry last issued regulations for the Pennsylvania Prevailing Wage Act (PPWA)[482] in 1997.[483] The PPWA requires that

[473] New Jersey SmartStart Buildings. Provides incentives for energy efficient measures. Available to businesses, schools, municipalities, and other commercial and industrial facilities engaging in construction and renovation projects. http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings.
[474] Pay for Performance. A comprehensive energy efficiency program that provides incentives towards whole-building energy improvements. http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings.
[475] Local Government Energy Audit. Receive a 100% subsidized investment grade energy audit from a pre-qualified auditing firm. Most recommended measures will be eligible for additional incentives through NJ SmartStart Buildings, Direct Install, and Pay for Performance. http://www.njcleanenergy.com/commercial-industrial/programs/local-government-energy-audit/local-government-energy-audit.
[476] Direct Install. Existing small to mid-size commercial and industrial facilities can apply for incentives of up to 60% of energy efficiency retrofit costs ($50,000 incentive cap per project). http://www.njcleanenergy.com/commercial-industrial/programs/direct-install.
[477] Renewable Energy Incentive Program. Provides rebates to reduce the upfront cost of installing renewable energy and biomass projects. http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program.
[478] Renewable Energy Manufacturing Incentive. Provides rebates for the purchase and installation of solar panels, inverters, and racking systems manufactured in New Jersey. http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-manufacturing-incentive.
[479] Utility Financing Programs. Financing programs created by New Jersey's four electric distribution companies, at the direction of the Board of Public Utilities, to support the installation of solar photovoltaic systems. http://www.njcleanenergy.com/renewable-energy/programs/utility-financing-programs/utility-financing-programs.
[480] NJEDA Programs, http://www.njcleanenergy.com/commercial-industrial/programs/eda-programs/eda-programs.
[481] N.J.S.A. 48:2-29.47(1) states that the NJPWL will not apply when assistance "is provided directly to a homeowner or tenant in connection with the homeowner's or tenant's place of residence, including assistance for energy-related and other improvements to the place of residence or if that assistance is provided for any new construction or weatherization of a single family home, town home, or row home, or of any apartment building, condominium building, or multi-family home of four stories or less.
[482] P.L. 987, No. 442 (1961).
[483] Department of Labor and Industry, Bureau of Labor Law Compliance. Regulations for Pennsylvania Prevailing Wage Act (1997 Edition) 5 Pa.B 1347, http://www.portal.state.pa.us/portal/server.pt?open=514&objID=552990&mode=2.

prevailing wages[484] be paid to all workmen employed in public work. Public work is defined as "construction, reconstruction, demolition, alteration or repair work other than maintenance work,[485] done under contract and paid for in whole or in part out of the funds of a public body where the estimated cost of the total project cost is in excess of $25,000."[486]

The PPWA does not include specific provisions pertaining to utility work or public and private groups that receive financial assistance from the Pennsylvania Utility Commission (PUC). However, the scope of the PPWA extends its provisions to "[authorities] created by the General Assembly of the Commonwealth" and "instrumentalities or agencies of the Commonwealth."[487] The PUC falls within these categories, requiring any project over $25,000 that the PUC funds, to adhere to the wage standards of the PPWA.

It should be noted that there has been a recent backlash to the PPWA, especially among public townships and school districts, due to diminishing funds and budget constraints. There are currently seven bills circulating in the Pennsylvania state legislature that would impact the PPWA.[488] They include provisions such as imposing a moratorium on the enforcement of the PPWA,[489] exempting political subdivisions from the PPWA unless they choose to opt into the system,[490] allowing political subdivisions to opt out of adhering to the PPWA through a local ordinance or resolution,[491] raising the project threshold from $25,000 to $200,000,[492] exempting school districts from the PPWA unless the district chooses to opt in,[493] and exempting projects in "Keystone Opportunity Zones"[494] from meeting the PPWA's wage requirements.[495]

Additionally, the Pennsylvania House Labor & Industry Committee conducted a hearing on concerns regarding the PPWA in March 2011.[496] Proponents of maintaining the current PPWA standards generally cited a need to maintain what they viewed as fair wages and high quality work.[497]

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[484] Prevailing wages are determined by the Secretary of Labor and Industry, assisted by a seven member advisory board. P.L. 987, No. 442, §2.1.
[485] Maintenance work is defined as "the repair of existing facilities where the size, type or extent of such facilities is not thereby changed or increased." 5 Pa.B 1347 §9.102.
[486] 5 Pa.B 1347 §9.102.
[487] 5 Pa.B 1347 §9.101(a).
[488] Hahn, Peter W. Prevailing Wage Laws: What Are They and How Are They Changing? (May 23, 2011. http://www.dinslaw.com/prevailing_wage_laws/.
[489] Senate Bill 792, House Bill 1135.
[490] Senate Bill 795.
[491] Senate Bill 796.
[492] Senate Bill 821.
[493] House Bill 709.
[494] Keystone Opportunity Zones are areas that have been designated as commercial or industrial zones with reduced or no tax burden for property owners. Hahn, Peter W. Prevailing Wage Laws: What Are They and How Are They Changing? (May 23, 2011).
[495] House Bill 1190.
[496] Labor and Industry Committee, Hearing on Prevailing Wage Act (March 22, 2011). http://www.legis.state.pa.us/cfdocs/legis/tr/transcripts/2011_0058T.pdf.
[497] *Id*.

Testimony against the PPWA included representatives of individual school boards, the Pennsylvania School Boards Association (PSBA), and the Pennsylvania State Association of Township Supervisors. In support of its opposition to the PPWA, the PSBA cited a 2002 study in Ohio that found savings of over 10% in construction projects when prevailing wages were not used.[498] Another analysis of Michigan projects in 2007 revealed that a brief repeal of that state's prevailing wage law had demonstrated average savings of 10% as well.[499]

There were also specific examples offered that revealed some of the effects the PPWA is having on energy efficiency projects. The construction manager of a $3 million energy conservation program in the Phoenixville Area School District, which includes solar energy and other forms of renewable power generation, stated that the project could have been completed for about $300,000 less (a 10% savings) if the project had been bid in an open, competitive marketplace.[500]

Impact of Prevailing Wage Requirements on Energy Efficiency Projects

The true costs of prevailing wage laws can be difficult to ascertain. A number of other factors, such as economic growth, the costs of raw materials, and even the weather can impact construction costs.[501] The purest method to determine, with certainty, if prevailing wages impact a project's cost, would be to bid the project with and without prevailing wages.[502] However, it is unlikely that those required to use prevailing wages would take the time and money necessary to prepare and advertise different sets of bidding documents, and it is just as unlikely that construction companies would prepare a detailed bid for a project they knew would never be constructed.[503]

While no study has made a true cost comparison using data from individual projects that were bid both with and without prevailing wages, varied research projects since the 1990's have shown that the use of prevailing wages can increase construction costs by 10% or more. Michigan's prevailing wage law was suspended in 1994 by a Federal court decision.[504] State construction projects were open to competitive bidding until that decision was overturned in 1997 and the prevailing wage law was reinstated.[505] A study of the 30 month period when prevailing wages were not required found that the temporary

[498] *Id*. at 50.
[499] *Id*.
[500] *Id*. at 52-53.
[501] Vedder, Richard. Michigan's Prevailing Wage and Its Effects on Government Spending and Construction Employment (Mackinac Center for Public Policy, September 1999), http://www.mackinac.org/archives/1999/s1999-07.pdf at 1.
[502] County Commissioners Association of Pennsylvania, Testimony on Impacts of Prevailing Wage Laws (House Labor and Industry Committee, March 22, 2011), http://www.pacounties.org/GovernmentRelations/Documents/PrevailingWageHouseLandI20110329.pdf at 3.
[503] *Id*.
[504] Leef, George C. Prevailing Wage Laws: Public Interest or special Interest Legislation? Cato Journal, Vol. 30, No. 1 (Winter 2010). http://www.cato.org/pubs/journal/cj30n1/cj30n1-7.pdf. *See Associated Builders and Contractors v. Perry*, 869 F. Supp. 1239)
[505] *Id*. *See Associated Builders and Contractors v. Perry*, 115 F.3d 386.

invalidation of Michigan's public wage law spurred the creation of 11,000 new construction jobs[506] and saved that state at least $275 million a year, reducing construction costs by more than 10%.[507] A later Michigan study, published in 2007, reached a similar conclusion.[508]

Additionally, the Ohio Legislative Service Commission, in response to an inquiry from the state legislature, found that following passage of legislation in 1997 that exempted Ohio schools from using prevailing wages, the school system saved almost $490 million through competitive bidding (a savings of almost 11%).[509]

There is also data that suggests that ARRA is raising costs for some programs that had never been subject to prevailing wages before.[510] Department of Energy Officials expressed concern that the extension of the DBA to State Energy Programs and the Energy Efficiency and Conservation Block Grant program would have a "potentially large impact," by increasing costs.[511] Officials responsible for the Weatherization Assistance Program also anticipated increased costs due to the requirements of the ARRA.[512]

However, the views of public officials regarding the impact of Davis-Bacon on ARRA projects were mixed, with some state officials reporting that prevailing wage requirements had little impact, even on weatherization programs.[513]

Recommendations

A number of studies have estimated that the use of an open, competitive bidding process, as opposed to prevailing wages, could decrease project costs by roughly 10%. In addition, eliminating prevailing wage requirements would reduce contractor administrative costs and costs to public programs required to administer and enforce the prevailing wage requirements.

However, politicians and regulatory bodies must balance many policy objectives, including labor concerns. Therefore, in adding prevailing wage requirements and similar policy stacking, regulators must evaluate the price impacts of the added policy requirements and the price sensitivity of the actors involved in achieving the primary policy objective.

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[506] Adjusted for seasonal, weather, and cyclical business and economic considerations.
[507] Vedder at 1.
[508] Kersey, Paul. The Effects of Michigan's Prevailing Wage Law (Mackinac Center for Public Policy, 2007), http://www.mackinac.org/archives/2007/s2007-09.pdf. Concluded that prevailing wage laws raised construction costs 10-15%.
[509] Leef at 142.
[510] At the request of the United States Senate Minority Leader, the Government Accountability Office conducted a survey regarding officials' views of the impact of extending DBA to their respective programs. Government Accountability Office, Recovery Act, Officials' Views Vary on Impacts of Davis-Bacon Act Prevailing Wage Provision (February 2010), http://www.gao.gov/new.items/d10421.pdf.
[511] *Id*. at 14.
[512] *Id*. at 16.
[513] *Id*. At 17.

With respect to energy efficiency, smaller projects and those which can be done by small contractors are the most price sensitive. More data is needed on the impact of prevailing wage on EE. Both the NJPWL and PPWA apply to many energy efficiency projects within their respective states. The main distinction is that the PPWA has a much higher threshold for applicability. In addition, NJPWL contains specific provisions regulating utility projects, and any projects (both public and private) that have received financial assistance from utility programs are required to use prevailing wages.

It should be possible to compare the impact of the prevailing wage requirements on small projects in Pennsylvania, correcting for other factors, to determine the price sensitivity of EE retrofit projects, and the impact of prevailing wage.

If prevailing wage is shown to have a significant impact, GPIC can help craft policy solutions that address both the need to protect workers and the goal of achieving greater EE.

3.4. Stakeholder Objection

New Jersey Submetering Objection

As discussed in Part II Section F(2) above, New Jersey regulators have been resistant to smart meter installation. Reluctance to allow demand response through metering in New Jersey extends beyond smart metering. Until August 2011, New Jersey did not allow sub-metering of multi-family residential buildings, even with regular utility meters. Now, only water utilities may be sub-metered. As a result, it is effectively impossible to provide individual residents of multi-family buildings with demand response or energy monitoring technology.

In 2004, the Board dismissed a utility company's petition to sub-meter on multi-family properties.[514]However, the Board did order that a working group study the issue of sub-metering on multi-family properties.[515] Following the 2004 order, the board convened the sub-metering working group to consider the issue of sub-metering.[516] The group, composed of representatives from landlord associations, tenants' associations, sub-metering companies, utilities, and other New Jersey sister agencies,[517] recommended that the Board initiate a five-year pilot program to allow electric, gas, and water sub-metering for any multi-family housing financed by the New Jersey Housing & Mortgage Finance Agency ("NJHMFA").[518] The sub-metering working group found that NJHMFA would be the appropriate partner for the pilot program because of its ability to best control the sub-

[514] See In Re MP Real Estate LP, 2004 WL 1809738, Docket No. WO00040254, at *1 (N.J.B.P.U. 2004).
[515] *Id*. at 2.
[516] Seema Singh, Memorandum Re: Sub-metering of Utility Services (Sept. 9, 2005), http://www.state.nj.us/rpa/docs/Sub_Metering_Comment_Letter.pdf.
[517] The other New Jersey sister state agencies included the Division of Consumer Affairs, the Division of Codes & standards, the Division of Weights & Measures and the Department of Environmental Protection. Seema Singh, supra.
[518] Seema Singh, supra.

metering process in multi-family properties.[519] The working group determined that NJHMFA had the financial and personnel resources to control the process.[520] The working group also determined that NJHMFA would be able to implement accountability processes to monitor complaints from tenants.[521]

The Board accepted the working group's recommendation and ordered the NJHMFA sub-metering pilot program in 2005.[522] In doing so, the Board, under restricted terms, broke away from its precedent of historically having prohibited sub-metering on multi-family residential properties. The pilot program was designed to gather data on the conservation benefits to sub-metering in order to determine whether sub-metering for multi-family units should be an official policy.[523]

The program, however, was short lived. The Board ultimately suspended the program about two years after it initiated the program [524] due to strong resident opposition.

The tenants expressed several issues with the submetering program . First, tenants complained that once the landlord implemented sub-metering their bills were unpredictable and exorbitant.[525][526] Councilwoman Theresa Castellano, who led the movement to end the sub-metering program, claimed that "the disparity between the bills was outrageous. . . [s]ome people were getting billed $38 dollars a month and some people were getting billed as much as $238."[527]

In addition to fears of being charged more for energy, tenants have also expressed concern and that sub-metering will lead to unfair treatment from landlords.[528] Tenants have shared that they believe sub-metering will lead to new costs for tenants, yet a new source of revenue for property owners.[529] Essentially, tenants are concerned that sub-metering would be a rent in disguise, and that the true purpose of sub-metering is to eliminate the largest line item in the landlord's operating budget.[530]

Additionally, some residents have voiced that they believe implementing sub-metering will be unfair for residents living in older buildings with substandard insulation or older and less efficient HVAC and appliances.[531] They fear that they will bear additional

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[519] *Id*.
[520] *Id*.
[521] *Id*.
[522] Singh, supra.
[523] See Re The New Jersey Housing & Mortgage Finance Agency, 2005 WL 3578791 at 4.
[524] Amy S Clark. Controversial 'Sub-metering' program in Hoboken Suspended at Marineview Plaza, The Jersey Journal. Nov. 27. 2009, at http://www.nj.com/hobokennow/index.ssf/2009/11/controversial_sub-metering_pro.html.
[525] See Amy S. Clark, supra.
[526] It may be worth noting that the Board implemented the sub-metering pilot program in low-income housing where mostly seniors resided. Therefore, opposition to sub-metering due to higher costs of utilities is particularly strong. See Ravi Bhalla, supra.
[527] *Id*.
[528] *Id*.
[529] 2001 Draft Energy Master Plan at 113, supra.
[530] Re The New Jersey Housing & Mortgage Finance Agency, at 3; See Ravi Bhalla. Letter to the Editor, Progress Made in Fight Against Apartment Sub-metering, The Hudson Reporter. Nov. 8, 2009.
[531] *Id*.

utility costs because their landlords or building managers have not equipped the building to be more energy efficient.[532]

Finally, representatives for tenants' associations have also opposed sub-metering of any utility because they claim proponents of sub-metering cannot provide empirical information that sub-metering conserves energy.[533]

Although tenants are not the only constituency that have raised concerns about sub-metering, their resistance to sub-metering has had a profound effect on Board policy.[534] Nevertheless, utility groups' concerns may also help explain New Jersey's prohibition of sub-metering on multi-family units. First, there are some logistical issues associated with sub-metering. For example, not all multi-family units can be easily wired so that sub-metering can be implemented.[535]

Second, utility companies have some financial concerns associated with implementing sub-metering in multi-family residential property. For example, utility companies may be more reluctant to install sub-metering on multi-family residential properties than commercial properties " since utility companies can place liens on the owner's real property or attach other assets of a commercial enterprise if the utility bills remain unpaid, and since residential tenants can be more difficult to collect from or keep track of after they move to another rental property."[536]

There is some indication that the BPU is moving towards allowing utility submetering for multi-family properties.

First, over time, the Board has broadened the types of properties where sub-metering is allowed. When the Board first allowed sub-metering, it ruled that electric sub-metering was allowed only on publicly-financed and government-owned commercial and industrial buildings.[537] Today, the Board permits both gas and electric sub-metering on a variety of properties except for multi-family residential properties, even though it did implement a sub-metering pilot program for low-income multi-family residential housing in 2005 as discussed above.[538]

Most recently, on August 18, 2011, the New Jersey Board of Public Utilities (BPU) approved the use of water sub-metering in newly constructed residential apartment buildings. The August 2011 Order regarding sub-metering applies only to water utilities within BPU's jurisdiction.[539] However, the August 18th Order does not allow sub-metering

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[532] *Id*.
[533] Seema Singh, supra.
[534] See supra discussion at Part IV.B.2
[535] Telephone Call with Gary Fingers, Ombudsmen, New Jersey Board of Public Utilities (July 15, 2011); see also, S. 1039, 214th Legislature (2010), available at http://www.njleg.state.nj.us/2010/Bills/S1500/1039_I1.PDF (stating, " utility companies may prefer not to install sub-metering for any rental space unit, regardless of the type of tenant, if there is difficulty in getting access to meters for reading, or if electrical systems or plumbing are not suitable for the installation of sub-metering").
[536] *Id*.
[537] Re The New Jersey Housing & Mortgage Finance Agency, 2005 WL 3578791 at 2.
[538] See Id.
[539] Investor owned water and wastewater utilities, as well as municipally owned utilities (that provide service to 1,000 billed customers outside of the municipality's borders) fall under BPU's jurisdiction. County and regional water and wastewater utilities, as well as water utilities owned and operated by homeowner associations that have elected to be exempt from BPU's jurisdiction, are not affected by BPU's order.

in previously constructed residential buildings; nor does it provide approval for electric or gas sub-metering.

Concerns that building inefficiencies and cross plumbing/wiring of older buildings could pose barriers to retrofitting buildings for water sub-metering have led to BPU's decision to limit this Order to newly constructed buildings. The only way that a previously constructed building can qualify for water sub-metering is if the building in question is repurposed for residential use and all existing pipes, service lines, and other water infrastructure is completely replaced.

The Board's continued expansion of the types of properties where sub-metering is allowed and new allowance of multi-family water submetering may mean that the Board is more open to allowing electric and natural gas sub-metering. In addition, New Jersey's current Energy Master Plan advocates for the use of sub-metering.[540] It explains that sub-metering can encourage energy efficiency, which is a main priority for New Jersey energy policies.[541]

Nonetheless, until tenant and utility objections are addressed, multi-family submetering of electricity and natural gas will face an uphill battle. GPIC may be able to use its work on the psychological barriers to EE to address the tenant anxieties about submetering. Further, GPIC's data gathering may provide additional evidence of the energy saving benefits of submetering. Finally, GPIC may be able to pilot installing submeters on multi-family structures to address the utility objections.

Pennsylvania Building Code Adoption Litigation

In 2009, Pennsylvania Builders Association (PBA) filed suit against the Pennsylvania Department of Labor and Industry (L&I) challenging the constitutionality of the model code adoption process described above in Part II Section D(1)(c).[542] PBA claimed that the delegation of law-making authority from the PCCA to L&I, and by extension ICC, violated the Pennsylvania Constitution.[543] The PBA eventually lost the case, with the Pennsylvania Commonwealth Court holding that the code adoption process was constitutional.

The significance of Pennsylvania Builders Association v. Dep't of Labor and Industry (Pa. Commw. Ct. August 2010) is as a relevant example of the type of challenges that stakeholders can lodge against building code changes. Pennsylvania Builders Association did not challenge the substance of the code, but rather the procedure for adopting model code provisions.

As discussed above in Part II Section D(1), the Pennsylvania Construction Code Act (PCCA) was enacted by the Pennsylvania General Assembly in 1999.[544] Section 301(a) of the PCCA authorized the Pennsylvania Department of Labor and Industry (L&I) to promulgate regulations to establish Pennsylvania's Uniform Construction Code (UCC).[545] Section 304(a) of the PCCA mandated L&I to update the UCC every year that the model codes of the International Code Council (ICC) and the National Building Code (IBC) were

[540] See 2011 Draft Energy Master Plan, supra.
[541] See id.
[542] Pennsylvania Builders Association, *supra note 2*, at 5.
[543] *Id*. at 6.
[544] *See* 35 P.S. §§ 7210.101-1103.
[545] Pennsylvania Builders Association v. Dep't of Labor and Industry (Pa. Commw. Ct.) (August 2010), *available at* http://www.courts.state.pa.us/OpPosting/Cwealth/out/27MD10_8-25-10.pdf (last visited Sept. 13, 2011).

updated. This was to be done by December 31st of the same year to "insure uniform, modern construction standards and regulations, and to promote safety, health, and sanitary construction throughout the Commonwealth."[546]

As the model codes were changed, L&I adopted the new versions and updated them to Pennsylvania's UCC. In 2006, L&I adopted the 2003 model codes of the ICC and IBC without any notice-and-comment rulemaking.[547] In October 2008, the General Assembly modified the PCCA, establishing a UCC Review and Advisory Council (RAC) to "gather information relative to the UCC and proposed changes thereto, evaluate it, and make recommendations to the Governor concerning it."[548]

RAC was tasked with reviewing any new or amended provisions of the ICC model codes. If RAC determined that any new or amended part of the ICC was inconsistent with PCCA or should not be included in the UCC, the advisory council was to alert L&I, who was then directed by the PCCA to preclude those provisions from being adopted into the UCC.[549] The RAC-process was used for the first time in review of the ICC's 2009 model codes.

Following the adoption of the ICC codes, RAC held four public meetings and listened to testimony from interested stakeholders. However the council ultimately determined that none of the ICC's 2009 provisions should have been excluded from the UCC. RAC notified L&I of its decision in April 2009. L&I then, as mandated by the PCCA, promulgated regulations adopting the 2009 version of the ICC codes to replace the existing UCC, which was last modified in 2006.[550]

Less than one month after L&I published the modified 2009 UCC, the Pennsylvania Builders Association (PBA) filed suit against L&I on behalf of its 9,000 member companies, involved in all aspects of the building industry, challenging the constitutionality of the RAC-process.[551] PBA claimed that the delegation of law-making authority from the PCCA to L&I, and by extension ICC, violated the Pennsylvania Constitution.[552]

However, the Court found that the RAC-process was not an improper delegation of authority and therefore was not in violation of the Pennsylvania Constitution.[553] PBA's suit against L&I was dismissed.[554] In support of its decision, the Court cited *Charter Hosp. of Bucks County PA., Inc. v. Dep't of Health,* 534 A.2d 1125, 1130 (Pa. Cmwlth. 1987), which stated that properly delegated rulemaking authority exists "where the legislature states a general policy but gives the administrative agent, within limits set be express standards, the power to fill in details of the policy with regulations."[555]

The Court found that The General Assembly's delegation of authority via to PCCA to L&I, and through L&I to ICC, was reasonable and within Pennsylvania's acceptable

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[546] *Id*. at 3.
[547] *Id*.
[548] *Id*. at 4.
[549] *Id*.
[550] *Id*.
[551] Pennsylvania Builders Association, *supra note 2*, at 5.
[552] *Id*. at 6.
[553] *Id*. at 18.
[554] *Id*.
[555] *Id*. at 9, citing *Charter Hosp. of Bucks County PA., Inc. v. Dep't of Health,* 534 A.2d 1125, 1130 (Pa. Cmwlth. 1987).

standards.[556] Interestingly, however, the Court determined that the pre-RAC process had in fact been unconstitutional. Before the General Assembly created RAC, L&I had the (unconstitutional) authority to promulgate new rules for addition to the UCC without holding public hearings or receiving comments. It was only after the establishment of RAC that provisions were put in place to ensure public review before additions and amendments to ICC model codes were codified in the UCC.[557] While the Court determined that the L&I adoption of ICC codes in 2006 could have been considered unconstitutional, any constitutional issues were "rectified by the time L&I was required to adopt ICC's 2009 codes."[558]

The Court determined that "the RAC system worked in the manner in which the General Assembly intended, and was a restraint on L&I's exercise of administrative authority. Since the PCCA's basic policy choices are clearly made by the General Assembly, and the PCCA contains adequate standards to guide and restrain the exercise of L&I's delegated functions, we hold that the General Assembly did not unconstitutionally delegate its authority over its execution and administration of the 2009 version of Pennsylvania's UCC."[559]

Although PBA lost before the Commonwealth Court, in 2011 the Pennsylvania legislature enacted what became Act 1 of 2011, changing the model code adoption process from an "opt-in" to an "opt-out" model, and imposing a two-thirds majority vote of the RAC for any code change. As discussed in further detail in Part II Section D(1)(c) above, changing the Pennsylvania code adoption process in these ways may limit future adoption of energy efficient building and energy code upgrades.

4. PROCESS BARRIERS TO EE

4.1. Split Incentives

Although the economic benefits of energy efficient construction have been well documented, with some estimating that upgrading existing private commercial buildings could save a total of 810 trillion BTUs of energy and $104 billion by 2020,[560] this value is not being fully realized.

One of the barriers to implementing energy efficiency commercial retrofits is that the benefits and costs of implementing energy efficiency projects are not balanced among the parties that are involved. "By their nature, energy efficiency measures typically require a substantial upfront investment in exchange for savings that accrue over the lifetime of the deployed measures."[561] Thus, the party investing the upfront capital in the energy efficient retrofit must benefit from the lifetime savings (or at least recoup the investment in the retrofit) in order to be motivated to undertake the project.

[556] *See id.* at 10.
[557] Pennsylvania Builders Association, *supra note 2*, at 10-11.
[558] *Id*. at 11.
[559] *Id*. ay 17,
[560] McKinsey at 2.
[561] Id. At 10.

In a commercial building scenario, there are two primary parties involved in energy efficiency—the landlord and the tenant. There are three primary costs involved in building management—capital costs, operating costs and taxes. To allocate these costs, three primary lease structures are used—gross, modified gross and triple net. In a gross lease, the tenant pays rent, and the landlord assumes the costs and benefits of capital investment, operating expenses and taxes. In a modified gross lease, the tenant pays rent, and a negotiated share of the operating and taxes. In a triple net lease, the tenant pays its proportional share of taxes and operating expenses, including its own utility costs.

Typically, the landlord would be the party investing in the capital improvements. Meanwhile, the tenant and the tenant's behavior may be a key factor in realizing the benefits of energy efficiency. In addition, depending on the lease structure and how utility costs are allocated, the tenant may ultimately be the party that realizes the energy savings. This is known in the literature on green leases as the "split incentive problem."

In order to resolve the split incentive problem and incentivize investment in energy efficient commercial retrofits, the costs, responsibilities and benefits must be properly allocated between landlord and tenant. To that end, several models have been developed to allocate the costs, responsibilities and benefits between landlord and tenant.

The benefit of the model leases is providing security that both parties can benefit (or at least recoup the cost) of energy efficiency through the normal channel—rent—without undue transaction costs associated with inventing and negotiating energy efficiency lease provisions. Thus, model leases eliminate two barriers to energy efficient construction—appropriate allocation of energy efficiency risks and rewards, and reduced transaction costs.

The model leases take various forms and address the three different lease types.

The NYC Mayor's Office of Long Term Planning and Sustainability (OLTPS) developed model lease language that weighs the concerns of both owners and tenants with respect to recovering the costs of an efficiency retrofit. In conjunction with a working group of key stakeholders, OLTPS concluded that savings resulting from retrofits fall within +/- 20% of projections formulated by energy specialists.[562] Based on the 20% variability, the model stipulates that a building owner is allowed to pass through capital expenses equivalent to "80% of such predicted savings in any given year," which extends the payback period by 25%.[563]

This "adjusted payback period" can be illustrated by the following example:

If the aggregate cost of a retrofit is $2,000,000 and the projected annual savings is $500,000, then the simple payback period[564] equals 4 years. The landlord would then

[562] NYC OLTPS, 1.
[563] Id, 1.
[564] "Simple payback period": Length of time calculated by dividing the aggregate costs of a capital improvement by the projected annual savings (i.d., 5).

change the payback period to $400,000 over an adjusted recovery time of five years.[565] Essentially, the landlord charges the tenant 80% of the projected savings each year until it has paid for the entire cost of the retrofit. Since the retrofit could generate approximately 20% less savings than predicted by the energy specialist, an annual charge that equals 80% of the annual savings protects the tenant from any years during the payback period in which energy savings are lower than projected.[566]

Beyond protection against unpredictable efficiency savings, the OLTPS lease model provides additional benefits to the tenant as well as the owner. First, the tenant and landlord experience minimal transaction costs because the adjusted payback provision can be inserted into a preexisting modified gross commercial lease and therefore no separate "green lease" provisions are required.[567] Moreover, the tenant immediately receives 20% of annual energy savings and 100% once the payback period is complete, assuming the retrofit generates savings that match the projections calculated by the energy specialist.[568] Lastly, the landlord recovers the entire costs of the retrofit earlier than under a standard modified gross lease because the landlord can set an annual fee equal to 80% of predicted savings instead of extending the payback period throughout the useful life of the retrofit.[569]

In April 2011, Silverstein Properties and WilmerHale agreed to the first lease that used this particular pass through structure for a floor located in the World Trade Center.[570] In order to facilitate further expansion of energy efficiency retrofits, OLTPS collaborated with the Natural Resource Defense Council's (NRDC) Center for Market Innovation to form the New York City Energy Efficiency Corporation (NYCEEC).[571] This non-profit corporation is funded by the Department of Energy's Energy Efficiency and Conservation Block Grant Program (EECBG)[572].[573]

The Building Owners and Managers Association International (BOMA) released a green leasing manual in 2008, entitled "Guide to Writing a Commercial Real Estate Lease, Including Green Lease Language." Under the BOMA model, the lease language is framed to meet a third-party rating system such as LEED EBOM.[574] [575]

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[565] Id, 5.
[566] Id, 1.
[567] Id, 2.
[568] Id, 2.
[569] Id, 2.
[570] Id, 3.
[571] Hale, 10.
[572] "EECBG': A Federal government program, funded by the American Recovery and Reinvestment Act of 2009, which aims to "develop, promote, implement, and manage energy efficiency and conservation projects (US Department of Energy. "Energy Efficiency and Conservation Block Grant Program." http://www1.eere.energy.gov/wip/eecbg.html)."
[573] Id 10.
[574] "LEED EBOM": LEED for Existing Buildings Rating System provides guidance on measuring "operations, improvements, and maintenance…with the goal of maximizing operational efficiency while minimizing environmental impacts." (US Green Building Council. "Existing Buildings: Operations and & Maintenance. www.usgbc.org/DisplayPage.aspx?CMSPage ID=221)

The BOMA model provides guidance on the extent to which tenant and landlord are responsible for energy and water efficiency retrofits depending on the type of lease in use.[576] The BOMA guide resolves the split incentive problem for triple net leases by authorizing the owner to pass through any "capital costs that result in lower total operating costs." [577] This pass-through system includes any efforts associated with meeting third-party standards (like LEED), which reduces the payback period to the landlord associated with energy efficiency retrofits.[578] Equally important, it contains "alternative wording" that not only fits into preexisting triple net leases, but modified gross leases as well.[579] The BOMA lease also contains conditions that require the tenant to conduct his or her operations consistently with the "landlord's sustainability practices."[580] Additionally, the landlord must offer detailed justifications for efficiency retrofits and standards and specific strategies that the tenant can pursue in order to comply with the new provisions.[581]

Other green leasing models exist, including the "Model Green Lease" drafted by the Corporate Realty, Design and Management Institute and the "National Standard Green Office Lease for Single Building Projects – 1.02 – 2009" released by the Real Property Association of Canada.[582]

There is no right form of lease for addressing split incentive problem and "[p]ractioners debate what form of lease best serves a green building."[583] In the opinion of the author of this study, the landlord and the tenant (and their counsel) should be able to negotiate the allocation of risk and reward associated with energy efficiency just like the parties negotiate the other components of the lease, including responsibility for other capital expenditures. Thus, the split-incentive problem is really one of raising energy efficiency to the same level of concern (and thus negotiation) as the other components of the lease. Using a model lease or lease terms can facilitate the negotiations and make energy efficient retrofits more attractive.

In addition to the much analyzed split incentive problem, several other issues arise in the landlord-tenant context.

First, leases for commercial space can be very long, between five to twenty years on average. This presents a variety of issues for energy efficient retrofits. If a landlord wants

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[575] Miller, 11. "Commercial Green Leasing in the Era of Climate Change: Practical Solutions for Balancing Risks, Burdens and Incentives," Environmental Law Institute, 2010. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1600422
[576] Gordon, 15. "The Jolly Green Giant is Here to Stay: Leasing Sustainable Buildings," New Jersey Lawyer. December 2009.
[577] BOMA San Francisco, 8. "BOMA Guide to Writing a Commercial Real Estate Lease." September 2008. www.bomasf.org/pdf/bulletin/BOMASep08.pdf
[578] Id, 8.
[579] Rives and Sharp, 5.
[580] Miller, 11.
[581] Id, 5.
[582] Rives and Sharp, 5.
[583] Sharp, John M.,"Green Leasing: A Practitioner's Overview," Washington State Bar Association Real Property Probate and Trust Section Newsletter, Summer, 2009 at 2.

to do an energy efficiency retrofit in the middle of a lease term, the terms of the existing leases with each tenant may need to be renegotiated, which will be difficult. Some sources recommend addressing this situation with a non-binding memorandum of understanding (MOU) with existing tenants[584] which may then be incorporated into any lease renewal.

Second, the requirements for energy efficiency or operations may change over the course of the lease. Any MOU or energy efficient lease must provide for a changing energy benchmarks and tenant requirements over the term of the tenancy.

Third, landlords and tenants must address the issue of tenant improvements. Often, large tenants undertake their own improvements. If the components of the tenant improvements, like lighting, are not in line with the energy efficiency improvements for the building as a whole, energy savings may not be realized. Any MOU or energy efficient lease must address tenant improvement issues, or separate energy costs and savings attributable to tenant improvements from the allocation of costs and benefits from energy efficient improvements to the building as a whole.

Fourth, landlords and tenants need to address data sharing and confidentiality issues related to energy use. Some sources say that energy efficiency leases and MOUs are more effective if occupiers in the building agree to share utility data among themselves within a confidential context.[585]

The issues associated with leasing energy efficient commercial space goes beyond the "split-incentive problem" often cited as a barrier to energy efficient construction. Like all lease terms, the landlord and tenant must address who bears the costs and who realizes the benefits, and who is responsible for improvements, operations and maintenance. Model leases provide language which addresses common considerations in green or energy efficient lease transactions, but each situation will be unique.

4.2. Undervaluation of Energy Efficient Buildings

In recent years, there has been growing recognition of the opportunities that "energy efficient buildings" provide both residential and commercial property owners. Property owners are becoming more aware that energy efficient buildings can decrease operating costs, improve returns in investments, and demand higher rental prices. Theoretically, all of these benefits should yield a higher property value than a similarly situated building without energy efficient features. However, real estate appraisers often fail to properly value energy efficient properties.

Real estate appraisers estimate the "value of real property whenever it is sold, mortgaged, taxed, insured, or developed." Appraisers are supposed to take into account

[584] A model MOU is available as part of the Green Building Management Toolkit developed by the London Better Buildings Initiative. Green Building Management Toolkit at 31, Better Buildings Partnership available at http://www.betterbuildingspartnership.co.uk/download/bbp-green-building-managment-toolkit-1.pdf
[585] Green Building Management Toolkit at 8, Better Buildings Partnership available at http://www.betterbuildingspartnership.co.uk/download/bbp-green-building-managment-toolkit-1.pdf

any unique factors of a property that could affect its worth, such as architectural style, a building's physical condition and location, comparable sales, lease records, previous appraisals, and income potential. There is no federal standard of education or skill level that must be obtained before becoming an appraiser. However, federal law mandates that appraisers meet minimum standards set by state regulatory agencies, which must certify and license real estate appraisers.

If appraisers fail to take into account the added value of energy efficient features, energy efficient properties will be appraised below their actual value. The underestimation can lead to a reduced resale value, lower rents, and poorer financing options than the owner would realize if the appraisal took into account the value of the property's energy efficient attributes. Experts agree that "Recognition of this value . . . could yield powerful financial incentives for the building owner, including resale value and expanded borrowing privileges."

Traditional Appraisal Methods

There are three primary appraisal methods. The cost approach is based on determining what it would cost to replace or reproduce the property, less depreciation and physical deterioration. The ascertained value would then be added to the value of the land, yielding a full appraisal price.

The second approach is the comparison method. This method of appraisals uses properties of similar size, value, and location that have recently been sold as a benchmark to value the subject property. Specific features of the subject property may be taken into account to increase or lessen its valuation. However, it is generally assumed that a prospective purchaser would not pay any more than what was recently paid for a similarly situated property with comparable characteristics.

The third widely used appraisal method is the income approach. An appraiser using the income approach would determine what an investor would pay for the subject property based upon its projected income stream. Because most residential properties do not provide owners with income, the income approach is primarily only used to appraise commercial properties. In general, an appraiser's estimate of a property's income stream will be based upon its net operating income (NOI). NOI is defined as operating income, after expenses have been deducted, but before taxes and interest are deducted.

Challenges Posed by Applying Traditional Appraisal Methods to Energy efficient Appraisals

Performing appraisals on energy efficient properties ("energy efficient appraisals") using traditional appraisal methods often yields inaccurate valuations that fail to fully account for the potential value of energy efficient characteristics that should, theoretically, make the property more valuable than a similarly situated property that is not energy efficient.

The traditional ways in which appraisers determine value generally do not take into account future operating savings, which are among the most important financial benefits of energy efficient construction. By only considering the present asset value recognized by financial markets, much of a energy efficient property's future value is not realized during the appraisal process, and even if an appraiser is generally aware that energy efficient features have financial value, it may be difficult to quantify exactly how much money will be saved by energy efficiency tools and other energy efficient features that have the potential to reduce operating costs.

Failing to account for reduced operating costs during an appraisal places energy efficient buildings at a comparative disadvantage and fails to appropriately reward property owners for investments made in sustainability features. Energy costs can be a large factor when determining NOI, and ignoring energy efficiency measures that property owners have implemented unfairly places high-energy usage properties and low-energy usage properties on the same valuation plane. The EPA estimates that energy usage represents approximately thirty percent of a typical commercial building's operating expenses. It is estimated that implementing energy efficient measures could decrease operating costs by up to nine percent. Rising energy prices will only increase the importance of energy efficiency and investments in energy efficient measures that will reduce future operating costs. The value of these property improvements should be reflected during an appraisal.

The lack of a national standard to value energy efficiency projects also makes verification difficult, and can leave financiers and investors wary of accepting energy efficient appraisals at face value. Owners will always have an incentive to suppress past costs in order to obtain a higher energy efficiency valuation during an appraisal. The true value of energy efficient investments could also be skewed by factors such as temperature, occupancy, and operating hours, which could either mask energy efficiency gains and other reduced operating costs, or unjustly inflate the apparent gains.

Another challenge posed by utilizing traditional appraisal methods to value energy efficient properties is that although energy efficient properties are appearing in greater numbers, they still only account for a small portion of overall buildings nationally. Therefore, in many areas, it may be difficult to obtain a comparative valuation, simply due to the fact that there may not be many (or even any) similar energy efficient buildings in that locality that can be used to set a benchmark price for the subject property.

It is generally believed that a lack of education among appraisers of the financial benefits of energy efficient buildings and an inability to collect sufficient data to calculate energy efficient benefits, even if appraisers are aware of them, are among the root causes of inaccurate energy efficient appraisals. Education courses launched by trade associations, such as the Appraisal Institute, can be helpful, but are not mandatory for state certification at this time. Property owners who have installed energy efficient technologies should seek out appraisers who have been specifically trained to conduct energy efficient appraisals.

Reforming Traditional Appraisal Methods to Account for Energy Efficient Construction

The U.S. government and the appraisal industry have recognized that energy efficient construction projects are often incorrectly valued by appraisers. To address the concerns of property owners, financiers, and investors; and to ensure that investments in energy efficient building technologies are properly valued during the appraisal process, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) and The Appraisal Foundation recently signed a Memorandum of Understanding (MOU) to work towards improving the energy efficient appraisal process.

The MOU states that EERE will create a national database to aggregate building performance of building types, and the effects of energy efficient technology upgrades. A database such as this would provide appraisers with a useful tool to find properties, similar to the subject property that could be evaluated using the comparison method. EERE will also create an educational course curriculum that will teach appraisers how to properly value energy performance upgrades and sustainable buildings in general. The Appraisal Foundation has committed to developing guidance, for use by state appraisal regulatory offices, to apply existing appraisal standards and valuation methods to energy efficient appraisals.

4.3. Public Procurement Process Barriers

Alternative Project Management Mechanisms

Traditionally, public agencies have used the design-bid-build (DBB) project delivery method for public works projects. Under DBB, the public agency first contracts with (or solicits proposals from) an engineer or architect to design the project. After the designs and specifications for the project are complete, a competitive bidding process is conducted to select one or more contractors to construct the project. Under the DBB method, contractors, including trade contractors for mechanical, plumbing and engineering systems, are not involved until after the design and budget decisions have already been finalized. The DBB method is intended to ensure a cost-effective price through competitive bidding, and also a high level of owner oversight through direct contracts between the public agency and the design and construction entities. In addition, the competitive bidding process is used to ensure that the selection remains impartial and avoids any semblance of favoritism.

An increasing number of private sector projects are using the design-build (DB) project delivery method instead of traditional DBB. In DB, the design and construction phases of a project are bid to a single entity, enabling both design and construction input from the initiation of the project.

Research has shown that DB saves time, money and increases the energy efficiency of construction projects. Research has shown that, compared to the DBB method, on

average, DB projects cost 6% less and are 12% faster to build and 33% faster to complete from design through construction. According to a study by the National Institute of Standards and Technology, "Schedule, change, rework, and practice use performance were significantly better among owner submitted DB projects."
From an energy efficiency perspective, some research has shown that DB yields higher success rates in delivering sustainable projects and anecdotal evidence has shown that "Especially for an innovative building, design-build delivery coupled with clear and prioritized energy performance requirements…appears to be a successful combination… for achieving aggressive energy performance goals on a firm fixed price."
Despite the potential advantages of DB, fewer public projects than private projects use DB. Part of the issue appears to be that public procurement processes are not compatible with DB.

Pennsylvania Alternative Project Management Barriers

Pennsylvania requires that all contracts awarded by the Commonwealth be solicited through a competitive sealed bidding process, unless authorized by law. Specific rules have been crafted by the legislature to guide the process from the initial publication of the bid until acceptance.

When using the competitive sealed bidding process, all received bids are to be "opened publicly in the presence of one more witnesses at the time and place designated in the invitation for bids." Bids are to be evaluated based on the requirements that were initially set forth in the invitation for bids and "may include criteria to determine acceptability such as inspection, testing, quality, workmanship, delivery and suitability for a particular purpose. Any criteria used to evaluate a bid for award, however, must be objectively measureable. The bid is to be awarded to "the lowest responsible bidder." "Responsible" is not limited to economic cost, and may also include "judgment and skill." Douglass v. Commonwealth, 108 Pa. 559 (Pa. 1885). This interpretation affords the state some discretion in awarding the contract. Other permissible factors in the "responsible" evaluation include "financial responsibility, integrity, efficiency, industry, experience, process, and the ability to carry out the project." Clairton Slag, Inc. v. Dep't of Gen. Servs., 2 A.3d 765, 775 (Pa. Cmmw. Ct. 2010).

The competitively sealed bidding process also allows for multistep sealed bidding in some cases. "When it is considered impractical to prepare initially a procurement description to support an award based on price, an invitation for bids may be issued requesting the submission of unpriced bids, to be followed by an invitation for bids requesting priced bids from responsible bidders of the first solicitation." However, Pennsylvania courts have severely limited the circumstances under which multistep bidding may be used, and rejected the use of multistep bidding in the DB context.

Two of the exceptions to the rule that all contract awards follow competitive sealed bidding are section 513 (competitive sealed proposals) and section 905 (contracts for design professional services). See id. § 511. Section 513 allows the state to award contracts based on sealed competitive proposals. Id. § 513. A competitive sealed proposal

differs from a competitive sealed bid [HOW?] The invitation for proposals must include the relative weight given to any of the evaluative metrics factoring into the contract award. "The responsible offeror whose proposal is determined in writing to be the most advantageous to the purchasing agency . . . shall be selected for contract negotiation." Id. § 513(g). This procedure allows the state to seek proposals without committing itself to accepting the lowest bidder. The Pennsylvania Supreme Court has held that "contracts for the procurement of construction may be entered by [state agencies] under Section 513, through the competitive sealed proposal process." Pa. Associated Builders and Contractors, Inc. v. Commw. Dep't of Gen. Servs., 932 A.2d 1271, 1281 (Pa. 2007). Notably, contracts awarded under this provision are not subject to the Separations Act. See id. However, when an agency issues a request for proposals ("RFP"), it must specify with "particularity" the basis for choosing proposals over competitive sealed bidding. Pa. Associated Builders and Contractors, Inc. v. Commw. Dep't of Gen. Servs., 996 A.2d 576, 585 (Pa. Commw. Ct. 2010). This "particularity" standard requires that the agency give a "detailed explanation" sufficient to allowed a dissatisfied bidder to make an "informed choice" whether to file a bid protest. Id. at 585-86.

The other main exception to the rule that all contracts be awarded based upon competitive sealed bidding is section 905 (design professional contracts). See 62 Pa. Cons. Stat. § 905 (2011). Such services include "architecture, geology, engineering, landscape architecture, or land surveying." Id. § 901. These contracts are not awarded based on bids. Instead, the "most highly qualified" designers are selected for contract negotiation. Id. § 905(e)(2).

In addition to requiring competitive bidding of construction projects, Pennsylvania requires that contracts with trade contractors be made directly with the state through a separate competitive bidding process.

The Separations Act requires that on any construction project undertaken by a department of the Commonwealth exceeding $25,000, the state must separately award each element of the project to the "lowest responsible bidder" through competitive sealed bidding. 71 Pa. Stat. Ann. § 1618 (West 1990). It specifically requires separate competitive bidding for plumbing, heating, ventilating, and electrical work. Id.

Additionally, it is not sufficient for the Commonwealth to award a bid to a general contractor, and then have the general contractor separately bid each aspect of the project. Mech. Contractors Ass'n of E. Pa. v. S.E. Pa. Transp. Auth., 654 A.2d 119, 122 (Pa. Cmmw. Ct. 1995). The Commonwealth (or an agency of it) must be the "direct contracting party" and hold a separate bidding process for various aspects of any public work, as required by the Separations Act. Id.

The Separations Act was enacted "to keep the expenditure of public funds a process open and clear of any possible manipulations. Metz v. Housing Authority of the City of Pittsburgh, 654 A.2d 119, 121, quoting 550 A. 2d 599 (1988). It was feared that if one general contractor was awarded a large project, and could control the subcontracting process without any government oversight, workers could "become subject to the whim of

a dishonest or incompetent general contractor; not only in the procedures the general contractor adopted for the award of work, but also for payment of work done." Id. By requiring that the Commonwealth hold bids for work to be performed by separate subcontractors, the legislature intended the Separation Act to protect those workers from unscrupulous general contractors.

Various Commonwealth agencies have attempted to use the DB method to construct public works projects under the exceptions to the competitive sealed bidding process. However, several recent cases have constrained agencies' ability to use DB.

In Brayman Constr. Corp. v. Pa. Dep't of Transp., 13 A.3d 925, 927 (Pa. 2011), the Pennsylvania Supreme Court rejected the Pennsylvania Department of Transportation's (PennDOT) approach to soliciting a DB contract based on a two-step "best value" method. The "best value" method did not award the contract to the lowest responsible bidder through a competitive sealed bid process. Rather, PennDOT solicited qualifications for design-build teams, and then paid each selected team a stipend to "develop a proposed design for the project." PennDOT then used a "best-value assessment methodology" to award the contract. Id. at 928-29. The "best-value" assessment was based on a nebulous methodology, without clear standards against which the proposals would be judged. The Court held that the two-step process for qualifying bidders was not allowed under the Pennsylvania procurement requirements, and that the "best value" assessment was too nebulous.

In American Infrastructure, Inc. v. Dept. of General Srvcs., No. 621 M.D. 2010 (Pa. Commw. Ct. 2010), the Pennsylvania Commonwealth Court took up both the issue of the two-step bidding process and the separation of bids requirements. In American Infrastructure, the Pennsylvania Bureau of Prisons solicited DB bids for a new prison. The bidding was done through a two-step process similar to that used in Brayman, and the bid did not require separate bids for mechanical, plumbing and electrical services. The Court did not rule on the two-step process, but did hold that separate MEP bids were required for DB projects, even though it may be "impossible to have competitive sealed bids for MEPs because the design process is not completed. American Infrastructure at 17.

Although DB contracts are technically allowed under Pennsylvania procurement law, American Infrastructure and Brayman hamstring state agencies from effectively procuring DB contracts. Read together, the two decisions essentially require state agencies to use competitive sealed bids absent unique circumstances, use price as the prime requirement, and bid MEP contracts separately, regardless of the status of the MEP design requirements.

Given the advantages of DB, Pennsylvania law should allow for greater and more flexible use of design-build, while continuing to ensure transparency in public expenditures and police against the abuse of public funds.

Federal regulations provide a model for procurement of design-build, best-value contracts through a two phase process similar to the procurement processes used in

Brayman and American Infrastructure. See 48 C.F.R. § 36.303-1 (2011); see also Josh M. Leavitt & John C. McIlwee, Navigating State Design Build Statutes in the Wake of a "Turned Federal Battleship", Order No. 29194 Prac. L. Inst. 701 (2011).

In the first phase, the agency solicits proposals from interested design-build teams. Id. The solicitation lists the evaluation factors for the first phase. These factors focus on bidders' qualifications, and do not include price or cost measures, which are "not permitted in Phase One." Id. The solicitation must also include the second phase bid evaluation factors and the maximum number of teams that will be selected to continue to phase two. Id. At that point, the agency selects "the most highly qualified offerors" to advance, and requests that only those bidders submit proposals in phase two. Id.

The phase two proposals are evaluated based on a number of criteria, including price and past performance. See id. § 15.305. The agency does not have to award the contract to the lowest bidder, but it must give a basis for its decision. The agency is allowed to consider "benefits associated with additional costs." Id. § 15.308. This system offers the government a great deal of flexibility. This two-step procurement method is nearly identical to the one PennDOT used, and the Court enjoined, in Brayman.

However, the two-step bidding process does not address the requirement for separation of bids for MEP contractors. The legislature could waive the separation of bids requirement for DB contracts, or require MEP contractors to be part of the DB team from the beginning.

Finally, the two step process does not alleviate the potential for "nebulous" evaluation criteria. However, general resources exist delineating the critical factors required for public procurement of DB contracts. The revised DB procurement requirements could specify the evaluation criteria by which DB contracts are to be judged.

Pennsylvania should modify its procurement requirements to resolve the ambiguities in Brayman and American Infrastructure, and specifically allow for effective DB project procurement and "best-value" analysis.

New Jersey Alternative Project Management

New Jersey's current procurement process for erecting, altering, or repairing state buildings is based on the traditional design-bid-build (DBB) system.[586] When using DBB, the state first contracts for the design of a project, and then contracts for the actual construction with a separate company, using a distinct bidding process.[587] Any project exceeding $2,000 may also (but is not required to) have "separate plans and specifications for: (1) the plumbing and gas fitting and all work kindred thereto; (2) the steam and hot water heating and ventilating apparatus, steam power plans and all work kindred thereto; (3) electrical work; (4) structural steel and ornamental iron work; and (5) general construction, which shall include all other work and materials required for the completion

[586] *See* N.J.S.A. 52:32-2.
[587] The Associated General Contractors of America, *Design-Bid-Build*, http://www.agc.org/cs/industry_topics/project_delivery/designbidbuild (last visited Sept. 13, 2011).

of the project."[588] The person or body awarding such a contract would bid each of these jobs separately, using separate advertisements and bidding processes.[589]

However, there has been support in New Jersey to provide for the ability to use design-build (DB) contracts. Under a DB method of contracting, one entity is selected through a bidding process to provide both design and construction services.[590] This streamlined process is expected to save time and money, and in the case of green projects, may provide a higher level of knowledge and skill that can effectively work towards LEED certification.[591]

In May 2011, Assemblyman Louis Greenwald (D-Camden) introduced A3945, the *Design-Build Construction Services Procurement Act*.[592] The bill was referred to the Assembly Housing and Local Government Committee, but has not been voted upon at this time.[593] The third section of the bill provides that "If a contracting unit can demonstrate why the design-build approach meets their needs better than the traditional design-bid-build approach established under New Jersey public procurement statutes for the project or projects under consideration, it shall be the public policy of the State to permit that contracting unit to enter into design-build contracts…"[594]

4.4. Financial Transaction Barriers

While much research has been done regarding the financing issues inhibiting EE retrofits, most of the attention has been on the lack of capital to invest in EE. EE projects require large capital investments and often involve third party financing, tax incentives and government programs. To date, little attention has been paid to EE retrofits as financial transactions, with tax, accounting, and disclosure implications.

Two examples highlight the financial transaction barriers to EE. Recent accounting rule changes by the Financial Accounting Standards Board potentially change how energy services agreements will be reported on company balance sheets, moving energy services agreements from off-balance sheet financing mechanisms to on-balance sheet transactions. These reporting changes may lead to more expensive financing (due to higher leverage ratios), higher tax exposure, more extensive disclosure requirements and steeper annual accounting costs. All of these added transaction costs make the return on investment of EE projects longer. In addition, the added costs and exposure potentially reduces the appeal of energy services contracts, eliminating a potential source of financing for EE projects.

Most banks do not have financing models or boiler-plate transaction documents designed for EE retrofits, particularly with alternative financing arrangements. This makes

[588] N.J.S.A. 52:32-2(a).
[589] *See* N.J.S.A. 52:32-2(b).
[590] Design-Build Institute of America, *What is Design-Build?*, http://www.dbia.org/about/designbuild/ (last visited Sept. 13, 2011).
[591] *Id*.
[592] New Jersey Assembly, No. 3945 (Introduced May 5, 2011), *available at* http://www.njleg.state.nj.us/2010/Bills/A4000/3945_I1.PDF (last visited Sept. 13, 2011).
[593] New Jersey State Legislature, *Bills 2010-2011*, http://www.njleg.state.nj.us/bills/BillView.asp (last visited Sept. 13, 2011).
[594] New Jersey Assembly, No. 3945, *supra* note 7, at 3.

projects harder to finance, and takes longer to negotiate. As compared to more traditional capital investments, both companies and banks may decide that it is not worth the time and effort.

In addition, EE retrofit projects may involve several financial participants, like private lenders, government or utility loans, and private or publicly funded grants. In addition, the buildings on which EE retrofits are being performed often have existing mortgages, bonds or other financing. As demonstrated by the PACE controversy, discussed above in Part II Section C(2), issues of prior financing requirements, lien priority and rights in the event of default become relevant.

More work by qualified accountants and corporate finance professionals needs to be done to address the perceived and actual implications of EE projects and financing on corporate finance, tax, disclosure and governance. In addition, GPIC could develop model financial documents, disclosures, and appraisal and accounting resources geared towards EE projects specifically.

Financial Transaction Barriers

Financial institutions have not generally devoted the time or resources to developing the expertise and boiler-plate transaction documentation necessary to facilitate EE transactions.

> Assessing, developing, and operationalising EE financing options requires time and resources; this is particularly important for private-sector FIs: "Banks have little time to cope with the range of things going on, particularly at the moment, so it's partly a resource problem."[595]

This has been Philadelphia's experience in deploying Pennsylvania's energy efficient commercial loan funds for commercial buildings.

> The primary barrier to scaling up energy efficiency financing is that, in the long term, it will have to come from the private sector—banks and other private institutions who do the vast majority of real estate lending—rather than from publicly-funded investments. "No matter how much ARRA funding goes towards energy efficiency, it is a pittance compared with the cost-effective energy improvements needed in our buildings," says Clark. Involving banks in energy efficiency lending will therefore be a crucial step.
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> The problem, says [Andy Rachlin, Deputy Chief of Staff, Office of the Deputy Mayor for Planning and Economic Development, City of Philadelphia], is that "banks are

[595] Energy Efficiency and the Finance Sector, 28, UNEP Finance Initiative, January 2009.

> conservative institutions, especially now, and they're going to need to see lots and lots of evidence" that customers want energy efficiency and that it makes sense as a financial investment. The evidence—a combination of energy costs, construction costs, and energy consumption data—varies from city to city, adding to the complexity of proving the value of energy efficiency.[596]

In addition, many financial institutions do not have a structure for financing energy efficiency energy services companies and other alternative financing entities. As a result, companies that could provide financing and services for smaller scale projects have difficulty obtaining financing.

> [E]nergy savings, which underpin the usual ESCO business proposition, are not a conventional 'asset' against which a bank will lend. In other words, cash-flow from energy savings is not a familiar form of revenue or collateral to back lending (although clearly any additional equipment provided would be an asset). This means that FIs, particularly local FIs, need to become familiar with the nature, as well as the performance and credit risks of energy savings financed projects in order to be comfortable with providing debt.[597]

Finally, EE retrofit projects may involve several financial participants, like private lenders, government or utility loans, and private or publicly funded grants. The buildings on which EE retrofits are being performed often have existing mortgages, bonds or other financing. As demonstrated by the PACE controversy, discussed above in Part II Section C(2), issues of prior financing requirements, lien priority and rights in the event of default become relevant.

The above described barriers relate to the underlying risk and investment decisions of financial institutions. However, the lack of boiler-plate documentation, underwriting standards and project evaluation methodology also makes projects harder to finance, and means that each transaction requires more time and investment in transaction costs. As compared to more traditional capital investments, companies and banks often decide that it is not worth the time and effort.

To help to overcome these barriers, GPIC could develop model financial and legal documentation for EE transactions. Natural Resources Canada recently developed a "legal toolkit" which includes model financial agreements and other related documents, which could be a template for developing additional resources.[598] If possible, the resources and

[596] Climate Leadership Academy Network, Case Study: Philadelphia, June 2010 available at http://www.iscvt.org/resources/documents/philadelphia_greenworks_loan_fund.pdf.
[597] Id. at 4.
[598] Natural Resources Canada "Clean Energy Legal Toolkit" can be accessed at http://www.retscreen.net/ang/legal_aspects_of_energy_projects.php.

experience of The Reinvestment Fund in administering and underwriting Pennsylvania's commercial EE loan programs should be leveraged.

Accounting Standards

Since 1973, businesses and nonprofit organizations have adhered to the financial accounting and reporting standards set by the Financial Accounting Standards Board (FASB).[599] There is little more arcane than the Federal Accounting Standards Board (FASB) rules government corporate accounting, and seemingly little nexus between energy efficiency and accounting rules. This is not the case.

FASB recently proposed changes to the accounting rules regarding leases. Under current accounting standards, there exist two categories of leases. Capital leases[600] involve those that "transfer to the lessee substantially all the risks and rewards incidental to ownership of the leased asset," while all others are classified as operating leases[601].[602] Under a capital lease, companies are required to record the cost of equipment as an asset and the value of future lease payments as a liability on their balance sheets. By contrast, operating leases are listed in the footnotes, and not included in calculations of debt.[603] Critics of the current structure argue that operating leases are assets and liabilities as well, and thus the current standards enable companies to exclude important information on balance sheets, leading to a "lack of comparability and undue complexity."[604]

The changes to the definition of "lease" created an issue as to how EE and renewable energy services contracts were going to be accounted for by the energy services company, the customer and the financier. Under FASB's new lease rule, energy services contracts will be treated as leases rather than service contracts or operating leases. As a result, the contracts will appear as assets or liabilities on the building owner's balance sheet, becoming "on-book" financing.

Although the financial structure of the energy services contract will remain the same, the changed accounting structure may lead to more expensive financing (due to higher leverage ratios), higher tax exposure, more extensive disclosure requirements and steeper annual accounting costs. All of these added transaction costs make the return on investment of EE projects longer. In addition, the added costs and exposure potentially

[599] Hertz, Robert. Chairman of FASB. Congressional Testimony, May 2010.
[600] One of the following four criteria must be met to be classified as a "capital lease": 1) ownership of the assets are transferred at the end of the term; 2) a bargain purchase option is available at the end of the term; 3) the lease term constitutes over 75% of the useful (economic) life of the asset; or, 4) the present value all lease payments equal at least 90% of the fair market value of the asset (Lines and Supple, 4-5).
[601] "Operating Lease": The lease term is "significantly less than the useful life of the asset in question, and the landlord retains ownership [of the] rights and risks (Davis, 1. "Client Alert: New Accounting Rules to Require Tenants to Reflect Operating Leases on Balance Sheet," Cozen O'Connor.)
[602] FASB Discussion Paper. "Leases: Preliminary Views." March 2009. http://www.fasb.org/draft/DP_Leases.pdf
[603] Lines and Supple, 5-6.
[604] FASB Exposure Draft, 1. "Proposed Accounting Standards Update." August 2010. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821125393&blobheader=application%2Fpdf

reduces the appeal of energy services contracts, eliminating a potential source of financing for EE projects.

In August 2010, FASB released an exposure draft ("ED") of proposed accounting standards for leases to address problems associated with ambiguous accounting practices regarding the recognition of assets and liabilities. In the ED, the FASB proposed a new definition of leases. FASB defined a lease as a contract that "depends on providing a specified asset" and "conveys the right to control the use of specified asset for an agreed period of time."[605] An asset could be explicitly or implicitly specified. [606] Moreover, "right to control" the use of an underlying asset implies that "the customer has the ability to direct the use of, and receive substantially all of the potential economic benefit from the asset throughout the term of the arrangement." [607]

As a result of these new stipulations under this "right of use" approach, the assets and liabilities of leases, regardless of their former capital or operating classifications, would be reported in the same way on the company's statement of financial position.[608] In response, energy service companies (ESCOs)[609] questioned the applicability of the "right-of-use" model to power purchase agreements (PPAs)[610] regarding the "right to control" concept.

Specifically, one of the key indicators of control is that the lessee receives "all but an insignificant amount of the output or utility of the asset."[611]

However, PPAs are frequently structured so that more than one party receives portions, rather than all of the output. For example, a customer might benefit from the direct purchase of electricity, while in the same PPA other entities might purchase the capacity[612] to produce energy or renewable energy certificates (RECs) [613].[614] In this

[605] FASB Exposure Draft, 41 Paragraph B4.
[606] "Implicitly specified" is defined as impractical or economically infeasible for the lessor to provide an alternative asset during the lease term FASB Exposure Draft, Appendix B, 41 Paragraph B2.
[607] PWC, 8.
[608] Grossman, Amanda and Steven Grossman, 1. "Capitalizing Lease Payments," The CPA Journal. May 2010. http://www.leasingnews.org/PDF/cpa_journal510.pdf
[609] "ESCO": "A business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a seven to twenty year time period. ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project." (National Association of Energy Service Companies, http://www.naesco.org/resources/esco.htm)
[610] "Power Purchase Agreement": A long term financial arrangement in which a "third-party developer [not the utility] owns, operates, and maintains" energy generating equipment (i.e. photovoltaic system), and a host customer agrees to site the system on its property and then purchases the electrical output for an agreed upon period. Meanwhile, an investor provides "equity financing and receives the Federal and state tax benefits" that are associated with usage of the equipment (EPA Green Power Partnership, www.epa.gov/greenpower/buygp/solarpower.htm#two).
[611] This stipulation implies that a customer has the right to substantially all of the benefits from the asset. FASB Exposure Draft, 42 Paragraph B4 (e).
[612] "Capacity" may be purchased for "regulatory purposes without the right to purchase the energy" or serve as a fee that grants the "purchaser the right, but not the obligation, to purchase any energy." "RECs" are the "non-physical property right to the environmental benefits associated with renewable energy production." Edison Electric Institute, A-8. Comment Letter No. 640 to FASB Exposure Draft.

scenario, if the RECs or capacity were considered output as well then no one customer would receive "all but an insignificant amount" of the benefits involved in a PPA.[615] This means that since these outputs could be sold to more than one recipient, the ED fails to clarify whether or not an agreement that involved multiple beneficiaries would count as a lease.

Moreover, to qualify as a lease, the right-of-use approach requires that the price paid by the lessee for the output of the asset be "neither contractually fixed per unit of output nor equal to the current market price per unit of output."[616] But PPAs do not fit uniformly into this model. For example, PPAs which set the price of electricity at "separate fixed pricing for different times of the day" or a "fixed formula based on the level of production from the plant" could be interpreted as leases or service agreements[617].[618] Literalists would argue that for these examples, the price per unit of output does not remain constant throughout the term so the price per unit is not fixed. Meanwhile, power companies and customers remain uncertain about how to interpret such pricing schemes because one could also argue that "the price is fixed for all units, albeit at different amounts," so such contracts meet this proposed requirement of a lease.[619]

FASB proposed to capitalize short-term leases because they have the potential to produce assets and liabilities, and excluding short term leases might incentivize parties to manipulate lease agreements to appear short term in order to avoid listing them on the balance sheet.[620] Meanwhile, energy service providers claim that recording all short-term leases on balance sheets creates an "unnecessary administrative burden."[621] More importantly, predicting future unpaid short-term rental payments for cars, equipment used in power plant and transmission system construction projects, and other leases can

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http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821970292&blobheader=application%2Fpdf

[613] "RECs": the "non-physical property right to the environmental benefits associated with renewable energy production." Edison Electric Institute, A-8. Comment Letter No. 640 to FASB Exposure Draft. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821970292&blobheader=application%2Fpdf

[614] Edison Electric Institute, A-8. Comment Letter No. 640 to FASB Exposure Draft. Edison Electric Institute is the association of US shareholder-owned electricity companies, which service 95% of customers in the shareholder-owned segment of the industry and represents approximately 70% of the US electric power industry. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821970292&blobheader=application%2Fpdf

[615] Edison Electric Institute, A-8.

[616] FASB Exposure Draft, 42 Paragraph B4 (e).

[617] "Service Agreement": "An agreement to sell output (raw materials, energy, etc.) or provide some type of performance to a recipient, regardless of the assets used to achieve that end (Lines and Supple, 3)."

[618] Constellation Energy, 3. Comment Letter No. 554 to FASB Exposure Draft. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821968123&blobheader=application%2Fpdf

[619] Edison Electric Institute, A-3.

[620] FASB Discussion Paper, 9 Paragraph 2.19.

[621] Progress Energy, 3. Comment Letter No. 370 to FASB Exposure Draft. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821951006&blobheader=application%2Fpdf

"obscure important liquidity ratios"[622] by adding liabilities that lessees have not yet incurred.[623]

The ESCOs are also concerned about FASB's proposal to define lease terms as the "longest possible term that is more than likely to occur."[624] Measuring the probable length of a lease term would depend on: (1) "contractual factors' that encouraged or discouraged the lessee to extend the lease including the amount of lease payments in a renewal period; (2) "non-contractual factors" such as local regulations impacting the lease term; (3) "business factors" including the location of the leased asset; and, (4) miscellaneous factors that relate to lessee's goals and past history.[625] Energy servicer providers companies argue that lessees should only account for those assets and liabilities that are "contractually obligated" in the current lease agreement.[626] Similar to the expected impact of capitalizing short-term leases, determining leases as the longest possible term would require ESCOs to subjectively add assets and liabilities, which in turn would hinder their financial ratios.[627]

The new definition would require PPA customers and energy service providers to predict rental payments that would produce similar perverse effects of inappropriately grossing up financial statements. Specifically, ESCOs and customers would have to measure assets and liabilities associated with contingent rentals[628] and expected payments using an expected outcome technique, and reevaluate these assets and liabilities after changes in facts or circumstances since the previous reporting period.[629] The expected outcome technique involves "identifying a reasonable number of possible cash flows," along with their amount, timing, present value, and probability of occurrence.[630]

ESCOs are concerned over the usage of the expected outcome technique because it is "probability-weighted,"[631] which might inaccurately forecast production levels as opposed to companies' current accounting models and practices.[632] While ESCOs formulate

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[622] "Liquidity Ratio": Financial metrics that express a firm's ability to meet short-term debt obligations. The two ratios used to measure this liquidity are: 1) current ratio: current assets/current liabilities and 2) quick ratio: (cash + marketable securities + net receivables)/current liabilities. (Department of Economics: Managerial Economics, University of Notre Dame. www.nd.edu/~mgrecon/simulations/micromaticweb/financialratios.html)
[623] Xcel Energy, 2. Comment Letter No. 543 to FASB Exposure Draft. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821966290&blobheader=application%2Fpdf
[624] FASB Exposure Draft, 46 Paragraph B16.
[625] FASB Exposure Draft, 46-47 Paragraphs B18 (a)-(d).
[626] Edison Electric Institute, 7.
[627] Idaho Power, 3. Comment Letter No. 606 to FASB Exposure Draft.
[628] "Contingent Rentals": "Lease payments that arise under the contractual terms of a lease because of changes in facts or circumstances occurring after the date of inception of the lease, other than the passage of the lease." FASB Exposure Draft, Appendix A, 38.
[35] FASB Exposure Draft, 2.
[630] FASB Exposure Draft, 49 Paragraphs B21 (b)-(d) and 107 Paragraph BC128.
[631] The expected outcome technique requires the lessee to consider a reasonable number of cash flows and their probability distribution. This estimation involves: 1) identifying each reasonably possible outcome; 2) estimating the amount and timing of the cash flows for each reasonably possible outcome; 3) determining the present value of those cash flows; and, 4) estimating the probability of each outcome (FASB Exposure Draft, 48-49).
[632] Edison Electric Institute, 8.

predictions of energy production that are similar to the proposal in the ED, their models consider the varied amount of energy a generator is ultimately able to supply.[633] ESCOs' current models account for stochastic factors including "planned and unplanned plant outages, historical production data," and in the case of a renewable energy agreement, variables such as "seasonal weather patterns" and "locational characteristics."[634] Therefore, ESCOs argue that usage of such models more accurately factor in the impact of unpredictable production levels when customers and ESCOs measure assets and liabilities associated with a PPA.

Furthermore, FASB claims that using lease terms at "initial recognition throughout the lease arrangement could be misleading" and not reflect "current market conditions."[635] According to some ESCOs, the variable nature of contingent payments in PPAs would require them to devote a significant amount of time and resources to measuring assets and liabilities for each reporting period.[636] For that reason, many ESCOs support a "trigger event" methodology, which means that companies would determine key changes in their respective industries and then only reevaluate leases that were affected by those relevant "triggers," rather than a "wholesale review of all leases."[637]

Along with the consequences for PPAs, ESCOs are concerned that the new lease requirements will impact the long-term viability of energy efficiency retrofits. Specifically, the ED could affect energy savings performance contracts (ESPCs). Under such an agreement, an ESCO offers "energy-saving services," such as the "installation of energy-saving equipment or building improvements" in exchange for "contingent payments based on actual, verified energy savings, as well as fixed payments for certain services" performed throughout the entire contract.[638] Essentially, this financing scheme operates according to the following process. First, an ESCO installs the energy efficiency retrofit, which is then paid for and owned by a third party that "shares the forward savings generated on the projects with [the] customer on a negotiated percentage basis."[639] Currently, the financing agreement is often reported as an operating lease,[640] which enables customers and ESCOs to employ off balance sheet financing and pursue retrofits "at no up-front cost and without impairing their existing debt picture."[641]

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[633] Excel Energy, 6.
[634] Edison Electric Institute, 8.
[635] FASB Exposure Draft, 108 Paragraph BC 132.
[636] Edison Electric Institute, 9.
[637] American Electric Power Institute, 3. Comment Letter No. 507 to FASB Exposure Draft. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821957522&blobheader=application%2Fpdf
[638] National Energy Association of Energy Service Companies, 2. Comment Letter No. 516 to FASB Exposure Draft. The National Association of Energy Service Companies (NAESCO) is the "national trade association for companies and institutions engaged in providing energy services and in the development, marketing, installation, and maintenance of energy efficient equipment (Comment Letter, 1)." http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821965420&blobheader=application%2Fpdf
[639] Lines and Supple, 9.
[640] NAESCO, 2.
[641] Lines and Supple, 8.

The usage of contingent payments for ESPCs generates the same concerns and arguments for PPAs: defining the length of a lease term, allocating ownership rights and determining how often liabilities and assets associated with contingent rentals should be reevaluated.

ESCOs assert that ESPCs should not be classified as leases because they do not meet the ED's proposed definition of the term, and in particular they do not adhere to the right-of-use model. Specifically, an ESPC involves: 1) the provision of "permanent improvements" and "long-term energy-related services" for a customer; 2) payments based on the "performance of the systems installed by the ESCO," which means that any energy savings not originally agreed upon are paid by the ESCO; and, 3) payments for "operating, maintenance, and energy monitoring services."[642] Essentially, a customer allocates operating funds to cover energy services and equipment, and in return receives "guaranteed reductions in overall energy bills."[643] Therefore, ESCOs argue that companies are not paying for the right to use and control any property involved in the ESPC, but rather they are paying for a suite of energy efficiency services.

According to the ED, a lessor should adopt a "performance obligation approach"[644] if it "retains exposure to significant risks or benefits associated with an underlying asset" during or after the lease term, while in all other cases a lessor should use the derecognition approach[645].[646]

When determining if significant risks or benefits arise during the lease of an asset, the three factors that a lessor should consider include: 1) contingent rentals "based on the use or performance" of the asset; 2) "options to extend or terminate the lease;" 3) and, "material non-distinct services[647] provided under the current lease."[648] Meanwhile, in order

[642] NAESCO, 3.
[643] NAESCO, 3.
[644] "Performance Obligation Approach": The underlying asset is a "continuing economic resource of the lessor" and thus, the existence of the lease should not impact how the lessor accounts for the underlying asset on the balance sheet. Therefore, the lessor must then recognize on the balance sheet the rental income from the lease as well as the lease liability, that being "the obligation to provide the lessee with the right to use the asset over the lease term." (IFRS, "Stephen Cooper: Lessor accounting – what really are the lessor's assets?" October 2010. http://www.ifrs.org/Investor+resources/2010+perspectives/October+2010+perspectives/26+October+2010+perspectives.htm.)
[645] "Derecognition Approach": The lessor has "transferred the economic benefits of the underlying asset to the lessee." Therefore, the lessor derecognizes the portion of the underlying asset that is assumed by the lessee and the present value of the right to receive lease payments. (IFRS, "Stephen Cooper: Lessor accounting – what really are the lessor's assets?" October 2010. http://www.ifrs.org/Investor+resources/2010+perspectives/October+2010+perspectives/26+October+2010+perspectives.htm.)
[646] FASB Exposure Draft, 21 Paragraph 29.
[647] "Material Non-distinct Services": The lease of the asset is combined with other integrated services that do not meet the criteria to become distinct, which can retain a lessor's exposure to the risks or benefits of an underlying asset (Ernst and Young, 33. http://www.ey.com/Publication/vwLUAssets/Proposed_accounting_for_leases_GL_IFRS/$FILE/Proposed_accounting_for_leases_GL_IFRS.pdf). A service is distinct if the lessor sells or could sell an identical or similar service separately (FASB Exposure Draft, 43 Paragraph B7 (a)-(b).)
[648] FASB Exposure Draft, 49 Paragraph 22 (a)-(c).

to determine if risks or benefits are produced after the lease term, the lessor should also consider: 1) whether the length of the lease term is unimportant with respect to the "remaining useful life" of the asset and 2) whether a "significant change in the value of the asset at the end of the lease term is expected."[649] Energy service providers agree that a lessor should apply the performance obligation approach if the lessor continues to assume "significant risks or benefits" associated with a leased asset during or after the lease term.[650] However, these power companies do argue that the performance obligation approach should be employed if the lessor receives economic benefits not only for "re-leasing" or "reselling" the underlying asset, but for "operating" it as well.[651]

More importantly, concern among energy service providers has less to do with these proposed changes, and more to do with the complexity that arises over whether or not they should even identify themselves as lessors in PPAs. Many ESCOs act as both "a lessor in the PPA and a lessee in the sale leaseback structure.[652]"[653] Therefore, if PPAs become capitalized leases as proposed under the ED, the ESCO would be a lessor in the PPA and a lessee in the sale leaseback agreement, thereby requiring the ESCO to place the same assets and liabilities twice on its balance sheet.[654]

Similar issues of ambiguity impact "energy service agreements," in which a third-party financier provides an ESCO with funding for the installation and maintenance of an energy efficiency retrofit project. [655] In this scenario, the investor is involved in one finance agreement with the ESCO in order to cover construction and maintenance costs, and a separate service agreement in which the customer pays the financier for the utilities. Since the customer, ESCO, and financier are engaged in multiple contracts for the same project, all three parties question whether they should be accounting for the same retrofit multiple times on the statement of financial position.

In response to the ED, the Solar Energy Industries Association argues that the proposed changes would encourage a process of "grossing up transactions" among ESCOs,

[649] FASB Exposure Draft, 49 Paragraph B24 (a)-(b).
[650] Edison Electric Institute, 4.
[651] Edison Electric Institute, 4.
[652] "Sale Leaseback Structure": A finance scheme that involves one project owner, in which a "tax-based investor purchases the project from the developer and then leases the project back to the developer. The tax-based investor receives the tax benefits of the project along with fixed lease payments. The developer operates the project, pays expenses and lease payments, and keeps the remaining cash flows (National Renewable Energy Laboratory (NREL), http://financere.nrel.gov/finance/content/flips-and-leases-sam-check-and-check."
[653] NREL, "Solar Development May be Hampered by Proposed New Accounting Rules." http://financere.nrel.gov/finance/content/solar-development-may-be-hampered-proposed-new-accounting-rules
[654] NREL, "Solar Development May be Hampered by Proposed New Accounting Rules." http://financere.nrel.gov/finance/content/solar-development-may-be-hampered-proposed-new-accounting-rules
[655] "Energy Savings Agreement": An ESCO installs an energy efficiency retrofit and provides maintenance services for a customer, while a third-party financier contracts with an ESCO to cover the costs associated with the retrofit and maintenance services. Then, the customer pays back the financier by either of the following methods: 1) a variable service charge that depends on the performance of the retrofit and is "set to always be less than existing utility payments" in order to maintain a positive cash-flow for the customer; or 2) "a monthly amount equal to the property's historical utility bill," while the financier pays the utility and retains the profit that arises due to the energy savings generated by the retrofit (Lines and Supple, 9).

financiers, and customers.[656] In turn, this need to account for the same lease multiple times could generate "confusion among investors who are trying to understand ownership and obligations" in renewable energy PPAs and energy efficiency retrofits.[657]

As of the publication of this study, it appears that FASB will adopt the new lease accounting standards.

4.5. Recommendations

To the extent that market processes have not caught up to the needs of EE transactions, GPIC should develop market-acceptable models to address process issues like leasing, financial transaction documentation and appraisals. New York City set an example of how policy institutions can create fruitful market models by developing a model green lease provision with contribution from the effected stakeholders. For example, GPIC could spearhead the development or piloting of model financing documents and appraisal requirements for EE projects.

5. CONCLUSIONS

Pennsylvania and New Jersey are typical of most of the country in that there are policies and legal processes which both help and hurt energy efficient commercial building retrofits. Therefore, the Greater Philadelphia Area is an excellent test-bed for EE policy and process efforts.

The authors of this study recommend further analysis of the impact of the polices already in place to directly incentivize EE. It is critical to know the extent to which these policies have succeeded, the energy saved and the investment made.

Because government fragmentation is itself a barrier to EE because of the lack of cohesive and consistent policy making, GPIC can play an important, and somewhat unique role, as a cross-jurisdictional body to facilitate education and communication across governmental entities.

GPIC can use the other research being done on behavioral and market influences on EE to inform public policy efforts. Entrenched stakeholder objections and indirect barriers to EE may respond to changes in behavior and attitude towards EE.

Finally, GPIC can develop and pilot new resources for EE transactions to reduce the transactional barriers to EE. Through market-tested models, GPIC can offer credible models for use by financers, appraisers, lawyers and accountants to make EE transactions less complicated and costly.

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[656] Solar Energy Industries Association, 4. Comment Letter No. 84 to FASB Exposure Draft. http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175821982801&blobheader=application%2Fpdf

[657] Id, 4.

Therefore GPIC should engage in further research and programs as suggested in this study to enhance the EE policy environment and accelerate market transformation towards a more EE built environment.

APPENDIX A: INCENTIVE PROGRAMS

APPENDIX B: APPLIANCE STANDARD SUMMARY

HEATING, VENTILATION, WATER HEATING AND AIR CONDITIONING EQUIPMENT

Federal law regulates various commercial heating and air conditioning products alongside water heating equipment. The grouping of these products within the statute reflects their status as appliances covered by ASHRAE guidelines. These requirements are described according to the requisite standards for "small, large and very large commercial package air conditioning and heating equipment, packaged terminal air conditioners and heat pumps, warm air furnaces, packaged boilers, storage water heaters, instantiations water heaters, and unfired water storage tanks." The applicable standards for these devices are essentially governed by ASHRAE recommendations; The "Secretary [of Energy]," is required to "establish an amended uniform national standard…" anytime ASHRAE standard 90.1 is changed.

The minimum efficiency standards for commercial air conditioning and heating equipment are outlined first, expressly including "single package vertical air conditioners and single package vertical heat pumps." Package air conditioners are typically employed to regulate the internal temperature of commercial facilities such as hospitals, dormitories and condominium complexes. These appliances operate within the walls of a structure, distributing temperature controlled air flow through ducts or grates. Heating pumps serve a similar function, typically diverting warm temperatures in one location to another cooler location through a series of pressurized valves. Such devices are regulated according to their output, which is tied to a minimum ratio of conditioning effect in comparison to electrical expenditure. Appliances of different sizes are governed by different efficiency ratios.

"Terminal air condition[ers]," and " terminal heating pumps" are similarly regulated according to energy efficiency ratios. These appliances perform the same function as their single package vertical counterparts, but operate as smaller, self contained units that are visibly mounted onto a window or wall fixture. "Warm air furnace[s]," and "packaged boiler[s]" receive ratio designations according to their operative capacity, and whether they are fueled by gas or oil. Regulated water heaters include storage heaters, instantaneous heaters, and unfired water storage tanks. Storage heaters collect external thermal energy when it becomes available, or otherwise utilize electrical current when most efficient. Instantaneous heaters expend energy to produce heated water only when it

is immediately needed, and do not store it throughout the day. Unfired water tanks are typically industrial, and keep water heated in another device at a constant temperature for later use.

ASHRAE recommendations that govern the efficiency standards of these devices are intermittently updated , promoting a review and eventual recommendation of new standards by the Department of Energy. When an update to ASHRAE 90.1 is published, the Department of Energy posts public notice of potential energy savings in the Federal Register , and must update the national standard to meet the new recommendations within eighteen months, or create a more stringent standards within thirty months. More stringent standards are adopted if clear and convincing evidence suggests that such a national standard would produce significant additional energy savings. The existing standards governing the air conditioning and heat pump equipment, for example, were amended by the Energy Impendence and Security Act of 2007 to include regulations for single-package vertical air conditioners and heat pumps corresponding to ASHRAE 90.1-2004, after a review by the Department of Energy. On October 9th, 2010, ASHRAE 90.1-2010 was issued, and the Department of Energy thereafter began its review. Publishing the initial results of its review on May 5th, 2011, the Department of Energy evaluated the effectiveness of amended standards, and independently recommended more stringent standards for single package vertical air conditioners and heat pumps, for which ASHRAE standards generally did not change. In this initial review, the Department notes that heighted requirements for the following devices produced justifiably efficient increases in energy savings: various water-cooled air conditioners of particular electrical capacities , evaporatively-cool air conditioners , variable refrigerant flow ('VRF') heat-pumps of particular electrical capacities , single-packaged vertical air conditioners & heat-pumps for which standards were updated , water cooled air conditioners with fluid economizers and water cooled air conditioners with glycol-cooled fluid economizers.

The Department of Energy did not recommend updated standards for the following devices, despite the fact that ASHRAE 90.1-2010 contains heightened requirements: gas-fired commercial warm-air furnaces , various VRF air conditioners , VRF air-cooled heat pumps of various electrical capacities , VRF water source heat pumps of various electrical capacities , package terminal air conditioners and heat pumps (not vertical, discussed, infra) , through-the-wall air cooled heat pumps and small-duct high velocity air-cooled heat pumps.

Some ambiguity remains as to which of these new recommended standards applies to 'commercial' as opposed to 'residential' appliances. For example, the Department of Energy's recommendations, discussed above, appear in a report that expressly deals with the standards for "commercial heating, air conditioning, and water heating equipment." Nonetheless, a recommendation regarding small-duct high velocity air-cooled heat pumps and air conditioners is included, despite these devices categorization by the Department of Energy as residential appliances. If these high velocity heating pumps and air-conditioners are potentially commercial in application, it is relevant to note that proposed legislation before Congress currently seeks to mandate heightened standards for both air-

conditioners and heat-pumps of this type, despite the Department's recommendation against adopting ASHRAE 90.1-2010's requirements. Previous standards for these apparently residential devices came into effect in 2006 , and proposed legislation would regulate their air-output and require the Secretary of Energy to review and potentially amend efficiency standards.

Commentary on the Department of Energy's new standards reflects general acceptance of their enactment. ASHRAE 90.1 deals primarily with commercial building regulations, and The Building Owners and Managers Association ('BOMA'), representing the oldest and largest organization of commercial real estate professionals , worked closely with ASHRAE in developing their 2010 recommendations. The Department either adopted ASHRAE's recommended standards or retained the status quo in regards to almost every commercial appliance effecting real estate. The sole exception is the regulation of single package vertical air conditioners and heat pumps, for which the Department has recommended increased regulation despite ASHRAE's failure to recommend such a standard. These regulations have apparently generated little controversy, because such air-conditioners and heat pumps are niche products in comparison to widespread rooftop units. BOMA and their constituents continue to monitor new standards proposed by ASHRAE, and generally praise these regulation's ability to create a uniform standard applicable as a minimum in all fifty states.

ELECTRIC MOTORS

Electric motors are devices which convert electrical power into mechanical power within a motor-driven system.[658] Motors can either be sold to original equipment manufacturers (OEMs) and then integrated into prepackaged equipment, for sale to consumers, such as pumps, fans, and compressors; or they can be sold as individual items to the final customer and be integrated into specific applications on site.[659] Motors sold individually are generally for industrial use and have an output of 375 kW or greater.[660] While these large industrial motors only account for .03% of electric motors worldwide, they account for 23% of all motor power consumption, which equates to about 10.4% of annual global power use.[661]

Approximately half of all electrical energy consumed in the United States is used by electric motors.[662] It is estimated that global energy usage from electric motors could rise to 13,360 tWh and cost $900 billion annually by 2030 if effective energy efficiency measures are not taken.[663] These motors are currently the largest end-users of electricity

[658] *Energy-Efficiency Policy Opportunities for Electric Motor-Driven Systems*, International Energy Agency, Paul Waide and Conrad U. Brunner (2011), http://www.iea.org/papers/2011/EE_for_ElectricSystems.pdf at 11.
[659] *Id*. at 12.
[660] *Id*.
[661] *Id*.
[662] *Buying an Energy-Efficient Electric Motor*, U.S. Department of Energy, http://www1.eere.energy.gov/industry/bestpractices/pdfs/mc-0382.pdf at 1.
[663] *Energy-Efficiency Policy Opportunities for Electric Motor-Driven Systems*, at 11.

in the world and are used for HVAC systems, pumping, hard drives and fans, escalators and elevators, air and liquid compressors, and other forms of mechanical handling and processing.[664] Motors consume twice as much energy as lighting and account for about 45% of electricity usage worldwide.[665]

Because electric motors, especially those in commercial and industrial applications, consume such a large portion of the world's energy, making them more efficient has the potential to have a significant effect on worldwide electricity usage. While using the most efficient motors today can reduce electricity consumption by about 5%, linking those motors with more energy-efficient procedures can curtail electricity consumption by another 25%.[666] Putting in place procedures that eliminate idle time, institute well-defined production cycles and intervals, reduce unnecessary overloads, and ensure that there are regular mechanical and electrical checks, can significantly reduce the electricity usage of motors.[667]

However, barriers exist to increasing the efficiency of electrical motors. There is a lack of awareness among motor purchasers of the potential energy and cost savings of using a high efficiency motor (HEM).[668] Although the initial cost of an HEM is greater than other motors, the payback, caused by reduced energy costs, is relatively quick and generally occurs within two years of installing the HEM.[669] Another significant barrier to efficiency in motors is the fact that the majority of them are integrated into OEM equipment before sale to the final end-user, which in most cases does not afford customers the choice to install a HEM until the motor for that OEM product needs to be replaced.

The efficiency of electric motors became regulated with the passage of the Energy Policy Act of 1992 (EPAct 1992).[670] EPAct 1992 required certain motors to increase their efficiency by 1-4% and the Energy Policy Act of 2005 (EPAct 2005) required all federal motor purchases to conform with the NEMA Premium Motor efficiency ratings.[671] The latest change to the regulation of electric motor efficiency came in 2007, with the passage of the Energy Independence and Security Act (EISA), which updated EPAct 1992's efficiency standards and extended coverage to new categories of motors.[672]

Today, commercial electric motors are regulated if they meet the technical criteria for general purpose electric motors outlined in the Department of Energy's (DOE's) final

[664] *Id*. at 18.
[665] *Id*. at 11.
[666] *Id*. at 13.
[667] *Id*. at 70-71.
[668] *Id*. at 13.
[669] *Buying an Energy-Efficient Electric Motor*, U.S. Department of Energy, at 4.
[670] *Energy-Efficiency Policy Opportunities for Electric Motor-Driven Systems*, at 92.
[671] *Id*. The NEMA standards can be found at http://www.nema.org/stds/complimentary-docs/upload/MG1premium.pdf.
[672] *Id*.

rule on these devices,[673] or if they contain a number of mechanical components specified in Federal law.[674] Beginning on October 24th of 1992, such devices have been required to carry a preset nominal full-load efficiency rating, based upon their horsepower and status as an open or closed motor.[675] Since the passage of EISA, commercial electric motors have been held to the standards proscribed by the National Electrical Manufacturers' Association ('NEMA') MG-1 standard.[676] This Federal regulation covers general purpose electric motors, fire pump motors, and NEMA Design-B motors of a requisite horsepower rating.[677] Smaller electric motors are regulated as a separate category of devices.[678] However, all of these standards are currently under review in the agency rulemaking process.[679] NEMA recently challenged the DOE standards for small motors in the 4th U.S. Circuit Court of Appeals, but the Court denied NEMA's petition and upheld DOE's rule.[680]

Announcing that it planned to amend existing regulations for commercial electric motors on September 28th of 2010, DOE held a public meeting to collect industry input on October 28th of 2010.[681] The American Council for an Energy Efficient Economy (ACEEE) advocated for an expansion of existing regulations to extend efficiency standards to additional motor types, but stressed the need for industry consensus due to the complexities of the electric motor market.[682]

Industry representatives expressed concern with current statutory definitions of "general purpose" electric motors and the inclusion of NEMA design-B motors.[683] These distinctions, they explain, make it difficult for manufacturers to determine which products are regulated, and in what manner, thereby raising the costs of compliance.[684] If a more general, goal-oriented standard were imposed, manufacturers could better streamline the process with standardized parts.[685]

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673 42 U.S.C. § 6311(13)(A); *United States' Department of Energy, Energy Efficiency Program for Certain Commercial and Industrial Equipment: Test Procedures, Labeling, and Certification Requirements for Electric Motors Final Rule*, Federal Register Vol. 64 No. 192, 54114 9/05/1999.
674 42 U.S.C. § 6311(13)(B).
675 42 U.S.C. § 6313(b)(1).
676 *Id.* at (b)(2)(A)-(D).
677 *Id.*
678 *United States' Department of Energy, Energy Conservation Program: Test procedures for Electric Motors and Small Electric Motors*, Federal Register Vol. 74 No. 3, 648 1/01/2011.
679 *United States' Department of Energy, Energy Efficiency Program for Certain Commercial and Industrial Equipment: Test Procedures, Labeling, and Certification Requirements for Electric Motors Final Rule*, Federal Register Vol. 64 No. 192, 9/05/1999.
680 *See* Nat'l Elec. Mfr. Ass'n v. Dep't of Energy (4th Cir. Aug. 16, 2011), *available at* http://www.leagle.com/xmlResult.aspx?xmldoc=In%20FCO%2020110816119.xml&docbase=CSLWAR3-2007-CURR (last visited August 17, 2011).
681 *Id.*
682 *U.S. Department of Energy: Public Meeting to Address Rulemaking Process Framework for Electric Motor Efficiency Standards*, Public meeting convened in Room 8E-089 of the United States' Department of Energy (October 18th, 2010).
683 *Id.* at 44.
684 *Id.*
685 *Id.*

Citing concerns that mandatory regulations on American manufacturers could drive jobs overseas, commentators have noted a preference for a rebate program granting monetary incentives to manufacturers who elect to sell efficient devices.[686] DOE has not yet responded to these comments and concerns, but the final rule is scheduled to be available on December 19, 2012 and go into effect December 19, 2015.[687]

HIGH INTENSITY DISCHARGE LAMPS AND METAL HALIDE LAMP FIXTURES

In 2007, Congress required the Department of Energy (DOE) to consider the feasibility and effectiveness of new standards governing the energy use of high-intensity discharge lamps (HIDs).[688] HIDs are most typically used for street and roadway lighting but are also commonly installed to illuminate stadiums, large commercial buildings and some residential landscapes.[689] HID lighting is preferable to incandescent, quartz-halogen, and most fluorescent lighting systems due to its high efficiency and lighting qualities particularly suited for outdoor uses.[690]

On July 1, 2010, DOE announced its conclusion that the regulation of these lamps would be both technologically feasible and economically justified.[691] Such standards, DOE notes, would incentivize an industry shift from less-efficient probe-start metal halide lamps, toward more-efficient pulse start and high-pressure sodium devices.[692] Without exception, industry commentators indicated their support these new regulations during public comment.[693]

DOE estimates that conservation standards for high-intensity discharge lamps would save $30 billion in 2010 dollars nationally over the course of 30 years.[694] Additionally, regulation would save 11.4 quads of energy over the same 30 year period, the equivalent of the annual electricity consumption of 57 million U.S. households.[695] Given the general acceptance of the proposed review cited by the Department of Energy, it seems likely that new regulations for high-intensity discharge lamps will be forthcoming.

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[686] *Id.* at 237-239.
[687] *Id.*
[688] 42 U.S.C. § 6317(a)(2).
[689] United States' Department of Energy, *Appliances & Commercial Equipment Standards – High-Intensity Discharge Lamps*, (June 14th, 12:01PM), http://www1.eere.energy.gov/buildings/appliance_standards/commercial/high_intensity_discharge_lamps.html.
[690] *Energy Efficient Lighting*, State of Michigan, http://www.michigan.gov/documents/CIS_EO_Lighting_167401_7.pdf at 7.
[691] *United States' Department of Energy, Energy Efficiency Program for Certain Commercial and Industrial Equipment: Final Determination Concerning the Potential for Energy Conservation Standards for High-Intensity Discharge (HID) Lamps*, Federal Register Vol. 75 No. 126, 37975 7/01/2010.
[692] *Id.*
[693] *Id.*
[694] *Id.* at 37976.
[695] *Id.*

There has also been interest in regulating metal halide lamp fixtures. A metal halide lamp fixture consists of two primary components, the lamp and the ballast.[696] The lamp is a type of high-intensity discharge lamp that generates light through a process of radiating metal halide, while the ballast is an electronic device that activates and operates the lamp.[697]

Although separate regulation already governs the energy efficiency of metal halide lamp fixtures, the federal government has mandated internal lamp ballasts meet minimum standards as well.[698] Specifically, section 324(e) of the 2007 Energy Independence and Security Act (EISA) established minimum efficiency levels for pulse start metal halide ballasts[699], magnetic probe-start ballasts,[700] and nonpulse-start electronic ballasts[701] that operate metal halide lamps rated greater than or equal to 150 watts, but less than or equal to 500 watts.[702] These standards for metal halide ballasts became effective January 1st, 2009.[703]

Among the three types of ballasts, electronic ballasts have the most efficiency potential. According to research conducted by the Appliance Standards Awareness Project, pulse start ballasts use approximately 15% and electronic ballasts use approximately 26% less energy than probe start lamps.[704] The comparatively higher efficiency gains of electronic ballasts stem from "reduced ballast loses, reduced size, higher power factor,[705] longer lamp life, and improved dimming capability."[706] However, commercial consumers are dissuaded from procuring electronic ballasts because of high upfront costs, compatibility issues with metal halide lamp fixtures, and limited availability.[707]

Following passage of the EISA, the Department of Energy (DOE) consulted with industry officials in December 2008 about the need to craft new standards beyond the ANSI

[696] US Department of Energy (DOE). "Appliances and Commercial Equipment Standards: Metal Halide Lamp Fixtures," Office of Energy Efficiency and Renewable Energy. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/metal_halide_lamp_fixtures.html
[697] Rider and Singh, 46. "2010 Appliance Efficiency Regulations," California Energy Commission. December 2010. http://www.energy.ca.gov/2010publications/CEC-400-2010-012/CEC-400-2010-012.PDF
[698] 42 U.S.C. § 6295(hh)(1)(A).
[699] "Pulse start metal halide ballast": Powers a lamp through high voltage pulses that ionize gas to "produce a glow discharge." (Rider and Singh, 47)
[700] "Probe start metal halide ballast": Starts a lamp with a "high ballast open circuit voltage" rather than an igniter. (Id, 47)
[701] "Electronic ballast": Starts and operates a lamp through the use of semiconductors. (Id, 47)
[702] 42 U.S.C. § 6295(hh)(1)(A).
[703] Id. at (hh)(1)(c).
[704] Appliance Standards Awareness Project (ASAP). "Metal Halide Lamp Fixtures." http://www.appliance-standards.org/node/6804
[705] "Power factor": The ratio of "active power to the apparent power." The factor ranges between 0 and 1 in which "1 indicates that the voltage and current waveforms are in phase" while 0 means that "no real power is being transferred." (Navigant Consulting, Inc. and Pacific Northwest National Laboratory, 31-32. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/mhlf_preanalysis_chapter3.pdf
[706] ASAP. "Metal Halide Lamp Fixtures."
[707] Id.

Standard C82.6-2005,[708] which serves as the guide for evaluating efficiency levels of ballast devices.[709] A large portion of the discussion focused on the challenges associated with creating a coherent set of rules for further regulating ballasts since they often perform multiple functions within lamps that possess several settings.[710] Among the problems discussed, stakeholders at the meeting explained that determining which portion of the lamp uses the most energy at a given time is a key challenge.[711] In response, the DOE plans to test and regulate metal halide lamps' energy usage while operating in "standby mode" but not in "off mode," even though these lamps still consume electricity when not being utilized.[712]

Currently, the DOE is required to establish new standards for metal halide lamp fixtures by January 2012, which will become effective in 2015.[713] Overall, these new rules have the potential to create economic and energy savings for commercial consumers. For example, new efficiency standards are expected to save the sector 1.1 quads of "primary energy"[714] through 2030.[715] Moreover, annual savings created by the new standards are anticipated to outweigh costs by $850 million in 2020 and $7,836 million in 2030.[716] Lastly, the new standards have the potential to save 360 kWh per fixture on annual basis[717], which collectively will offset 3.1 million metric tons (MMT) of carbon emissions in 2020 and 10.2 MMT in 2030.[718]

COMMERCIAL REFRIGERATION EQUIPMENT

[708] "ANSI Standard C82.6": Certification, compliance, and enforcement provisions for federal energy conservation standards. (US DOE. "Appliances and Commercial Equipment Standards: Metal Halide Lamp Fixtures," Office of Energy Efficiency and Renewable Energy. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/metal_halide_lamp_ballasts_tp_nopr.html
[709] US DOE: Public Meeting on Energy Conservation Program for Certain Commercial and Industrial Equipment: Test Procedures for Metal Halide Ballasts. Public meeting convened in Room 1E-245 of the United States' Department of Energy (October 18th, 2010).
[710] Id. at 30-33.
[711] Id. at 35-39.
[712] United States' Department of Energy, Energy Efficiency Program for Certain Commercial and Industrial Equipment: Test Procedure for Metal Halide Lamp Ballasts (Active and Standby Modes) and Proposed Information Collection; Comment Request; Certification, Compliance and Enforcement Requirements for Consumer Products and Certain Commercial and Industrial Equipment; Final Rule and Notice, Federal Register Vol. 75 No. 45, 10959 3/09/2010.
[713] Neubauer et al., 6. "Ka-BOOM! The Power of Appliance Standards: Opportunities for New Federal Appliance and Equipment Standards," American Council for an Energy Efficient Economy (ACEEE) and Appliance Standards Awareness Project (ASAP). July 2009. http://www.appliance-standards.org/sites/default/files/A091_0.pdf
[714] "Primary energy": Incorporates the "energy content of the fuel burned at the power plant" along with the energy content of electricity used at the commercial office space. (Nadel et al., iv. "Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards," ACEEE and ASAP. January 2005. http://www.clasponline.org/files/a051.pdf)
[715] Neubauer et al., 18.
[716] Id, 20.
[717] Id, 24.
[718] Id, 21.

Commercial refrigeration equipment consists of refrigerators and freezers that are typically located in supermarkets, convenience stores, and food service establishments.[719] In general, refrigeration appliances are responsible for "7% of the total energy consumed by commercial buildings."[720] In supermarkets alone, large commercial refrigerators account for 44% to 62% of the industry's total energy use.[721]

Separate energy efficiency requirements exist for commercial refrigerators and freezers with and without doors.[722] Specifically, the Energy Policy Act of 2005 established standards for "self-contained"[723] appliances with doors and pull-down applications, while in 2009 the Department of Energy (DOE) established distinct standards for self-contained equipment without doors, "remote condensing"[724] equipment, and ice cream freezers.[725] The standards for open cases are "much less stringent" than those for doored cases, yet doorless equipment utilizes approximately three times more energy than open case appliances.[726] For that reason, debate has arisen over the necessity to maintain softer standards for open cases due to their comparatively higher environmental impact.

On one hand, industry representatives argue that doorless equipment is important to commercial consumers despite the inefficiencies of this appliance."[727] However, research conducted by the American Society of Heating, Refrigerating and Air-Conditioning Engineers suggests that no "feature" of open display cases warrants separate classification.[728] The study reveals that when consumers replace open case appliances with doored display cases, product sales do not decrease.[729] Moreover, customers found the "indoor environment overall to be more comfortable" and the food safety improved due to less variations in product temperatures.[730]

While upcoming deadlines will enable the DOE to strengthen commercial refrigeration equipment standards, current rules set since 2009 will yield significant

[719] Appliance Standards Awareness Project (ASAP), 1. "Commercial Refrigeration Equipment." http://www.appliance-standards.org/node/6787
[720] Id, 1.
[721] Emerson Climate Technologies, Status of Energy Regulations for Commercial Refrigeration Equipment, Energy Regulation Update – White Paper, (January 2011), http://www.emersonclimate.com/White%20Papers/EnergyRegUpdate2005ECT-172%20R5.pdf
[722] Mauer, 1. "Comments on the Commercial Refrigeration Equipment Framework Document," ASAP. July 2010. http://www.appliance-standards.org/sites/default/files/Comments%20on%20the%20Commercial%20Refrigeration%20Equipment%20Framework%20Document-%20July%2030,%202010.pdf
[723] "Self-contained": "The refrigerated case and complete refrigeration system are combined into a single physical unit." (ASAP, 1)
[724] "Remote condensing": "The condensing unit is located remotely (typically outdoors) from the refrigerated case." (Id, 1)
[725] Id, 1.
[726] ASAP, 1.
[727] US DOE, 29-33. "Public Meeting on Energy Conservation Program for Commercial Regeneration Equipment." Public meeting convened in Room 8 E-089 of the United States' Department of Energy. April 19th, 2011.
[728] Mauer, 1.
[729] Id, 1.
[730] Id, 2.

savings for commercial consumers. Over the next thirty years, these standards will save 1.04 quads of energy[731] and 52.6 million metric tons of carbon emissions.[732] Ultimately, if the DOE concludes that doorless appliances do not possess distinguishable "performance features" that affect the functional refrigeration process, new DOE rules that are more uniform could prohibit or severely discourage the use of these products.[733] Whether or not standards for commercial refrigeration equipment become streamlined, stricter rules for both open and doored cases will encourage manufacturers to incorporate LEDs, vacuum insulated panels, and other energy efficient design features into commercial refrigeration equipment.[734]

AUTOMATIC COMMERCIAL ICE MAKERS

Various commercial ice making appliances are subject to express energy efficiency requirements. These standards apply only to those devices which produce "cube ice [in amounts] between 50 and 2500 pounds per 24-hour period," and became effective on January 1st, 2010. Commercial icemaking appliances covered by this set of criteria are limited according to their 'harvest rate', or the amount of ice they produce within a twenty-four hour period. Such icemaker's maximum energy and water usages (not including water used as an element of the freezing process that does not become part of the final product) are capped, depending upon their output capacities. In this category, the following cube type icemakers of sufficient capacity are regulated: ice making head devices utilizing an air cooling system, ice making head devices utilizing a water cooling system, remote condensing icemakers utilizing air, remote condensing and compressing icemakers utilizing air, and self-contained icemakers utilizing air or water.

The Secretary of Energy is also charged with creating new regulations for commercial icemakers not included above. Such standards, and those already proscribed by statute, must be fully tested and evaluated for effectiveness by January 1st of 2015, to "determine whether amending… standards is technologically feasible and economically justified." This stage of the amendment process is currently ongoing, and public meetings have been held to obtain input from industry representatives. On April 4th of 2011, the Department of Energy announced that it planned to begin the process of creating regulations governing all batch and continuous type commercial icemakers, in addition to the cube type appliances already regulated. Potential standards under consideration would regulate any such commercial icemaker producing between fifty and four-thousand pounds of ice within twenty-four hours. Batch type devices function in cycles, alternatively freezing new ice and dispatching it. Such devices can produce cube, tube and fragmented ice. Continuous icemakers perform both functions simultaneously, and

[731] These energy savings account for "losses in generation, transmission, and distribution." ("Fact Sheet: Savings from Standards Since 2009," ASAP. June 2011. http://www.appliance-standards.org/sites/default/files/Fact_Sheet_Savings_since_2009.pdf)
[732] "Fact Sheet: Savings from Standards Since 2009," ASAP.
[733] US DOE, 31.
[734] ASAP, 1.

produce primarily flake and nugget type ice. The Department of Energy has also proposed creating a standardized testing procedure to determine the efficiency of these devices.

On April 29th of 2011, a public meeting of industry officials and Department of Energy representatives was convened to discuss these new standards and testing procedures. At the meeting, officials discussed the goal of developing a testing procedure by winter of 2011, and a final ruling on new standards by fall of 2012, to become effective by the required date of January 1st, 2015. The Department's proposed testing procedures would expand those currently in effect to include the new icemaker types it plans to regulate. Additionally, the new procedure would reflect the current editions of AHRI Standard 810-2007 and ASHRAE 29-2009, which are distinct from prior editions only in that they cover icemakers of higher capacities, more clearly define certain procedures and include a definition of "ice hardness" as a testing factor. Industry representatives in attendance at the public meeting seemed to favor this amended standard. Some technical debate was raised about the definition of ice quality to be used in the new testing standard, and weather it should take ice hardness into account.

The majority of the discussion revolved around the Department of Energy's technical and economic concerns with adding ASHRAE's proposed water-hardness and potable water use standards to its official testing procedure. Environmental advocates suggest including these considerations within a broad, flexible range , but the Department and industry officials explain that this would reduce the replicability of tests and burden the industry. Ultimately, the Department notes that the cost of these new tests would be "between $5,000 and $7,500… and annual review and filing costs." Some industry representatives point out that this may not take into account the cost of compliance with new standards, which could be much higher.

COMMERCIAL CLOTHES WASHERS

Commercial clothes washing appliances are subject to basic energy efficiency standards. Devices of this type manufactured after January 1st of 2007 must maintain a 'modified energy factor' of at least 1.26 and a 'water factor' of not more than 9.5. These ratios are incorporated from the Energy Star program's standards for residential appliances, and employ a formula taking into account energy or water use in comparison to clothes washing capacity.

The Department was additionally required to review and amended these standards if technologically feasible and economically justified , and announced that it planned to do so on January 8th of 2010. In this announcement, the Department of Energy explained that commercial consumers would enjoy overall savings under more stringent energy efficiency standards, despite a higher initial investment. An increased initial cost of approximately $214, the Department explains, will be offset by $394 in lifetime operating savings for commercial consumers. The Department additionally notes a loss of $5-7 million dollars for manufacturers, and the possibility of a decrease in employment. However, the

Department explains that such losses are easily offset by national energy savings of 0.10 quadrillion British thermal units, and 143 billion gallons of water.

These new standards will require top-loading commercial clothes washers to maintain a modified energy factor of 1.60, and a water factor of 8.5. Front-loading devices must carry an energy factor of 2.00 and a water factor of 5.5. Though such a standard again adopts the basic efficiency ratios used to evaluate residential appliances, the Department notes that its modified test procedure adequately accounts for the increased usage of commercial devices. This procedure may to subject to upcoming review and amendment , which could further account for the needs of commercial consumers. New standards become effective on January 18th, 2013, so the efficacy of the Department's predictions is yet to be seen.