Building Energy Efficient Affordable Housing: A Strategic Goal for Habitat for Humanity Of Michigan

Ryan Albright, Maria DeVoogd, and Sherika Mosley

Community and Economic Development Program Policy Report • December 2005
School of Planning, Design, & Construction, Michigan State University

Building Energy Efficient Affordable Housing:
A Strategic Goal for Habitat for Humanity of Michigan

By Ryan Albright, Maria DeVoogd, and Sherika Mosely

TABLE OF CONTENTS

Building Energy Efficient Affordable Housing: A Strategic Goal for Habitat for Humanity of Michigan

By Ryan Albright, Maria DeVoogd, & Sherika Mosley

I. Executive Summary

Energy & Affordable Housing

Energy is a fundamental need of modern life. Heat and electricity utilized in homes across the globe keep families safe, healthy and comfortable. Energy allows families to cook, bathe, learn, sleep and grow. Without energy, families are unable to safely store food, wash clothes, and heat homes. According to the U.S Department of Housing of Urban Development (HUD) "Inefficient use of energy presents a serious challenge to the continued affordability of a housing unit and particularly impacts low-income families."[1] As families are less able to pay rent and utility bills, it is essential to take measures to prevent energy inefficiencies.

Energy Efficient Housing

Energy efficient housing is an important way to reduce housing cost for low-income residents. Simple energy efficient improvements can cut energy cost by over 40%.[2] Habitat for Humanity houses are approximately 1,050 square feet. They are built using volunteer labor for low-income families in the community. An average Habitat house cost approximately $59,324. They build houses and use materials, which will the most affect on their specific community. A Michigan household spends approximately $1,381 on energy bills.[3] By adjusting a few methods of building habitat houses, the resident energy uses and heating needs would be decreased.

---

[1] US Department of Housing and Urban Development (HUD) (2005). Retrieved from http://www.hud.gov/offices/cpd/affordablehousing/training/energy

[2] Southface Energy Institute, Georgia Environmental Facilities, and Energy Checklist: Energy Efficient Construction. [On-line] Southface Energy Institute; available from http://www.southface.org/web/resources&services/publications/factsheets/sav_nrg$.pdf, accessed on 25, November 2005

[3] LIHEAP, LIHEAP in Michigan. [On-line] http://www.liheap.org/databook02/michigan.html, accessed on 27, November 2005

Energy Efficient Affordable Housing: By the Numbers

According to U.S. Department of Housing & Urban Development, the average home energy cost is $1300 annually, which is slightly lower than the average in the Midwest, which is $1381 annually. However, in light of recent events and the new 2006 energy projections from the Michigan Public Service Commission the numbers appear to be on average 46 percent[4] higher than last year, yielding a cost of $2016 for 2006 for Michigan residents. This in conjunction with the annual costs of a mortgage creates a significant burden to families of all income levels.

Funding

By utilizing state grant dollars in conjunction with the dollars from private philanthropic organizations these energy efficient affordable homes are a very near reality. Furthermore, by educating the homeowner in energy efficient behaviors and purchasing practices, along with utilizing the federal energy efficient tax credit the energy burden is decreased and the reality of homeownership is realized at a faster rate.

Purpose

This policy brief, "Building Energy Efficient Affordable Housing: A strategic Goal for Habitat for Humanity of Michigan" outlines a worrying problem facing the state, and possible solutions to overcome this crisis. More specifically, this brief:

- Focuses on current and future trends in home heating costs and how they affect those of low to moderate income
- Identifies cutting edge construction technology and energy efficient appliances
- Examines energy efficient mortgages, state, federal, and private funding streams as methods to fund energy efficient affordable housing.

By doing this, both the ways and means to produce energy efficient affordable housing in Michigan become a reality. The purpose of this policy brief is threefold. First, the brief will examine the current environment for energy efficient affordable housing. Secondly, it will provide a vision for the future of energy efficiency affordable housing in

[4] http://www.dleg.state.mi.us/mpsc/reports/energy/05winter/ea-winter05.pdf

the state of Michigan. Finally, the brief will describe necessary steps for the planning and implementation of energy efficient affordable housing.

Conclusion

There is no perfect solution that will cure all of the problems for those in poverty. However, there are ways to assist people in order to impact them in a positive manner. By building energy efficient affordable housing a positive step is taken for not only those in poverty, but for all. Energy Efficient affordable housing directly benefits individuals and families in need by lowering utility costs and potentially creating a healthier living environment. Funding for the building of energy efficient affordable housing, energy conservation, and educating consumers are ways in which low to moderate income families can reduce heating cost and ultimately work towards self-sufficiency.

Recommendations

This brief, in addition to defining this problem, also provides recommendations that will significantly improve the lives of these families and help them better meet their needs.

Education

- Educate affiliates about the construction methods and materials and their importance to home affordability
- Train affiliates in energy efficient housing through the *Energy and Environmental Building Association's* program HOUSES THAT WORK
- Explain to the homeowner how to capture the federal tax credit for energy efficient homes
- Mandate that Habitat Homeowners attend energy efficiency classes

Policy

- Advocate for a State "Green Building Tax Credit"

Funding

- Submit applications to the Green Communities Initiative, Community Energy Project, and Energy Efficiency Grant
- Help future homeowners utilize Energy Efficient Mortgages through FHA and traditional lenders

Energy Efficient Design

- Utilize 2x6 studs 24 inches on center when framing the home
- Use awning and casement style windows with less than or equal to .35 U-Factors
- Tightly seal all holes, throughout the construction process, which could lead to air leakage.
- Utilize Energy Star appliances, light fixtures, especially furnaces and boilers

II. Introduction

Created in 1993, Habitat for Humanity of Michigan (HFHM) is a nonprofit 501(c)(3) Christian housing ministry organization that builds homes in partnership with qualified families in need of decent and affordable housing[5]. The mission of HFHM is to "increase the capacity to build simple decent homes in partnership with people in need in the State of Michigan"[6]. HFH in Michigan gives support to over 75 cities and has provided over 10,000 individuals with housing by building more than 2,200 homes. In addition, 200,000 recruited and trained volunteers have been building houses for low-income families throughout Michigan since 1993. At this time, HFHM are building homes at the rate of 200 houses annually[7].

To receive a home built by HFHM, eligible homeowners must be willing to help in the construction of their house, their neighbor's house or by working in the Habitat Office[8]. Habitat homes are sold to selected homeowners at no profit, with a zero percent interest mortgage from Habitat. Homeowners pay an affordable monthly mortgage

[5] Habitat for Humanity Michigan (2005) retrieved from www.hfhmichigan.org
[6] ibid
[7] ibid
[8] Habitat for Humanity Bay County http://www.habitatbaycounty.org/

payment, not exceeding 25% of the household income. Once construction begins, it takes 9 to 12 months to complete a home[9].

A Habitat home is simple, decent, and in part affordable. All homes include an energy efficient furnace, a refrigerator/freezer and a stove/oven[10]. General policy mandates that Habitat homes meet the following square footage: 1050 sq ft for 3 bedroom homes and 1230 sq ft for 4 bedroom homes[11].

While HFHM has a commitment to making homes more energy efficient further action must be considered to maximize efficiency. HFH in Copper Country Michigan, for example, built a home in 2000 that was passive solar and energy efficient maximizing energy efficiency to its fullest.

The Need for Energy

Energy is a basic necessity of modern life. Heat and electricity utilized in homes continue to keep families safe, healthy and comfortable. Energy allows families to cook, bathe, learn, sleep and grow. Without them, families are unable to safely store food, wash clothes, and heat homes. According to the U.S Department of Housing of Urban Development (HUD) "Inefficient use of energy presents a serious challenge to the continued affordability of a housing unit and particularly impacts low-income families"[12]. Since more and more families cannot afford to pay rent and utility bills, it is essential to take measures to prevent energy inefficiencies.

There is no magic formula that will fix everything for those in poverty, but there are ways to assist people in order to have a greater impact on their lives. Building energy efficient affordable housing is one method. Energy Efficient affordable housing directly benefits individuals and families in need by lowering utility costs and potentially creating healthier living environments. Developing energy efficient affordable housing, energy conservation, and educating consumers are ways in which low-income families can reduce energy cost and ultimately work towards self-sufficiency.

---

[9]Habitat for Humanity Bay County http://www.habitatbaycounty.org/faqs.htm
[10] Ibid.
[11] Ibid.
[12] US Department of Housing and Urban Development (HUD) (2005). Retrieved from http://www.hud.gov/offices/cpd/affordablehousing/training/energy

III. Purpose

The purpose of this policy brief is threefold:

- First, examine the current environment for energy efficient affordable housing.
- Secondly, develop a vision for the future of energy efficiency affordable housing for HFH and the state of Michigan.
- Finally, describes the step necessary for the planning and implementation of energy efficient affordable housing.

In order to achieve these goals, the policy brief will first examine home heating costs and how they affect those of low to moderate income. Secondly, by looking at cutting edge construction technology and energy efficient appliances we begin to shape the vision for energy efficient affordable housing in Michigan. Finally, the brief examines energy efficient mortgages, state, federal, and private funding streams as methods to fund energy efficient affordable housing. By doing this, both the ways and means to produce energy efficient affordable housing in Michigan become a reality.

IV. Methodology

This policy brief addresses the core issue of the energy burden on those of low to moderate income. Furthermore, the brief examines how other states and non-profit/for-profit organizations have addressed the issue of energy efficient affordable housing. Finally, both public and private funding streams are examined as potential financing mechanisms.

Home Heating Use and Home Energy Bills in Michigan

Energy and water costs are generally the largest single housing expense after food and shelter for low-income families[13]. Utility expenses are commonly overlooked when considering housing costs[14]. Yet, utility expenses often represent 14 percent or more of the annual gross incomes of low-income households and account for nearly one-fourth of

[13] US Department of Housing and Urban Development (2005). Retrieved from http://www.hud.gov/offices/cpd/affordablehousing/training/energy
[14] ibid

total housing costs[15]. As rent and utility payments are combined, housing costs for low-income families are at times not affordable. Across Michigan tens of thousands of families and individuals struggle to provide for the vital necessities of life[16]. The most expensive basics, for example, housing and food, will consume a great share of income limiting money for heating expenses.

Typically, home energy bills include the cost of natural gas, electricity, propane and heating oil and sometimes water and sewage. According to the 2000 census, 78.8 percent of Michigan's homes heat with natural gas, 9.5 percent with propane, 6.7 percent with electricity and 3.5 percent with heating oil, with the balance using wood and other sources. Many households use multiple sources to heat. The combined total of these energy expenses may have substantial burdens on low-income families

Impact on Low-Income Families

Low-income families are at a considerably higher risk for having their electricity turned off. Many low-income households accumulate unpaid bills and experience the termination of services. Even when low-income households pay their electric bill in full and on time, families often suffer major adverse effects and sacrifice needs in other areas[17].

Home heating expenses weigh heavily on low-income households. Low-income families face many challenges paying for heating services. A study by the National Energy Assistance Directors Association (NEADA) highlighted the significance of heating costs and the impact it has on low-income families. This study indicated that those who cannot afford their winter heating bill face dire choices such as sacrificing food, medical care or prescription medicine to pay for home heating[18]. The loss of utility service can be devastating, especially for poor families. Because of this loss, poor

---

[15] ibid
[16] U.S Department of Labor, Bureau of Labor Statistics, Consumer Expenditures in 2001. October 2005 www.uses.doleta.gov/pdf/lsajurisdictions03.pdf
17 Colton, Roger, Michigan Home Energy Affordability Gap (2004): By state house district and state senate district The Heat and Warmth Fund, Feb. 2005
[18] National Energy Assistance Directors Association (2005), Press Release, Low-income Energy Crisis Worsens-National survey reports unaffordable energy bills have serious, long-term impacts on families, April 2004 available at http://www.neada.org/comm/press/pr040426.htm

families can find themselves facing the prospects of hypothermia in the winter, hyperthermia in the summer, eviction, property damage from frozen pipes, and the use of dangerous alternative sources of heat, such as stoves, space heaters and fireplaces[19]. The consequences of unaffordable heating bills have a major burden on low-income families and impact other areas of their life.

Home Energy Burden

Low-income families face the critical challenge of paying for the cost of rising energy prices. A recent 2004 study by Roger Colton found that more than 180,000 Michigan households live with annual incomes below 50 percent of the federal poverty level and thus face a home energy burden of 38 percent or more of annual income[20]. According to the study the affordability of energy bills is measured by a household's "energy burden.[21]" Energy burdens are simply the "household energy bill as a percent of household income[22]." If a resident has a $10,000 annual income and a $1,000 home energy bill, for example, the resident has an energy burden of 10 percent. Colton indicates that a home energy burden can range from 5.8 percent to 38 percent depending where the household falls on the poverty level[23]. According to the study by Colton, for instance, families at 50-74 percent below the poverty level pay 15.4 percent of their annual income towards home heat[24]. Thus, a family's combined income of 9570.00 pays approximately $1475 a year on home energy bills[25].

---

[19] National Fire Protection fact Sheets on Home Heating, in U.S Home Heating Patterns, http://www.nfpa.org/publicJournalDetail.asp?categoryID=1127&itemID=26437&src=NFPAJournal
[20] Colton, Roger, Michigan Home Energy Affordability Gap (2004): By state house district and state senate district The Heat and Warmth Fund, Feb. 2005
[21] ibid
[22] ibid
[23] Ibid.
[24] ibid
[25] Department of Health and Human Services, (2005) retrieved on October 10from http://aspe.hhs.gov/poverty/05poverty.shtml

(Annual Income) x
(% energy burden) =
estimated home energy bill

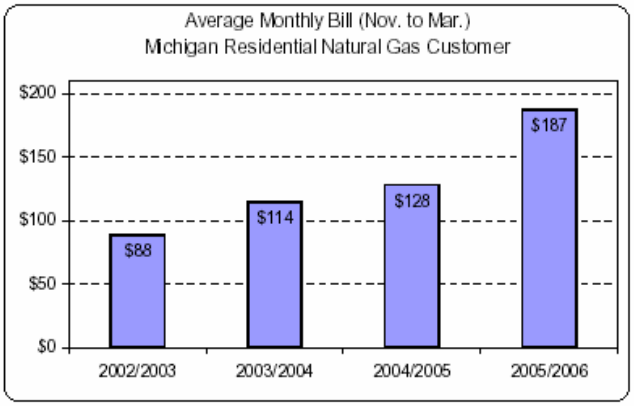
Poverty Level	Home Energy Burden
Below 50%	38.0%
50 – 74%	15.4%
75 – 100%	11.0%
101 – 124%	8.6%
125 – 150%	7.0%
150% - 185%	5.8%

Source: Fisher, Sheehan & Colton Home Energy Affordability Gap: 2004 (Michigan Fact Sheet)

V. A Look At The Facts: Michigan Energy Costs

In Michigan it is estimated that low-income households spend a disproportionate share of their annual income on energy costs. Residential energy cost in the Midwest for all households was $1637 and for low-income families in Michigan $1381[26]. The average U.S. household spends about $1,300 each year on utility bills. A Michigan resident spends 6 percent more than the national average on home energy costs

The price of home heating has a considerable impact on the poor in Michigan. The impact of the hurricanes on oil and natural gas production, oil refining, natural gas processing, and pipeline systems have added "strain to the already-tight natural gas and petroleum product markets for the 2005-2006 heating season"[27].



Source: Michigan Department of Labor and Economic Growth 2005

[26] LIHEAP Report to Congress for FY01. www.liheap.org
[27] Michigan Department of Labor and Economic Growth Public Service Commission Michigan Energy Appraisal, http://www.dleg.state.mi.us/mpsc/reports/energy/05winter/index.htm

Energy efficiency is an issue that affects the entire state and will continue to worsen as these winter months approach. According to an October 2005 announcement by the Michigan Public Service Commission (MPSC) Michigan households will face a 46 percent increase in the price of natural gas on winter heating bills [28] (MPSC, 2005). Peter Lark, (2005) Chairman of MPSC affirms "The average homeowner's winter bill increase will be about $59 dollars per month, bringing the average monthly winter natural gas bill to about $187." Given that the vast majority of Michigan households use natural gas to heat their homes, for some families this rise in cost will be detrimental.

Natural Gas Prices

The majority of Michigan households use natural gas to heat their homes. According to Michigan Department of Labor and Economic Growth 78.8 percent of Michigan residents use natural gas to heat their homes.[29] Residential natural gas prices have steadily been on the rise in Michigan. In 2000 natural gas cost $5.11 thousand cubic feet as compared to $8.47 per thousand cubic feet the year after.[30] Michigan residential natural gas prices are expected to rise from a 2004 price of $8.42 Mcf to $12.30 Mcf in the winter of 2005-2006[31].

The Energy Information Administration (EIA) projects that in 2025 natural gas consumption will increase to or between 31.8 trillion cubic feet and 37.5 trillion cubic feet per year. This is compared to 22.6 trillion in 2001. With this increase in demand, consequently the price for natural gas will increase. EIA projections are that natural gas prices will rise 89 cents per thousand cubic feet between in 2005 and 2025.

---

[28] Michigan Public Service Commission, (2005)Press Release, With Natural Gas Prices up dramatically, MPSC reminds customers to be "winter-wise," Highlights Financial Assistance Programs for low-income customers, October 11, 2005 available from http://www.michigan.gov/mpsc/0,1607,7-159-16400_17280-127984--,00.html

[29] Michigan Department of Labor and Economic Growth, 2005, Semiannual projection of Energy Supply and Demand Winter Outlook 2005/2006 [one-line] http://www.dleg.state.mi.us/mpsc/reports/energy/05winter/ea-winter05.pdf, accessed on 15, October 2005

[30] Energy Information Administration, 2005, Short Tem Energy Outlook [on-line]. US Department of Energy; http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SMI_a.htm; accessed on 15, October 2005

[31] Michigan Department of Labor and Economic Growth, 2005, Semiannual projection of Energy Supply and Demand Winter Outlook 2005/2006 [one-line] http://www.dleg.state.mi.us/mpsc/reports/energy/05winter/ea-winter05.pdf, accessed on 15, October 2005

The Michigan Public Service Commission estimates that Michigan residents will spend approximately $935 from November 2005 to March 2006. This is an increase of $294 from the same period in 2004-2005. Annually residential customers of natural gas are expected to increase 38% from last year, increasing from $944 to $1,298[32].

VI. Federal and State Programs for Energy Assistance

To address this energy income gap, federal and state energy assistance programs have been established. Energy assistance programs provide financial support to help pay home energy bills for low-income individuals or provide services to make homes more energy efficient, therefore reducing energy usage[33].

The federal energy assistance program offered to Michigan for low-income families is the Low-Income, Heating Energy Assistance Programs (LIHEAP). Its purpose is to assist low-income households, particularly those with the lowest income, by providing funding for home energy. In 2005, LIHEAP allocated $102,283,485 to 381,580 households in Michigan. Federal LIHEAP dollars were used to fund three state assistance programs[34]. These programs are the State Emergency Relief program (SER), the Weatherization Assistance Program and the Home Heating Credit.

State Emergency Relief

The State Emergency Relief program administered by the State of Michigan Department of Human Services is a crisis intervention program that provides services including funding for heating fuel, electricity and home repairs[35]. Eligibility for applicants is based on several criteria.

---

[32] Michigan Department of Labor and Economic Growth, 2005, Semiannual projection of Energy Supply and Demand Winter Outlook 2005/2006 [one-line] http://www.dleg.state.mi.us/mpsc/reports/energy/05winter/ea-winter05.pdf, accessed on 15, October 2005

[33] National Energy Assistance Directors Association (2005), Press Release, Low-income Energy Crisis Worsens-National survey reports unaffordable energy bills have serious, long-term impacts on families, April 2004 available at http://www.neada.org/comm/press/pr040426.htm

[34] LIHEAP, LIHEAP in Michigan. [On-line] http://www.liheap.org/databook02/michigan.html, accessed on 27, November 2005

[35] LIHEAP, LIHEAP in Michigan. [On-line] http://www.liheap.org/databook02/michigan.html, accessed on 27, November 2005

These criteria include[36]:

- Demonstration of immediate need (shut off notice), or
- Declared need for a deliverable fuel such as fuel oil, or
- Verified need for energy related home repair, and
- Income, and
- Assets.

Weatherization Assistance Program

Michigan's Weatherization Assistance Program is a residential energy conservation program that provides free home energy conservation services to low-income Michigan homeowners and renters[37]. These services help low-income families reduce energy use and lower utility bills, thus creating more self-sufficient households. Energy efficiency services administered by local Community Action Agencies include improvements in wall, attic, and foundation insulation; ventilation; smoke detectors; and dryer venting[38].

Home Heating Credit

In Michigan LIHEAP funding is used to finance Home Heating Credits. To that end, Michigan Public Act 458 was passed to create home heating credits in 1978. Home Heating Credits are refundable tax credits designed to assist low-income families with the cost of heating their homes.[39] Home Heating Credits, according to the Michigan Department of Treasury, are calculated in two ways. The first method, the standard method, is equal to a standard allowance amount determined by the number of exemptions for which the household is eligible less 3.5 percent of household income. The second method, the alternative credit, is equal to 70 percent of the difference between 70 percent of the difference between heating cost and 11 percent of household income.[40] The graphic below illustrates two calculation methods for the Home Heating Credits. The

[36] ibid
[37] ibid
[38] Ibid.
[39] Office of Revenue and Tax Analysis, Michigan Department of Treasury, Michigan Home Heating Credit 1978-2002 (Michigan: Office of Revenue and Tax Analysis, 2004)
[40] Office of Revenue and Tax Analysis, Michigan Department of Treasury, Michigan Home Heating Credit 1978-2002 (Michigan: Office of Revenue and Tax Analysis, 2004)

below is based on a household with 4 personal exemptions, household income of$12,000, and annual home heating costs of $1,400

Home Heating Credit Calculation

Standard Credit Calculation (Used by 91 percent of claimants)	
Standard allowance from 2002 MI-1040 CR-7 Table A	$698
Less: 3.5 percent of household income ($12,000 x 0.035)	-$420
Total Standard Credit amount **	**$278**
Alternative Credit Calculation (Used by 9 percent of claimants)	
Annual heating costs (limited to $1,578)	$1,400
Less: 11 percent of household income ($12,000 x 0.11)	$1,320
	$80
Total Alternate Credit (80x70 percent)	**$56**

Since the standard credit calculation is higher than the alterative credit, taxpayers would receive the higher home heating credit amount of $278.

LIHEAP funding is utilized to help pay home energy bills for low-incomes families who otherwise could not afford it. Cash assistance, emergency relief and funding from LIHEAP are all short-term solutions that address the energy crisis of today. In order to tackle the long-term goal of living in an energy efficient sustainable environment, all affordable housing built should consider constructing in ways to conserve energy.

VII. Building Energy Efficient Affordable Housing

Although houses constructed throughout the U.S. often share similarities, depending on the location the construction technique and materials used will differ. The reason for the differences is that each Habitat affiliate operates as a separate local entity using their own plans and methods to build much needed affordable homes. Difference can naturally be found throughout the United States due to the various climates, but they

can also be found within the same State. For example in Michigan, with respect to studs in framing, Lansing affiliate may use 2x4 studs while the Copper Country affiliate uses 2x6 studs. Due to these differences in building methods and materials used between the affiliates there is not any single prescribed method or common set of materials, which can be linked to Habitat for Humanity. This being said, for the purpose of this section the assumptions being made are general in nature, and recognize that each house and affiliate may be operating with different resources and opportunities.

Habitat for Humanity houses are approximately 1,050 square feet. They are built, using to the extent possible volunteer labor, for low-income families in the community. An average Habitat house cost approximately $59,324. By adopting a few energy efficient methods of building habitat houses, the resident energy uses and heating needs of Habitat homes could be decreased. The following discussion describes the possible alternative.

Systems Approach to Energy Efficient Design

A system approach can be used in building an energy efficient house. A system approach considers the interaction between all of the elements (windows, doors, ventilation, framing…etc.) and recognizes that one component affects the others. An example is energy efficient windows; they generally cost more than standard products to purchase. However, energy efficient windows reduce heating cost and cooling needs, which reduces the size of the mechanical heating/cooling system. The reduction in size often saves money on the purchase and installation cost of the mechanical equipment, which could pay for the more efficient windows.[41] There are four essential elements in building an energy efficient house; 1) creating a thermal envelope, 2) controlled ventilation 3) energy efficient appliance selection, and 4) high efficiency heating and cooling systems.

[41] Southface Energy Institute, Georgia Environmental Facilities, and Energy Checklist: Energy Efficient Construction. [On-line] Southface Energy Institute; available from http://www.southface.org/web/resources&services/publications/factsheets/cheklist.pdf; accessed on 15, October 2005

Thermal Envelope

The thermal envelope is everything about the house that serves to shield the living spaces from the outdoors. This includes wall and roof assembles insulation, windows, doors, finishes, weather stripping, and air/vapor retarders. The first step in creating a thermal envelope is the wall framing. Currently Habitat for Humanity houses are generally built with 2x4 stud walls 16 inches on center. This provides an insulation value of approximately R-6. By increasing the walls to 2x6 studs spaced 24 inches on center allows for 5 ½ inches of insulations raising the wall to R-19. The R-value measures the heat resistance to heat flow. The higher the R value the better the resistance. The construction cost to use 2x6 is approximately $1 more per square foot. Another advantage of 2x6 construction is that there is more space to insulate around piping, wiring, and ductwork thus reducing airflow.

Air sealing is one of the most important aspects of wall insulation. Air leakage can account for 50% of a home's heating and cooling cost, and contribute to problems with moisture, noise, dust, and the entry of pollutants, insects, and rodents.[42] Commonly used materials such as drywall and sheathing are effective in stopping air leakage; the problem comes with the spaces and holes in between sheet materials. Many holes in sheet material are hidden in spaces such as behind kitchen cabinets, and under bathtubs. Air sealing materials are inexpensive and can be done through the entire construction process: during framing, prior to insulation and installation of finish materials, after instillation of fixtures, and as a part of final punch out. Commonly used materials to air seal are caulk, spray foam, and weather stripping.

Windows and doors are important aspects of building's thermal envelope. A typical home can lose more than twenty-five percent of its heat through its window. Windows in Michigan should have a U factor of ≤.35. U-Factor measures the rate of heat transfer and tells you how well the window insulates.[43] The lower the U-Factor the better

[42] Southface Energy Institute, Georgia Environmental Facilities, and Energy Checklist: Energy Efficient Construction. [On-line] Southface Energy Institute; available from http://www.southface.org/web/resources&services/publications/factsheets/cheklist.pdf; accessed on 15, October 2005

[43]U.S. Environmental Protection Agency, Energy Star, Independently Tested and Certified Energy Performance, [on-line]; http://www.energystar.gov/index.cfm? c=windows_doors.pr_ind_tested, accessed 15, October 2005

the window insulates. For energy efficiency the best windows to use are awning and casement styles because they close tighter then sliding windows. A homeowner in Michigan could save an estimated $55 annually on energy bills when energy star windows are used in new housing construction as opposed to double paned windows.[44] Standard traditional wood doors have of R-value of approximately four. By changing to fiberglass or insulated steel doors heat loss will be reduced and less energy will be needed. Both fiberglass and insulated steel door types have R-values of 19.

Controlled Ventilation

Traditionally houses are ventilated through the natural ventilation process. This is when uncontrolled air movements flows in a building through cracks and small holes and through vents such as windows and doors.[45] With a tightly sealed house there is a need for a more controlled ventilation system. Controlled mechanical ventilation prevents health risk from indoor air pollution, promotes a more comfortable atmosphere, and reduces air moisture infiltration, thus reducing the likelihood of structural damage.[46] Heat recovery ventilation or recovery ventilators are good to use in envelope sealed houses. These systems can salvage 70 percent energy from stale air exhaust air and transfer that energy to fresh air.[47] Other options for ventilations are through the wall vents and systems, which pull in air from the outside.

Energy Efficient Appliances

In addition to the changes to the physical building envelope process and ventilation, by including energy efficient major appliances cost for the homeowners will decrease. Refrigeration accounts for 6 percent of home energy bill cost[48]. Habitat

[44] U.S. Environmental Protection Agency, Energy Star, Save Money and Energy—Choose Energy Star Qualified Windows, Doors, and Skylights [on-line]; http://www.energystar.gov/index.cfm?c=windows_doors.pr_savemoney
[45] Whole House Ventilation Systems, Technology Fact Sheet, [on-line] http://www.eere.energy.gov/buildings/info/documents/pdfs/26458.pdf accessed on 6, December 2005
[46] U.S. Department of Energy, National Renewable Energy Laboratory, Elements of an Energy Efficient House (U.S. Department of Energy, 2000)
[47] U.S. Department of Energy, National Renewable Energy Laboratory, Elements of an Energy Efficient House (U.S. Department of Energy, 2000)
[48] U.S. Environmental Protection Agency, Energy Star, what does m y energy bills pay for [on-line] http://www.energystar.gov/index.cfm?c=products.pr_pie accessed on 27, November 2005

currently uses standard refrigerators. By switching from a standard refrigerator to energy star refrigerator homeowners can save approximately 4 percent on energy cost over the life cycle of the appliance. Cooking appliances account for approximately 15 percent of home energy cost.[49] This includes stoves, ovens, and microwaves. The most energy efficient stove are gas stoves with electric ignitions. These save more energy then those with gas stoves with continually burning pilot lights because they only burn when necessary for cooking. Annually gas stove tops with electric ignition switches cost approximately $11 to operate where as gas stove tops with pilot lights cost about $24 annually to operate.[50] The majority of newer gas stoves being produced have electric ignition switches. Self-cleaning ovens are more energy efficient then standard ovens. These ovens are about 20 percent more efficient because they offer more insulation.[51]

Heating and Cooling

Forty five percent of energy bill costs are for home heating and cooling.[52] Energy efficient homes require less heating and cooling than standard homes. This includes furnace, hot water, and air-conditioning. Typically they require less than 50,000 Btu/hour even for very cold climates.[53] There are several different options builders can use in choosing heating and cooling devices. Switching from a standard furnace or boiler to an energy star brand saves the homeowners cost on energy. Over the life cycle of energy star furnace compared to a standard furnace there is a savings of $3,538.[54] An energy star boiler over its life cycle compared to the standard boiler there is a savings of $2,170.[55] Typically appliances have a lifecycle of 10-15 years.

---

[49] U.S. Environmental Protection Agency, Energy Star, what does m y energy bills pay for [on-line] http://www.energystar.gov/index.cfm?c=products.pr_pie accessed on 27, November 2005
[50] Rocky Mountain Institute, Home Energy Brief, #5 Cooking Appliance & Dishwashers, [on-line] http://www.p2pays.org/ref/32/31144.pdf#search='energy%20efficient%20ovens', accessed on 27, November 2005
[51] Rocky Mountain Institute, Home Energy Brief, #5 Cooking Appliance & Dishwashers, [on-line] http://www.p2pays.org/ref/32/31144.pdf#search='energy%20efficient%20ovens', accessed on 27, November 2005
[52]U.S. Environmental Protection Agency, Energy Star, what does m y energy bills pay for [on-line] http://www.energystar.gov/index.cfm?c=products.pr_pie accessed on 27, November 2005
[53] U.S. Department of Energy, National Renewable Energy Laboratory, Elements of an Energy Efficient House (U.S. Department of Energy, 2000)
[54] See Appendix
[55] See Appendix

The building of energy efficient homes does not necessarily mean a large increase in construction and labor cost. Any increase in this cost may be off set by the decrease in the cost of heating the home. By sealing holes and spaces during construction, properly insulating of walls, and using energy efficient appliance new homes can become energy efficient and affordable for homeowners. With these improvements in construction, Habitat for Humanity can offer limited income homeowners significant savings in energy cost.

Can This Really Be Done?

Copper Country Habitat for Humanity affiliate currently builds energy efficient houses for their community. This affiliate is located Houghton, Michigan in the Upper Peninsula where the annually snowfall is approximately 180 inches.[56] New homes being built by Copper Country are using a passive solar design. This design refers to the use of the sun's energy for the heating and cooling of living spaces. Some of the things, which Copper Country utilizes to make their new homes energy efficient, are to use 2x6 stud wall with high insulation to bring the wall value to R-21. The house is completely sealed with caulking. For the ventilation a heat recovery ventilation system is used. Compact florescent lights are used as well as energy efficient appliances. The Copper Country Habitat estimates that energy consumption is decreasing by 43% as a result of these measures. The average monthly winter heating bills range from $20-$30 dollars. Copper Country is an example of how energy efficient houses can be built affordably so that the homeowners will not be burdened with energy bills.

What Can The Homeowner Do?

Another way that Habitat for Humanity can help to reduce homeowners energy cost is through energy efficient education. For example, Habitat could hold workshops, which habitat homeowners attend prior to moving into their new house. These workshops can educate the new homeowners on ways, which they can modify their behavior to save energy.

[56] City of Houghton, Houghton Downtown Blue Print 2005 [on-line], http://www.cityofhoughton.com/ accessed on 27, November 2005

Examples of topics, which could be covered, are:

- Setting thermostat at a comfortable low in the winter and a comfortable high in the summer
- Using florescent light bulbs
- Turning off computers and monitors when not in use
- Plugging home electronics, such as TVs and DVD players into power strip; turn the power strips off when the equipment is not in use
- Take short showers instead of baths
- Wash only full loads of clothes[57]

Also in these workshops information can be given to the homeowners on filling out the homes energy tax credits. By educating homeowners on how to live an energy efficient lifestyle, Habitat will be giving them the tools to lower their energy cost which in turn allows them to have money to spend on other needs. Information on creating energy efficient workshops can be found through Michigan Department of Commerce in their Hands on Weatherization Workshop Manual.[58]

VIII. Energy Efficient Affordable Housing: By the Numbers

Securing the financing necessary to build energy efficient homes for those of low to moderate income is critical to the successful implementation of an energy efficient housing strategy. This section examines the feasibility of incorporating the additional cost of energy efficient construction into the home mortgage payment and goes on to explain the long-term savings associated with said costs.

By performing a comparative analysis between a market rate home and a Habitat for Humanity home we can begin to see the costs associated with homeownership, with respect to heating costs and mortgage expenditures. The average cost for a market rate home of 1100 square feet, built in the Lansing area would be $72,670 the numbers used to calculate this are from the National Building Cost Manual.[59] The national average for

[57] U.S. Department of Energy, E energy efficiency and renewable energy, Energy savers: Tips on saving Energy and Money at Home (U.S. Department of Energy, 2005)
[58] See Appendix
[59] http://www.building-cost.net

the cost of a Habitat for Humanity home with the approximately the same square footage is $59,324, according to Habitat for Humanity International.[60]

Consider the following example; the principal of the market rate fixed mortgage is $72,670 at a rate of 6.520%[61] over a 30 year term, which produces $93,030.80 in interest paid over the life of the mortgage. Therefore, the total payoff amount for homeowner in the market rate home will be $165,700.80. As for the zero interest Habitat mortgage the pay off amount will be only the principal of $59,324. In the following pages the energy burden to be borne this winter, and in the future, along with the potential for long-term savings associated with energy efficient homes, will be discussed in order to give the reader a more comprehensive look at the costs of homeownership.

Market Fixed Rate Mortgage Amortization

Inputs	
Loan principal amount	$72,670.00
Annual interest rate	6.520%
Loan period in years	30
Base year of loan	2005
Base month of loan	December

Key Figures	
Annual loan payments	$5,523.36
Monthly payments	$460.28
Interest in first calendar year	$394.84
Interest over term of loan	$93,030.80
Sum of all payments	$165,700.80

Habitat Mortgage Amortization

Inputs	
Loan principal amount	$59,324.00
Annual interest rate	0.000%
Loan period in years	30
Base year of loan	2005
Base month of loan	December

Key Figures	
Annual loan payments	$1,977.48
Monthly payments	$164.79
Interest in first calendar year	$0.00
Interest over term of loan	$0.00
Sum of all payments	$59,324.00

By looking at the "sum of all payments" row one can clearly see that the benefits to the no interest mortgage from Habitat enables a savings in excess of $100,000 to the homeowner. In order to increase that savings even more, and make homeownership more feasible for a larger group, the benefits of energy efficient construction must be utilized. To that end, it should be recognized that on average the additional construction cost for

[60] http://www.habitat.org/how/factsheet.aspx
[61] http://www.hsh.com/today.html

an energy efficient house is approximately 5 percent greater than that of a traditionally built home.

The following charts are a culmination of statistics looking at the overall benefit to the homeowner when they utilize energy efficient materials. The initial balance in the chart is for a traditional home without any energy efficiency modifications. As can be seen below it is essential to make energy efficiency investments during the earliest part of the mortgage in order to recapture the most money.[62]

First we will look at the ending balance for a traditional home without any energy efficient modifications, and then we will examine the same home with a 10 percent and 50 percent reduction in energy consumption respectively.

Heating Costs For A Traditional Home

Year	Beginning	Utilities
2006	$2,016.00	$2,016.00
2007	$4,132.80	$2,116.80
2008	$6,355.44	$2,222.64
2009	$8,689.21	$2,333.77
2010	$11,139.67	$2,450.46
2011	$13,712.66	$2,572.98
2012	$16,414.29	$2,701.63
2013	$19,251.00	$2,836.71
2014	$22,229.55	$2,978.55
2015	$25,357.03	$3,127.48
2016	$28,640.88	$3,283.85
2017	$32,088.93	$3,448.04
2018	$35,709.37	$3,620.45
2019	$39,510.84	$3,801.47
2020	$43,502.38	$3,991.54
2021	$47,693.50	$4,191.12
2022	$52,094.18	$4,400.68
2023	$56,714.89	$4,620.71
2024	$61,566.63	$4,851.74
2025	$66,660.96	$5,094.33
2026	$72,010.01	$5,349.05
2027	$77,626.51	$5,616.50
2028	$83,523.84	$5,897.33
2029	$89,716.03	$6,192.19
2030	$96,217.83	$6,501.80
2031	$103,044.72	$6,826.89
2032	$110,212.96	$7,168.24
2033	$117,739.61	$7,526.65
2034	$125,642.59	$7,902.98
2035	$133,940.72	$8,298.13

Heating Costs For An Energy Efficient Home (10% Energy Consumption Reduction)

Year	Beginning	Utilities
2006	$1,814.40	$1,814.40
2007	$3,719.52	$1,905.12
2008	$5,719.90	$2,000.38
2009	$7,820.29	$2,100.39
2010	$10,025.71	$2,205.41
2011	$12,341.39	$2,315.69
2012	$14,772.86	$2,431.47
2013	$17,325.90	$2,553.04
2014	$20,006.60	$2,680.70
2015	$22,821.33	$2,814.73
2016	$25,776.79	$2,955.47
2017	$28,880.03	$3,103.24
2018	$32,138.44	$3,258.40
2019	$35,559.76	$3,421.32
2020	$39,152.15	$3,592.39
2021	$42,924.15	$3,772.01
2022	$46,884.76	$3,960.61
2023	$51,043.40	$4,158.64
2024	$55,409.97	$4,366.57
2025	$59,994.87	$4,584.90
2026	$64,809.01	$4,814.14
2027	$69,863.86	$5,054.85
2028	$75,171.45	$5,307.59
2029	$80,744.43	$5,572.97
2030	$86,596.05	$5,851.62
2031	$92,740.25	$6,144.20
2032	$99,191.66	$6,451.41
2033	$105,965.65	$6,773.98
2034	$113,078.33	$7,112.68
2035	$120,546.64	$7,468.32

Heating Costs For An Energy Efficient Home (50% Energy Consumption Reduction)

Year	Beginning Balance	Utilities
2006	$1,008.00	$1,008.00
2007	$2,066.40	$1,058.40
2008	$3,177.72	$1,111.32
2009	$4,344.61	$1,166.89
2010	$5,569.84	$1,225.23
2011	$6,856.33	$1,286.49
2012	$8,207.14	$1,350.82
2013	$9,625.50	$1,418.36
2014	$11,114.78	$1,489.28
2015	$12,678.52	$1,563.74
2016	$14,320.44	$1,641.93
2017	$16,044.46	$1,724.02
2018	$17,854.69	$1,810.22
2019	$19,755.42	$1,900.73
2020	$21,751.19	$1,995.77
2021	$23,846.75	$2,095.56
2022	$26,047.09	$2,200.34
2023	$28,357.44	$2,310.35
2024	$30,783.32	$2,425.87
2025	$33,330.48	$2,547.17
2026	$36,005.01	$2,674.52
2027	$38,813.26	$2,808.25
2028	$41,761.92	$2,948.66
2029	$44,858.01	$3,096.10
2030	$48,108.92	$3,250.90
2031	$51,522.36	$3,413.45
2032	$55,106.48	$3,584.12
2033	$58,869.80	$3,763.32
2034	$62,821.29	$3,951.49
2035	$66,970.36	$4,149.06

[62] The projections are for the term of the 30-year mortgage, and a modest five percent rate of inflation for energy was used to calculate the chart

Market Rate Home

Traditional	Heating Costs (30 Years)	Mortgage	Ending Balance	Savings
Totals	$133,940.72	$165,700.80	$299,641.52	$0

Energy 10%	Heating Costs (30 Years)	Mortgage	Ending Balance	Savings
Totals	$120,546.64	$165,700.80	$286,247.44	$13,394.08

Energy 50%	Heating Costs (30 Years)	Mortgage	Ending Balance	Savings
Totals	$66,970.36	$165,700.80	$232,671.16	$66,970.36

Habitat for Humanity Home

Traditional	Heating Costs (30 Years)	Mortgage	Ending Balance	Savings
Totals	$133,940.72	$59,324.00	$193,264.72	$0

Energy 10%	Heating Costs (30 Years)	Mortgage	Ending Balance	Savings
Totals	$120,546.64	$59,324.00	$179,870.64	$13,394.08

Energy 50%	Heating Costs (30 Years)	Mortgage	Ending Balance	Savings
Totals	$66,970.36	$59,324.00	$126,294.36	$66,970.36

After looking at these numbers it is critical to look to the next step, financing for the homeowner, in particular an energy efficient mortgage. We will be looking at its structure, who qualifies, and the benefits of such a mortgage.

IX. The Energy Efficient Mortgage

Energy Efficient Mortgages (EEMs) recognize that reduced utility expenses can permit a homeowner to pay a higher mortgage to cover the cost of the energy improvements on top of the approved mortgage. FHA EEMs provide mortgage insurance for a person to purchase or refinance a principal residence and incorporate the cost of energy-efficient improvements into the mortgage. The borrower does not have to qualify for the additional money and does not make a down payment on it. A lending institution, such as a mortgage company, bank, or savings and loan association, funds the mortgage loan and the mortgage is insured by HUD. .[63]

Eligibility Requirements

- The borrower is eligible for maximum FHA financing, using standard underwriting procedures. The borrower must make 3-percent cash investment in the property. This 3- percent cash investment is based on the sales price. Closing costs are not included in the 3- percent calculation but may be used to satisfy the requirement. Any upfront mortgage insurance premium can be financed as part of the mortgage.
- Eligible properties are one- to four-unit existing and new construction.
- The cost of the energy-efficient improvements that may be eligible for financing into the mortgage is the greater of 5 percent of the property's value (not to exceed $8,000), or $4,000.
- To be eligible for inclusion in this mortgage, the energy-efficient improvements must be cost effective, meaning that the total cost of the improvements is less than the total present value of the energy saved over the useful life of the energy improvement.
- The cost of the energy improvements and estimate of the energy savings must be determined by a home energy rating report which is done by a home energy rating system or energy consultant. The cost of the energy rating may be financed as part of the cost-effective energy package.
- The energy improvements are installed after the loan closes. The lender will place the money in an escrow account. The money will be released to the borrower after an inspection verifies that the improvements are installed and the energy savings will be achieved.
- The maximum mortgage amount for a single-family unit depends on its location, and it is adjusted annually. As of January 1, 2001, for most parts of the country it was $132,000 for single-family homes. In high-cost areas it can be as much as $239,250. The cost of the eligible energy-efficient improvements is added to the mortgage amount. The final loan amount can exceed the maximum mortgage limit by the amount of the energy-efficient improvements

[63] http://www.hud.gov/offices/cpd/energyenviron/energy/apply/fha.cfm

Because energy-efficient homes require less money to operate, many lenders now offer energy-efficient mortgages. EEMs typically have lower points and allow for the stretching of debt-to-income ratios. State and local government energy offices can be contacted for information on region-specific financing. In the end, your energy-efficient house will provide you with superior comfort and lower operating costs, not to mention a higher real estate market value.

Content Provided By the U.S. Department of Energy[64]

How An FHA EEM Can Save You Money

	Non-Energy Efficient Home $100,000	Energy Efficient Home $105,000
Purchase Price	$100,000	$105,000
Maximum Loan Amount	$97,750	$102,637
Interest Rate	6%	6%
Monthly PITI	$736.50	$765.82
Average Utility Bill	$140.00	$70.00
Total Expenses	$876.50	$835.82
Qualifying Income	$30,475	$28,509
Monthly Savings	**$0**	**$40.68**

In this example, the EEM provides $5,000 in extra buying power while providing a savings of $40.68.

Source: http://www.michigan.gov/cis/0,1607,7-154-25676_25692-91324--,00.html

In the next section we will continue to examine the mortgage and homeowner aspects in conjunction with financing for Habitat for Humanity of Michigan and its affiliates by looking at state, federal, and private funding.

[64] http://doityourself.com/energy/elementenergyefficienthouse.htm

Energy Efficiency Grants

Summary

The Michigan Public Service Commission (PSC) energy-efficiency grant program, funded by the state's Low-Income and Energy Efficiency Fund, supports the implementation of energy-efficiency projects and renewable-energy projects in the state. Businesses, non-profit organizations, government agencies and/or schools are eligible to apply.

Grants are awarded in three categories: (1) energy efficiency for low-income clients, (2) energy financial assistance to low-income clients, and (3) energy efficiency for all customer classes. The PSC has emphasized that this program does not provide any direct funding to homeowners or renters. Interested applicants should review currently available requests for proposals to ensure they qualify before contacting the PSC for additional information.

As a result of the most recent round of proposals, the PSC announced in June 2005 $6 million in awards to 11 organizations. Renewable-energy projects supported include solar, wind, anaerobic digesters, fuel cells and biofuel applications.

Contact the Michigan PSC for more information on potential future grant funding for energy efficiency and renewable energy projects.

Contact

Tom Stanton
Michigan Public Service Commission
Competitive Energy Division
P.O. Box 30221
Lansing, MI 48909
Phone: (517) 241-6086
Fax: (517) 373-3113
E-Mail: tstanton@michigan.gov

Community Energy Project Grants

Summary

On an annual basis -- usually in June -- the Michigan Energy Office solicits proposals for community demonstration projects or education programs to help consumers better understand energy efficiency and renewable-energy options. Community Energy Project Grants are available to public and non-profit agencies.

The deadline for 2006 proposals is September 1, 2005. The 2006 round of grants will support solar-energy demonstrations; bioenergy, biofuels and bioproducts education; green-commuting projects, green-building projects; statewide energy conferences; and statewide energy events. (PV systems must have a minimum capacity of 1 kW.) These grants cover a one-year period, from January 1, 2006, through December 31, 2006. The maximum individual award is $6,000; approximately 20 grants will be made. Cost share is not required.

Contact John Sarver at the Michigan Energy Office for a copy of the current request for proposals (RFP).

Contact

John Sarver
Michigan Department of Labor and Economic Growth
Energy Office
611 W. Ottawa
P.O. Box 30221
Lansing, MI 48909
Phone: (517) 241-6280
Fax: (517) 241-6229
E-Mail: jhsarve@michigan.gov
Web site: http://www.michigan.gov/cis/0,1607,7-154-10573_17393---,00.html

New State Policy

The following is an adaptation of a bill passed in the State of New York in order to incentivize Green Building practices. It is essential that Habitat for Humanity of Michigan, in conjunction with its affiliates, advocate at the state level for a Green Building Tax Credit (GBTC). It is worthy of note that this tax credit passed with overwhelming support of both the construction industry and developers alike. Included in the appendix is a sample bill, with the appropriate language, from the State Environmental Resource Center. Below is a highlight of a conceptual bill for use in the State of Michigan.

Eligible Taxpayers:

- Corporations, utilities, banks, insurance companies and personal income taxpayers.

Eligible Buildings

- Single Family Residential Homes
- Residential multi-family buildings having at least 12 units having at least 20,000 square feet of interior space
- Residential multi-family buildings, at least 2 units, part of single or phased construction, with at least 20,000 square feet of interior space, provided at least 10,000 square feet is under construction or rehabilitation in any single phase
- Any combination of above

Photovoltaic Module Credit Component

- Must be serving green space to qualify
- Must be a "qualifying alternate energy source"
- 100% of incremental cost of Building integrated photovoltaic modules (20% x 5 years)
- 25% of incremental cost of non-Building integrated photovoltaic modules (5% x 5 years)

Federal Existing Home Energy Efficiency Tax Credits (SEC. 1333)

How much is the tax credit?

A maximum of $500 for all energy efficiency improvements. There are also maximums for windows ($200), furnaces or boilers ($150), advanced main air circulating fans ($50), heat pumps ($300), central air conditioners ($300), and water heaters ($300). For insulation, the tax credit is 10% of expenditures.

Do the tax credits only apply to my principal residence?

Yes.

What qualifies for the tax credit?

Qualified energy efficiency improvements – 10% of expenditures
Building envelope component must meet prescriptive criteria of the 2004 IECC
Wall Insulation: R-21
Ceiling Insulation: R-49
Basement Insulation: Lower Peninsula R-11, UP R-19
Windows & Doors: U-factor = .35
Metal roof with pigmented coating – must be Energy Star
Windows – maximum of $200
Residential energy property expenditures
Energy efficient building property – maximum of $300 for any item
Advanced main air circulating fan – maximum of $50
Natural gas, propane, or oil furnace or hot water boiler – maximum of $150

Minimum Requirements

Electric heat pump water heater: Energy Factor - 2.0
Electric heat pump: HSPF - 9, SEER - 15, & EER – 13
Geothermal heat pump, closed loop: EER - 14.1 & COP - 3.3
Geothermal heat pump, open loop: EER - 16.2 & COP - 3.6
Geothermal heat pump, direct expansion: EER - 15 & COP - 3.5
Central air conditioner: highest tier set by Consortium for Energy Efficiency on 1/1/06
Natural gas, propane, or oil water heater/space heater: Energy Factor - .80
Natural gas, propane, or oil furnace or hot water boiler: AFUE – 95
Advanced main air circulating fan: fan used in a furnace which has annual electricity use
of no more than 2% of total furnace energy use

Is there a time limit?

The improvements have to be placed in service during calendar year 2006 or 2007.

Do Energy Star products automatically qualify?

Not necessarily, but many will.

What kind of water heater will qualify?

Most water heaters will not be able to meet the .80 Energy Factor standard. It appears that many water heater/space heater combinations and tankless water heaters will qualify.

Contact

Energy Office
611 W. Ottawa
P.O. Box 30221
Lansing, MI 48909
Phone: (517) 241-6228
Fax: (517) 241-6229

Michigan Green Communities Cooperative

The Michigan State Housing Development Authority (MSHDA), the Great Lakes Capital Fund (GLCF), and Enterprise/The Enterprise Social Investment Corporation (Enterprise) have joined forces to invest more than $70 million to build 500 affordable homes in Michigan that promote health, conserve energy and natural resources, and provide easy access to jobs, schools and services. This includes $750,000 in grants and flexible financing plus up to $70 million in Low-Income Housing Tax Credit equity.

Michigan Green Communities™, as the new collaborative is called, provides incentives to encourage developers to build green affordable housing across the state. Michigan Green Communities™ is part of a national effort to transform the way we think about, locate and design affordable housing.

The national Green Communities™ initiative is a partnership of Enterprise and the Natural Resources Defense Council (NRDC), along with the American Institute of Architects, the American Planning Association, and top corporate, financial and philanthropic organizations including The Kresge Foundation. This five-year, $555 million initiative is designed to build more than 8,500 homes that provide significant health, economic and environmental benefits to low-income families and communities across the country.[65]

Contact

Maryanne Vukonich
Michigan State Housing Development Authority
735 E. Michigan
Lansing, MI 48912
(517) 373-9478
VukonichM@michigan.gov

Beth Hunter
Great Lakes Capital Fund
1000 South Washington Avenue Suite 200
Lansing, MI 48910
(517) 482-8555 (517) 482-8598 (Fax)
bhunter@capfund.net

[65] http://www.greencommunitiesonline.org/Michigan/

X. Recommendations

Education

- Educate affiliates about the construction methods and materials and their importance to home affordability
- Train affiliates in energy efficient housing through the *Energy and Environmental Building Association's* program HOUSES THAT WORK
- Explain to the homeowner how to capture the federal tax credit for energy efficient homes
- Mandate that Habitat Homeowners attend energy efficiency classes

Policy

- Advocate for a State "Green Building Tax Credit"

Funding

- Submit applications to the Green Communities Initiative, Community Energy Project, and Energy Efficiency Grant
- Help future homeowners utilize Energy Efficient Mortgages through FHA and traditional lenders

Energy Efficient Design

- Utilize 2x6 studs 24 inches on center when framing the home
- Use awning and casement style windows with less than or equal to .35 U-Factors
- Tightly seal all holes, throughout the construction process, which could lead to air leakage.
- Utilize Energy Star appliances, light fixtures, especially furnaces and boilers

XI. Conclusion

There is no perfect solution that will cure all of the problems for those in poverty. However, there are ways to assist people in order to impact them in a positive manner. By building energy efficient affordable housing a positive step is taken for not only those in poverty, but for all. Energy Efficient affordable housing directly benefits individuals and families in need by lowering utility costs and potentially creating a healthier living environment. Funding for the development of energy efficient affordable housing, energy conservation, and educating consumers are ways in which low to moderate income families can reduce energy cost and ultimately work towards self-sufficiency.

References

City of Houghton, Houghton Downtown Blue Print 2005 [on-line], http://www.cityofhoughton.com/ accessed on 27, November 2005

Colton, Roger, Michigan Home Energy Affordability Gap (2004): By state house district and state senate district The Heat and Warmth Fund, Feb. 2005

Elements of an Energy-Efficient House (2005) Retrieved on October 5th from the World Wide Web http://doityourself.com/energy/elementenergyefficienthouse.htm

Habitat for Humanity Bay County (2005) retrieved on November 27th from the World Wide Web: www.habitatbaycounty.org/

Habitat for Humanity Michigan (2005) retrieved on October 15th from the World Wide Web www.hfhmichigan.org

HSH Associates, Financial Publishers (2005) Retrieved on October 5th from the World Wide Web http://www.hsh.com/today.html

Michigan Department of Human Services Low Income Heating Energy Assistance Program, LIHEAP in Michigan. [On-line] Retrieved on November 27 from the World Wide Web http://www.liheap.org/databook02/michigan.html,

Michigan Department of Human Services up dramatically, MPSC reminds customers to be "winter-wise," Highlights Financial Assistance Programs for low-income customers, October 11, 2005 available from http://www.michigan.gov/mpsc/0,1607,7-159-16400_17280-127984--,00.html

Michigan Department of Labor and Economic Growth Public Service Commission Michigan Energy Appraisal, http://www.dleg.state.mi.us/mpsc/reports/energy/05winter/index.htm

Michigan Department of Treasury Office of Revenue and Tax Analysis, Michigan Home Heating Credit 1978-2002 (Michigan: Office of Revenue and Tax Analysis, 2004)

Michigan Green Communities (2005) Retrieved on November 2nd from the World Wide Web http://www.greencommunitiesonline.org/Michigan/

National Energy Assistance Directors Association (2005), Press Release, Low-income Energy Crisis Worsens-National survey reports unaffordable energy bills have serious, long-term impacts on families, April 2004 available at http://www.neada.org/comm/press/pr040426.htm

National Fire Protection fact Sheets on Home Heating, in U.S Home Heating Patterns, http://www.nfpa.org/publicJournalDetail.asp?categoryID=1127&itemID=26437&src=NFPAJourna

Resources for the Construction Professional (2005). Retrieved on October 5th from the World Wide Web: http://www.building-cost.net

Rocky Mountain Institute, Home Energy Brief, #5 Cooking Appliance & Dishwashers, [on-line] http://www.p2pays.org/ref/32/31144.pdf#search='energy%20efficient%20ovens', accessed on 27, November 2005

Southface Energy Institute, Georgia Environmental Facilities, and Energy Checklist: Energy Efficient Construction. [On-line] Southface Energy Institute: from http://www.southface.org/web/resources&services/publications/factsheets/sav_nrg$.pdf, accessed on 25, November 2005

U.S. Department of Energy; Energy Information Administration, 2005, Short Tem Energy Outlook [on-line] http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_SMI_a.htm;accessed on 15, October 2005

U.S. Department of Energy, National Renewable Energy Laboratory, Elements of an Energy Efficient House (U.S. Department of Energy, 2000)

U.S. Department of Energy, E energy efficiency and renewable energy, Energy savers: Tips on saving Energy and Money at Home (U.S. Department of Energy, 2005)

U.S. Department of Environmental Protection Agency, Energy Star, Independently Tested and Certified Energy Performance, [on-line]; http://www.energystar.gov/index.cfm? c=windows_doors.pr_ind_tested, accessed 15, October 2005

U.S. Department of Environmental Protection Agency, Energy Star, what does my energy bills pay for [on-line] http://www.energystar.gov/index.cfm?c=products.pr_pie accessed on 27, November 2005

U.S Department of Housing and Urban Development (HUD) (2005). Retrieved from http://www.hud.gov/offices/cpd/affordablehousing/training/energy

U.S Department of Housing and Urban Development (HUD) (2005). Retrieved on November 27th 2005 from the World Wide Web: http://www.hud.gov/offices/cpd/affordablehousing/training/energy

U.S Department of Labor, Bureau of Labor Statistics, Consumer Expenditures in 2001. October 2005 www, uses.doleta.gov/pdf/lsajurisdictions03.pdf

Whole House Ventilation Systems, Technology Fact Sheet, [on-line] http://www.eere.energy.gov/buildings/info/documents/pdfs/26458.pdf accessed on 6, December 2005.

Appendices

Appendix 1

Energy Savers
Tips on Saving Energy and Money at Home
Produced by U.S. Department of Energy
Energy Efficiency and Renewable Energy

(34 page PDF)

http://www.eere.energy.gov/consumer/tips/pdfs/energy_savers.pdf

Appendix 2

Energy Star Label for Buildings
Produced by U.S. Department of Energy and
the Environmental Protection Agency

(2 page PDF)

www.michigan.gov/documents/CIS_EO_Inside_Energy_Star_Incentive_59090_7.pdf

Appendix 3

www.michigan.gov
(To Print: use your browser's print function)

Release Date: March 08, 2002
Last Update: December 12, 2005

Low Income Home Energy Assistance Program (LIHEAP)

LIHEAP is federal money given to each state to assist low-income families with energy costs. In Michigan, the LIHEAP block grant is used for the following programs:

- Home Heating Credit
- State Emergency Relief (SER)
- Weatherization Assistance Program (WAP)

Home Heating Credit

The Home Heating Credit is available to all low-income households. The Michigan Department of Treasury determines eligibility and makes the payments. You do not need to file a state income tax return to receive the Home Heating Credit. You may apply for the Home Heating Credit only. Eligibility is based on income, number of exemptions and household heating costs.

Application forms are available from the Department of Treasury, local Department of Human Services offices and anywhere Michigan tax return forms are available. Forms are automatically mailed to households who received a credit last year. Applications are available from mid to late January and may be made through September 30 of each year.

Request a Home Heating Credit Claim form (MI-1040CR-7) from the list of forms on the Michigan Department of Treasury website or for more information go to the Energy Assistance Programs Home Heating Credit web site.

State Emergency Relief (SER)

The State Emergency Relief (SER) program is administered by the Department of Human Services (DHS). An application is needed to request assistance and an appointment is generally required. To apply, please contact the local DHS office in the county in which you reside.

SER is a crisis intervention program and provides services such as payment for heating fuel, electricity and home repairs. Eligibility is based on:

- demonstration of immediate need (shut off notice), or
- declared need for a deliverable fuel such as fuel oil, or
- verified need for energy related home repair, **and**
- income, **and**
- assets.

SER Payments

- Heating fuel has an annual maximum of $550 to $1100 depending on the fuel type. The maximum payment may change based on available funding.
- State Energy-related home repairs have a $1500 lifetime limit per household.

- Heat, Electric and home repairs are only issued to enrolled LIHEAP providers. The enrollment form is the DHS-355, Energy Supplier Participation Agreement.

Weatherization Assistance Program (WAP)

Michigan's Weatherization Assistance Program (WAP) is a federally funded, low-income residential energy conservation program. The program provides free home energy conservation services to low-income Michigan homeowners and renters. These services reduce energy use and lower utility bills, thus creating more self-sufficient households. Services are typically administered by local Community Action Agencies and include:

- Wall Insulation
- Attic Insulation and Ventilation
- Foundation Insulation
- Air Leakage Reduction
- Smoke Detectors
- Dryer Venting

For more information on LIHEAP, call the toll free DHS Energy Hotline at 1-800-292-5650 between the hours of 8:00 am - 4:45 pm Monday through Friday.
For more about **Energy Assistance Programs** click on the button below.

Related Documents

> DHS-355, Energy Supplier Participation Agreement - 12572 bytes PDF
> Low Income Home Energy Assistance Program (LIHEAP) 2005 State Plan PDF

Appendix 4

www.michigan.gov
(To Print: use your browser's print function)

Release Date: February 22, 2002
Last Update: March 22, 2005

Weatherization Assistance Program (WAP)

Michigan's Weatherization Assistance Program (WAP) is a federally funded, low-income residential energy conservation program. The program provides free home energy conservation services to low-income Michigan homeowners and renters. These services reduce energy use and lower utility bills, thus creating more self-sufficient households. Services include:

- Wall Insulation
- Attic Insulation and Ventilation
- Foundation Insulation
- Air Leakage Reduction
- Smoke Detectors
- Dryer Venting

A trained inspector will assess eligible dwellings for energy conservation needs. A typical inspection will include Blower Door testing for air leakage, Combustion Appliance testing for safety and efficiency, and a Health and Safety inspection. A computerized audit is the basis for determining which measures are most cost effective for each individual dwelling.

According to national studies, households that receive weatherization services can expect heating costs to be reduced 20 to 25 percent. At today's fuel cost, that amounts to about a $300 savings. As fuel costs continue to rise, even greater savings will result.

Eligibility is based on household income being at or below 150% of the federal poverty guidelines. Recipients of the Family Independence Program (FIP) administered by the Department of Human Services (DHS) or those who receive Supplemental Security Income (SSI) automatically qualify for this no-cost program.

Community Action Agencies/non-profit organizations provide weatherization services statewide. Eligibility is based on Federal poverty guidelines. For more information about the Weatherization Program contact your local Weatherization Operator. Refer to the State Map of Weatherization Operators.

Only local Weatherization Operators can make eligibility determinations for this program due to many variables.

Most of the Weatherization operators are also community action agencies and administer other low-income programs. The Michigan Community Action Agency Association (MCAAA) Website also displays information relative to other programs available to low-income persons. Click here to go to the MCAAA Website.

For more about Energy Assistance Programs click on the button below.

Energy Assistance Programs
michigan.gov/heatingassistance

Appendix 5

How Can I Get An Energy Efficient Mortgage?

The following companies have indicated that they offer Energy Efficient Mortgages *(EEM)*, Energy Improvement Mortgages *(EIM)*, or both.

EASTERN MICHIGAN

Chase Manhattan Mortgage (EEM)
1050 Wilshire Dr., Suite 105
Troy, MI 48084
Phone: 248/649-1280 or 1-888-267-3495 ext 203
Contact: Kathleen Bloom

Countrywide Home Loans (EEM, EIM)
43411 Joy Road
Canton, MI 48187
Phone: 734/354-0260
Contact: Belinda Lopez

GMAC Mortgage (EEM, EIM)
215 Ann Arbor Rd., Suite 100
Plymouth, MI 48170
Phone: 734/454-3600
Contact: Terry Conway

GMAC Mortgage (EEM)
37020 Garfield
Clinton Twp., MI 48036
Phone: 810/286-0570
Contact: Mark W. Johnson

GMAC Mortgage (EEM)
5400 Gateway Centre
Flint, MI 48507
Phone: 810/237-7000
Contact: Judy Reif

Indigo Financial Group (EEM, EIM)
2216 E. Michigan Ave., Suite 103
Lansing, MI 48903
Phone: (Toll Free) 877/867-7095
Contact: Joel Wiese

Rock Financial (EEM, EIM)
3252 University, Suite 130
Auburn Hills, MI 48326
Phone: 877/LOAN 211
Contact: Loren Rey or Troy Londo

Wells Fargo Home Mortgage (EEM)
24255 Novi Road
Novi, MI 48375-2403
Phone: 248/374-0137
Contact: Sandra Pouncy

CENTRAL MICHIGAN

Countrywide Home Loans (EEM, EIM)
5100 Marsh Rd., Suite H-2
Okemos, MI 48864
Phone: 517/349-3456
Contact: Amy Gonser

GMAC Mortgage (EEM)
4790 S. Hagadorn Road #120
East Lansing, MI 48823
Phone: 517/351-4570 or 1-800-695-3949
Contact: Dennis Shell

Independent Bank MSB (EEM, EIM)
623 Washington Ave.
Bay City, MI 48708
Phone: 517/892-3511 ext. 2006
Contact: Jim Gorzinski

Indigo Financial Group (EEM, EIM)
2216 E. Michigan Ave., Suite 103
Lansing, MI 48903
Phone: 517/483-5121
Contact: Joel Wiese

Wells Fargo Home Mortgage (EEM)
4277 Okemos Rd.
Okemos, MI 48864
Phone: 517/349-6995
Contact: Dave Hamlett

WESTERN MICHIGAN

Chase Manhattan Mortgage (EEM)
Cascade West Parkway.
Grand Rapids, MI 49546
Phone: 616/956-3255
Contact: Dan Cavanaugh

Countrywide Home Loans (EEM,EIM)
2905 Breton Ave., SE
Grand Rapids, MI 49512-1745
Phone: 616/246-5330
Contact: Sherri Dunlap

Glenwood Financial I, Inc. (EEM, EIM)
1423 W. Centre
Portage, MI 49024
Phone: 616/321-3332 or 1-866-321-3332
Contact: Elizabeth Powers

Indigo Financial Group (EEM, EIM)
2216 E. Michigan Ave., Suite 103
Lansing, MI 48903
Phone: (Toll Free) 877/867-7095
Contact: Joel Wiese

Wells Fargo Home Mortgage (EEM,EIM)
3230 Broadmoor St., SE
Grand Rapids, MI 49512
Phone: 616/575-5949
Contact: Bob Storrer

Wells Fargo Home Mortgage (EEM)
4625 Beckley Rd., #1002
Battle Creek, MI 49015-7948
Phone: 616/979-8780
Contact: Kim Lake

Appendix 6

State of Michigan Energy Office
Jennifer M. Granholm, Governor P.O. Box 30221
Department of Labor and Economic Growth Lansing, MI 48909
David C. Hollister, Director

ENERGY STAR HOME GRANT PROGRAM - 2006

The goal of this program is to encourage energy efficiency and innovation in the design and construction of new houses. Financial incentives are available for five new houses that can achieve an **Energy Star** or **Five Star** rating. The houses will be built in 2006. A total of $40,000 is available for these grants.

WHAT IS A FIVE STAR HOME?
A Home Energy Rating indicates the energy efficiency of a new or existing house. A computer software program is used to model a home=s energy usage and compare the home=s energy performance against the best performance possible for that structure. Ratings are 1-100 points and 1-5 stars. A five star rating qualifies a house for the Energy Star designation.

Points	Stars	Energy Efficiency
1-39	One	Very inefficient
40-59	Two	Inefficient
60-79	Three	Average
80-85	Four	Energy Efficient
86-100	Five	Very Energy Efficient

WHAT INCENTIVES ARE AVAILABLE?
Incentives are available for **five** new houses that achieve a Five Star rating. The selected home builders would be eligible for up to $5,000 based on the size of the house ($2.50/square foot of livable space) plus $3,000 which could be used for marketing and rating expenses.

WHICH HOUSES ARE ELIGIBLE & HOW WILL THE HOUSES BE SELECTED?
Only licensed builders are eligible and builders can only submit one application. Previous Five Star Home grant winners are not eligible. The date of the application must precede the date of the building permit. House construction should be completed by December 31, 2006. The Five Star rating will be the ***minimum*** criterion. Selection will be based on energy efficiency, innovative features, and marketing plans. Bonus points will be given to houses that have less than 2,000 square feet of livable space. Houses that feature less than 1,500 square feet of livable space will receive additional bonus points. The Easy Rating worksheet will be used in the application. The five home builders who are selected will be required to obtain a Home Energy Rating. In an effort to feature Energy Star houses throughout the State, geographic location will be considered when reviewing the grant applications.

HOW DO I APPLY?
An application will consist of three parts: 1) cover sheet, 2) description of innovations and marketing plans, and 3) Easy Rating worksheet. Application forms have to be submitted to: Energy Office, P.O. Box 30221, Lansing, MI 48909 by ***December 15, 2005***.

ENERGY STAR HOME GRANT APPLICATION (SAMPLE) - 2006

Part 1: Identification and Budget

Business Name: Nash Builders

Street Address: 243 Scrapwood Blvd.

City, State, Zip: Hell, MI 48137

Contact Person: Jerry Nash

Phone: 517/241-6238

Federal I.D. Number: 38-0000007

Home Address: 196 Rugged Rd., Pinckney, MI

Expected Completion Date: 10/15/05 Square Footage of Livable Space: 2,400

Budget:

Energy Efficiency Incentive ($2.50/square foot up to $5,000)	$5,000
Marketing costs (up to $3,000)	2,700
Home Energy Rating (up to $300)	300

Note: Grantees will be required to obtain an Aon-site@ rating including blower door test.

Total costs (cannot exceed $8,000) $8,000

Part 2: Innovations and Marketing Plans: On a separate sheet answer the following two questions.

1. What energy efficiency and/or renewable resource innovations have been incorporated into the design of the house?
2. What special marketing efforts will be used to highlight the Energy Star home?

This sheet plus Part 2: Innovations & Marketing Plans, and an Easy Rating worksheet must be submitted by ***December 15, 2005*** to: Energy Office, P.O. Box 30221, Lansing, MI 48909. Questions should be directed to Patrick Hudson at 517/241-6154.

Signature:_____ Date:_____

ENERGY STAR HOME GRANT APPLICATION - 2006

Part 1: Identification and Budget

Business Name: _____

Street Address: _____

City, State, Zip: _____

Contact Person: _____

Phone: _____

Federal I.D. Number: _____

Home Address: _____

Expected Completion Date: _____ Square Footage of Livable Space: _____

Budget:

Energy Efficiency Incentive ($2.50/square foot up to $5,000) _____

Marketing costs (up to $3,000) _____

Home Energy Rating (up to $300) _____

Note: Grantees will be required to obtain an Aon-site@ rating including blower door test.

Total costs (cannot exceed $8,000) _____

Part 2: Innovations and Marketing Plans: On a separate sheet answer the following two questions.

1. What energy efficiency and/or renewable resource innovations have been incorporated into the design of the house?
2. What special marketing efforts will be used to highlight the Energy Star home?

This sheet plus Part 2: Innovations & Marketing Plans, and an Easy Rating worksheet must be submitted by ***December 15, 2005*** to: Energy Office, P.O. Box 30221, Lansing, MI 48909. Questions should be directed to Patrick Hudson at 517/241-6154.

Signature:_____ Date:_____

Nash Builders - Part 2: Innovations and Marketing Plans: *(Sample)*

Innovations

1. Attic insulation: Soybean based product. Renewable, nonpolluting, carries a high R value.

2. Heat recovery system: A GFX heat recovery device will be used to recapture heat from the master bedroom shower.

3. Solar attic pool heater: For use with heating the outdoor swimming pool eliminating the need for a natural gas powered heater or an electric heater.

Marketing Plans

1. 2005 Parade of Homes: Nash Builders will have a special ad in the Parade booklet identifying the house as an Energy Star home. A brochure describing the house and its energy efficiency features will be ready for the Parade. We expect 5,000 visitors at the Spring 2005 Parade. Estimated expense: $1,000.

2. Tour for construction management students from community college: The instructor at Restoration Community College has indicated that he would like his spring and fall classes to tour the house.

3. Tour for local Realtors: The tour for local realtors is planned for the week before the Parade of Homes.

4. Cross section display: A first floor Plexiglas display will show a cross section of the special soybean biobased attic insulation product. This will enable visitors to see the insulation without having to visit the attic. Estimated cost: $700

5. Website: A website will be developed that documents the construction process and the various energy efficiency features. Estimated cost: $1,000.

Easy Rating for Michigan Homes

You can get an idea how *energy efficient* a house is by selecting the appropriate points below. Compare your total points to the scale on the bottom of the page. This is not a home energy rating and does not qualify a home for an energy efficient mortgage. Energy Office/DLEG 8/23/00

Energy Measures	Existing or Proposed	Points
Ceiling Insulation	None R-11 R-19 R-30 R-38 R-45 R-60 7.6 18.0 18.8 19.2 19.4 19.6 19.9	19.6
Above Grade Wall Insulation	None R-11 R-13 R-15 R-19 R-24 4.7 8.3 8.8 9.2 9.7 10.3	10.3
Rim/Band Joist Insulation	None R-11 R-13 R-19 .8 1.4 1.5 1.6	1.6
Basement/Foundation Wall Insulation or Floor Insulation (crawl space)	None R-5 R-10 R-19 3.8 5.7 6.7 7.2 None R-11 R-15 R-19 3.0 5.1 5.7 6.1	6.7
Concrete Floor Insulation or Slab-on-Grade Insulation	None Under Floor R-5 R-10 .8 1.1 2.2 None Perimeter R-5 R-10 .8 3.2 4.1	1.1
Windows	Single -3.3 Double - 5.2 Low-E - 6.6	6.6
Infiltration/Air Leakage	Average Good Very Good 0 (.67ACH) 1.0 (.50ACH) 2.2 (.35ACH)	2.2
Furnace Efficiency (AFUE) Natural Gas & Oil	50 or Less 55 60 70 80 90 95 10.0 22.2 27.2 32.2 34.7 37.2 38.0	38.0
Clock Thermostat	No - 0 Yes - 1.0	1.0
Ground Water/Geothermal Heat Pump (COP)	1.0 or Less 2.0 2.5 3.0 3.5 10.0 30.9 35.4 37.5 38.2	N/A
Water Heater	Less Efficient Efficient: Gas (.56EF) Electric (.93EF) 0 1.5 GW Heat Pump (1.3 COP)	1.5
Total Points		88.6

Least Efficient Home Energy Rating Scale Most Efficient

0-39	40-59	60-79	80-85	86-100
ι	ιι	ιιι	ιιιι	ιιιιι

Easy Rating for Michigan Homes

You can get an idea how *energy efficient* a house is by selecting the appropriate points below. Compare your total points to the scale on the bottom of the page. This is not a home energy rating and does not qualify a home for an energy efficient mortgage. Energy Office/DLEG 8/23/00

Energy Measures	Existing or Proposed	Points
Ceiling Insulation	None R-11 R-19 R-30 R-38 R-45 R-60 7.6 18.0 18.8 19.2 19.4 19.6 19.9	
Above Grade Wall Insulation	None R-11 R-13 R-15 R-19 R-24 4.7 8.3 8.8 9.2 9.7 10.3	
Rim/Band Joist Insulation	None R-11 R-13 R-19 .8 1.4 1.5 1.6	
Basement/Foundation Wall Insulation or Floor Insulation (crawl space)	None R-5 R-10 R-19 3.8 5.7 6.7 7.2 None R-11 R-15 R-19 3.0 5.1 5.7 6.1	
Concrete Floor Insulation or Slab-on-Grade Insulation	None Under Floor R-5 R-10 .8 1.1 2.2 None Perimeter R-5 R-10 .8 3.2 4.1	
Windows	Single -3.3 Double - 5.2 Low-E - 6.6	
Infiltration/Air Leakage	Average Good Very Good 0 (.67ACH) 1.0 (.50ACH) 2.2 (.35ACH)	
Furnace Efficiency (AFUE) Natural Gas & Oil	50 or Less 55 60 70 80 90 95 10.0 22.2 27.2 32.2 34.7 37.2 38.0	
Clock Thermostat	No - 0 Yes - 1.0	
Ground Water/Geothermal Heat Pump (COP)	1.0 or Less 2.0 2.5 3.0 3.5 10.0 30.9 35.4 37.5 38.2	
Water Heater	Less Efficient Efficient: Gas (.56EF) Electric (.93EF) 0 1.5 GW Heat Pump (1.3 COP)	
Total Points		

Least Efficient Home Energy Rating Scale Most Efficient

0-39	40-59	60-79	80-85	86-100
ι	ιι	ιιι	ιιιι	ιιιιι

Helper's Guide for Easy Rating

Ceiling Insulation - This would be any insulation in the attic or above a suspended ceiling where most or all rooms have suspended ceilings.

Above Grade Wall Insulation - This is all the outside walls of the house which are above the ground.

Rim/Band Joist Insulation - This is the open area (about 8 to 10 inches) at the top of a basement wall where the wood floor and the basement wall meet.

Basement/Foundation Wall Insulation - Insulation would be on either the inside of the basement wall or it would be on the outside of the basement wall. The basement wall is sometimes referred to as a foundation wall. Generally, if insulation is put on the inside basement wall, it will be covered with drywall or paneling.

Basement/Foundation Floor Insulation - This insulation would most often be put in a crawl space under the floor and between the wood floor supports.

Concrete Floor Insulation - Insulation under the concrete floor in a basement.

Slab-on-Grade Insulation - A house built with a concrete floor with insulation put under the concrete or insulation put around the total perimeter of the concrete floor.

Windows
Single - One piece of glass in a wood /metal/aluminum or vinyl frame.

Double - Two pieces of glass in a wood/metal/aluminum or vinyl frame. A single window with a storm window would also be an example of a double window.

Low-E - Would generally be two pieces of glass which has a film or coating to help keep the hot or cold temperatures from entering or exiting.

Infiltration/Air Leakage - This refers to the amount of cold or hot air that comes into a house by way of cracks in or around doors and windows, large or small holes made by plumbing or electrical pipes. These areas may be few(average) to none (very good).

Furnace Efficiency (AFUE).Natural Gas & Oil This may be determined by how old the furnace is. For Example:
A newer furnace 1991-2001-Could be an 80%, 90% ,95% or better. If exact percentage is unknown, then an 80% would be a reasonable selection. Other Years-1990-1984(70%), 1983-1970(60%), 1969-1960(55%). Before 1960(50%)

Clock Thermostat - A battery-operated thermostat which allows the temperature to be set to come on and go off at selected times.

Ground Water/Geothermal Heat Pump (COP) - If you do not know the COP, use "2.5".

Water Heater - If the water heater is new, and the energy efficient label indicator points to "Most Efficient", then use "1.5". Otherwise select "0".

Abbreviations: ACH (air changes per hour), AFUE (annual fuel utilization efficiency), COP (coefficient of performance), EF (energy factor), Low-E (low emissivity), R (resistance value of insulation or material).

Appendix 7

www.michigan.gov
(To Print: use your browser's print function)

Release Date: August 04, 2004
Last Update: September 07, 2005

Energy Star Home Grant Program

The goal of this program is to encourage energy efficiency and innovation in the design and construction of new houses. Financial incentives are available for five new houses that can achieve a **Five Star and Energy Star** rating. The houses will be built in 2006. A total of $40,000 is available for these grants.

What is a five star home?
A Home Energy Rating indicates the energy efficiency of a new or existing house. A computer software program is used to model a home's energy usage and compare the home's energy performance against the best performance possible for that structure. Ratings are 1-100 points and 1-5 stars. A Five Star rating qualifies a house for the Energy Star designation.

Points	Stars	Energy Efficiency
1-39	One	Very Inefficient
40-59	Two	Inefficient
60-79	Three	Average
80-85	Four	Energy Efficient
86-91	Five	Very Energy Efficient
92-100	Five Plus	Super Energy Efficient

What incentives are available?
Incentives are available for five new houses that achieve a Five Star rating. The selected home builders would be eligible for up to $5,000 based on the size of the house ($2.50/square foot of livable space) plus $3,000 which could be used for marketing and rating expenses.

Which houses are eligible & how will the houses be selected?
Only licensed builders are eligible and builders can only submit one application. Previous Five Star Home grant winners are not eligible. The date of the application must precede the date of the building permit. House construction should be completed by December 31, 2006. The Five Star rating will be the ***minimum*** criterion. Selection will be based on energy efficiency, innovative features, and marketing plans. In an effort to feature Energy Star houses throughout the State, geographic location will be considered when reviewing the grant applications. Bonus points will be given to houses that have less than 2,000 square feet of livable space. Houses that feature less than 1,500 square feet of livable space will receive additional bonus points. The Easy Rating worksheet will be used in the application. The five homebuilders who are selected will be required to submit additional data and obtain a Home Energy Rating.

How do I apply?
An application will consist of three parts: 1) cover sheet, 2) description of innovations and marketing plans, and 3) Easy Rating worksheet. Application forms have to be submitted to the Energy Office, P.O. Box 30221, Lansing, MI 48909 by: ***December 15, 2005*** .

Appendix 8

American Council for an Energy-Efficient Economy

WASHINGTON, DC

Opportunities for State Action: Green Buildings Tax Credit

One of a Series of ACEEE Fact Sheets

Context

Green Building is a field that uses environmentally sustainable materials to build buildings that conserve resources and provide healthy living or working space. Barriers to increased market share for green buildings include high first cost in materials and higher design costs since many practitioners are not yet familiar with the appropriate techniques. When energy-efficient materials and techniques become common practice, green building will be more common and economically attractive. In order to encourage these trends, some states have started tax incentives for green buildings.

Why Tax Credits?

Green building tax credits are designed to encourage sustainable building practice. This should decrease natural resource depletion for both construction and the energy bills of the structure. Advocates claim that better materials also result in a healthier workforce. Credits allow early adopters in the market to overcome the early price barriers to new technologies and practices while increasing the market share of green buildings and technologies. Equally as important, tax credits validate green building practices through the state's visible endorsement. As the market share for green buildings increases, the barriers to these practices will decrease and the credits will no longer be needed. Tax credits enacted to date have an explicit cost ceiling allowing their fiscal cost to be accurately estimated. Green building tax credits work with the market to form a lasting change.

Which States Are Implementing Tax Incentives for Green Building?

New York was the first state to pass green building legislation, which has been refined and modified by Maryland and Massachusetts. Implementation of the New York and Maryland credits begins in 2002. The Massachusetts bill was introduced to the 2000–2002 legislative session and is moving through the legislative process. Other states are considering this program, including Pennsylvania and Rhode Island.

What Are the Criteria?

In all three states, the regulations are loosely based on the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) Guidelines, but since the LEED Guidelines are not written in regulatory language and each state has its own needs, each opted to write its own interpretation. Generally an advisory committee knowledgeable about the buildings industry drafts the regulations. In New York, this process took 6 months. In these regulations, insulation, windows, building materials, air quality, and many other factors are covered. The three states have also included special rules that negate the credit if you build in an environmentally sensitive area as defined by the state. For example, builders in Maryland cannot qualify for the credit if they violate any of Maryland's Smart Growth regulations.

Cost/Benefit Analysis

New York performed a cost analysis and fiscal impact for its green buildings legislation, determining that the fiscal cost of approximately 12.7 million dollars a year over 10 years. Massachusetts performed a cost/benefit analysis on its legislation for both the public and private sectors. The costs in the public sector include the lost tax revenues from the credit and reduced revenues from utility taxes. Public benefits included increased employment, increased construction spending, reduced health costs, and reduced environmental costs. In Massachusetts, the public benefit payback period was estimated to be 6 years, with a public profit from the credit of over 6 million dollars after 10 years. In the private sector, costs include increased construction costs for green building features, and the benefits include reduced utility costs, higher productivity, and reduced operating and maintenance costs. The private sector payback is projected at 2 years. The Massachusetts report can be found at http://www.gbreb.com/greenbuildings/main.htm.

This information is drawn from the upcoming ACEEE report: ***Opportunities for State Action: Tax Credits for Energy Efficiency in the Private Sector.*** For more information, please contact

Patrick Quinlan
National Energy Policy Director, ACEEE
(202) 429-8873 ext. 722

Elizabeth Brown
Research Assistant, ACEEE
(202) 429-8873 ext. 716

American Council for an Energy-Efficient Economy, 1001 Connecticut Ave. NW, Suite 801, Washington, DC 20036 Voice: 202-429-8873. Fax: 202-429-2248. Web: www.aceee.org. For additional information, email info@aceee.org

Green Building Tax Credit Model Legislative Language

[Note: This language is based on bills enacted in New York and Maryland and now pending in Massachusetts. We have drafted this bill to have a single implementing agency. However, in some states, this responsibility is split between a Revenue Administration (for tax issues) and an Energy Office (for technical issues).]

Table Of Contents

Definitions

(A) In this section the following words have the meanings indicated.

(1) "Commissioner" means the Commissioner of the [IMPLEMENTING AGENCY]

(2)(I) "Allowable Costs" means amounts properly chargeable to capital account, other than for land, that are paid or incurred on or after [DATE OF IMPLEMENTATION] for:

1. Construction or rehabilitation;
2. Commissioning costs;
3. Interest paid or incurred during the construction or rehabilitation period;
4. Architectural, engineering, and other professional fees allocable to construction or rehabilitation;
5. Closing costs for construction, rehabilitation, or mortgage loans;
6. Recording taxes and filing fees incurred with respect to construction or rehabilitation; and
7. Finishes and furnishings consistent with the regulations adopted by the Commissioner under this section, lighting, plumbing, electrical wiring, and ventilation.

(II) "Allowable Costs" does not include:

1. The cost of telephone systems and computers other than electrical wiring costs;
2. Legal fees allocable to construction or rehabilitation;
3. Site costs, including temporary electric wiring, scaffolding, demolition costs, and fencing and security facilities;

4. Finishes or furnishings that are not consistent with the regulations adopted by the Commissioner under this section; or

5. The cost of purchasing or installing fuel cells.

(4) "Applicable energy efficiency standards" means ASHRAE/IESNA Standard 90.1-1999, Energy Standard for Buildings Except Low-Rise Residential Buildings, published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

(5) "Base building" means all areas of a building not intended for occupancy by a tenant or owner, including the structural components of the building, exterior walls, floors, windows, roofs, foundations, chimneys and stacks, parking areas, mechanical rooms and mechanical systems, and owner controlled or operated service spaces, sidewalks, main lobby, shafts and vertical transportation mechanisms, stairways, and corridors.

(6) "Commissioning" means:

(I) the testing and fine-tuning of heat, ventilating, and air-conditioning systems and other systems to assure proper functioning and adherence to design criteria; and

(II) the preparation of system operation manuals and instruction of maintenance personnel.

(7) "Credit allowance year" means the later of:

(I) the taxable year during which:

1. The property, construction, completion, or rehabilitation on which the credit allowed under this section is based is originally placed in service; or

2. A fuel cell, wind turbine, or photovoltaic module constitutes a qualifying alternate energy source and is fully operational; or

(II) the earliest taxable year for which the credit may be claimed under the initial credit certificate issued under subsection [CERTIFICATION] of this section.

(8) "Eligible building" means a building located in the state that:

(I)

1. Is a building used primarily for nonresidential purposes if the building contains at least 20,000 square feet of interior space;

2. Is a residential multifamily building with at least 12 dwelling units that contains at least 20,000 square feet of interior space; or

3. Is any combination of buildings described in item 1 or 2 of this item;

(II) in the case of a newly constructed building for which a certificate of occupancy was not issued before [DATE OF IMPLEMENTATION]

1. Is located on a qualified brownfields site, as defined by the state; or

2.

a. Is located in a priority funding area as defined by the state; and

b. Is not located on wetlands, the alteration of which requires a permit under § 404 of the federal clean water act, 33 U.S.C. § 1344; And

(III) in the case of the rehabilitation of a building:

1. Is located in a priority funding area as defined by the state or on a qualified brownfields site as defined by the state; or

2. Is not an increase of more than 25% in the square footage of the building.

(9) "Fuel cell" means a device that produces electricity directly from hydrogen or hydrocarbon fuel through a noncombustive electrochemical process.

(10) "Green base building" means a base building that is part of an eligible building and meets the requirements set out in subsection (i) of this section.

(11) "Green whole building" means a building for which the base building is a Green base building and all tenant space is green tenant space.

(12) "Green tenant space" means tenant space in a building if the building is an eligible building and the tenant space meets the requirements of subsection (j) of this section.

(13) "Incremental cost of building-integrated photovoltaic modules" means:

(I) the cost of building-integrated photovoltaic modules and any associated inverter, additional wiring or other electrical equipment for the photovoltaic modules, or additional mounting or structural materials, less the cost of spandrel glass or other building material that would have been used if building-integrated photovoltaic modules were not installed;

(II) incremental labor costs properly allocable to on-site preparation, assembly, and original installation of photovoltaic modules; and

(14) "Qualifying alternate energy sources" means building-integrated and non building-integrated photovoltaic modules, wind turbines, and fuel cells installed to serve the base building or tenant space that:

(i) have the capability to monitor their actual power output;

(ii) are fully commissioned upon installation, and annually thereafter, to ensure that the systems meet their design specifications; and

(iii) in the case of wind turbines, meet any applicable noise and bird protection ordinances.

(15) "Tenant improvements" means improvements that are necessary or appropriate to support or conduct the business of a tenant or occupying owner.

(16) "Tenant space" means the portion of a building intended for occupancy by a tenant or occupying owner.

(17) "economic development area" means an area as defined by the state

(18) "energy code" means any and all chapters within the State Building Code that cover in whole or in part energy or energy-related issues

Credit Components:

(A) Green building credit. A taxpayer subject to income tax is eligible for a green building credit against such tax, pursuant to the provisions referenced in subdivision (f) of this section. Provided, however, no credit shall be allowed under this section unless the taxpayer has complied with the applicable requirements of paragraph two of subdivision (d) of this section (relating to reports to [IMPLEMENTING AGENCY]). The amount of the credit shall be the sum of the credit components specified in paragraphs one through seven of this subdivision. Provided, however, the amount of each such credit component shall not exceed the limit set forth in the initial credit component certificate obtained pursuant to subdivision (c) of this section. In the determination of such credit components, no cost paid or incurred by the taxpayer shall be the basis for more than one such component.

(B) Credit to successor owner. If a credit is allowed to a building owner pursuant to this subdivision with respect to property, and such property (or an interest therein) is sold, the credit for the period after the sale which would have been allowable under this subdivision to the prior owner had the property not been sold shall be allowable to the new owner. Credit for the year of sale shall be allocated between the parties on the basis of the number of days during such year that the property or interest was held by each.

(C) Credit to successor tenant. If a credit is allowed to a tenant pursuant to this subdivision with respect to property, and if such tenancy is terminated but such property remains in use in the building by a successor tenant, the credit for the period after such termination which would have been allowable under this subdivision to the prior tenant had the tenancy not been terminated shall be allowable to the successor tenant. Credit for the year of termination shall be allocated between the parties on the basis of the number of days during such year that the property was used by each.

(D) Notwithstanding any other provision of law to the contrary, in the case of allowance of credit under this section to a successor owner or tenant, as provided in subparagraph (B) or (C) of this paragraph, the commissioner shall have the authority to reveal to the successor owner or tenant any information, with respect to the credit of the prior owner or tenant, which is the basis for the denial in whole or in part of the credit claimed by such successor owner or tenant.

(1) Green whole-building credit component. The green whole-building credit component shall be equal to the applicable percentage of the allowable costs paid or incurred by the taxpayer (whether owner or tenant), for either the construction of a green building or the rehabilitation of a building which is not a green building to be a green building. Provided, however, the credit component shall not exceed the maximum amount specified in the initial credit component certificate. The applicable percentage shall be 1.4 percent,

except that if the building is located in an economic development area, the applicable percentage shall be 1.6 percent. The credit component amount so determined shall be allowed for the credit allowance year, but only if

(A) the taxpayer has obtained and filed both an initial credit component certificate and an eligibility certificate issued pursuant to subdivision (c) of this section,

(B) a certificate of occupancy for the building has been issued and (C) where the credit allowance year is a year described in subparagraph (B) of paragraph two-a of subdivision (b) of this section, the green building or rehabilitation remains in service during such year.

Such credit component amount shall be allowed also for each of the next four succeeding taxable years with respect to which the taxpayer has obtained and filed an eligibility certificate pursuant to subdivision [CERTIFICATION] of this section. Provided, further, the allowable costs may not exceed, in the aggregate, one hundred fifty dollars per square foot with respect to the portion of the building which comprises the base building and seventy-five dollars per square foot with respect to the portion of the building which comprises the tenant space.

(2) Green base building credit component. The green base building credit component shall be equal to the applicable percentage of the allowable costs paid or incurred by the taxpayer, if the owner, for either the construction of a green base building or for the rehabilitation of a base building which is not a green base building to be a green base building. Provided, however, the credit component shall not exceed the maximum amount specified in the initial credit component certificate. The applicable percentage shall be one percent, except that if the building is located in an economic development area, the applicable percentage shall be 1.2 percent. The credit component amount so determined shall be allowed for the credit allowance year, but only if

(A) the taxpayer has obtained and filed both an initial credit component certificate and an eligibility certificate issued pursuant to subdivision [CERTIFICATION] of this section,

(B) a certificate of occupancy for the building has been issued and

(C) where the credit allowance year is a year described in subparagraph (B) of paragraph two-a of subdivision (b) of this section, the green base building or rehabilitation of a base building remains in service during such year.

Such credit component amount shall be allowed also for each of the next four succeeding taxable years with respect to which the taxpayer has obtained and filed an eligibility certificate pursuant to subdivision [CERTIFICATION] of this section. Provided, further, the allowable costs for the base building may not exceed, in the aggregate, one hundred fifty dollars per square foot.

(3) Green tenant space credit component. The green tenant space credit component shall be equal to the applicable percentage of allowable costs for tenant improvements paid or incurred by the taxpayer (whether owner or tenant) in constructing (including completing) tenant space, or rehabilitating tenant space which is not green tenant space to be green tenant space.

Provided, however, the credit component shall not exceed the maximum amount specified in the initial credit component certificate. The applicable percentage shall be one percent, except that if the building is located in an economic development area the applicable percentage shall be 1.2 percent. Provided, however, that the owner, or a tenant who occupies fewer than ten thousand square feet, shall qualify for such green tenant space credit component only in the event that the base building is a green base building. The credit component amount so determined shall be allowed for the credit allowance year, but only if

(A) the taxpayer has obtained and filed an initial credit component certificate and an eligibility certificate issued pursuant to subdivision [CERTIFICATION] of this section and

(B) where the credit allowance year is a year described in subparagraph (B) of paragraph two- a of subdivision (b) of this section, the construction, completion or rehabilitation remains in service during such year.

Such credit component amount shall be allowed also for each of the next four succeeding taxable years with respect to which the taxpayer has obtained and filed an eligibility certificate pursuant to subdivision [CERTIFICATION] of this section. Provided, however, the allowable costs for tenant space shall not exceed, in the aggregate, seventy-five dollars per square foot. In the event that both an owner and tenant incur such costs for tenant space with respect to the same tenant space and such costs in the aggregate exceed seventy five dollars per square foot, the owner shall have priority as to costs constituting the basis for the green tenant space credit component.

(4) Fuel cell credit component. A fuel cell credit component shall be allowed for the installation of a fuel cell which is a qualifying alternate energy source, installed to serve a green building, green base building or green tenant space. The amount of the credit component shall be six percent of the sum of the capitalized costs paid or incurred by the taxpayer with respect to each fuel cell installed to serve such building or space, including the cost of the foundation or platform and the labor cost associated with installation, such capitalized costs not to exceed one thousand dollars per kilowatt of installed DC rated capacity. Provided, however, the credit component shall not exceed the maximum amount specified in the initial credit component certificate. The fuel cell credit component amount so determined shall be allowed for the credit allowance year, but only if

(A) the taxpayer has obtained and filed an initial credit component certificate and an eligibility certificate issued pursuant to subdivision [CERTIFICATION] of this section and

(B) where the credit allowance year is a year described in subparagraph (B) of paragraph two- a of subdivision (b) of this section, the fuel cell remains in service during such year.

Such credit component amount shall be allowed also with respect to each of the four taxable years next following during which the fuel cell remains in service. Provided, however, that the amount of any federal, state or local grant

received by the taxpayer and used for the purchase and/or installation of such fuel cell and which was not included in the federal gross income of the taxpayer shall be subtracted from the amount of such cost.

(5) Photovoltaic module credit component. A photovoltaic module credit component shall be allowed for the installation of photovoltaic modules which constitute a qualifying alternate energy source installed to serve a green building, green base building or green tenant space. The amount of the credit component shall be twenty percent of the incremental cost paid or incurred by the taxpayer for building-integrated photovoltaic modules and five percent of the cost of non-building-integrated photovoltaic modules, in either case such cost not to exceed the product of (i) three dollars and (ii) the number of watts included in the DC rated capacity of the photovoltaic modules. Provided, however, the credit component shall not exceed the maximum amount specified in the initial credit component certificate. The credit component amount so determined shall be allowed for the credit allowance year, but only if

(A) the taxpayer has obtained and filed an initial credit component certificate and an eligibility certificate issued pursuant to subdivision (c) of this section and

(B) where the credit allowance year is a year described in subparagraph (B) of paragraph two-a of subdivision (b) of this section, the modules remain in service during such year. Such credit amount shall be allowed also for the four taxable years next following during which the modules remain in service. Provided, however, that the amount of any federal, state or local grant received by the taxpayer and used for the purchase and/or installation of such photovoltaic equipment and which was not included in the federal gross income of the taxpayer shall be subtracted from the amount of such cost.

(6) For the taxable year that is the credit allowance year, an owner or tenant may claim a credit in the amount determined under paragraph (2) of this subsection for the installation of a wind turbine that is a qualifying alternative energy source and is installed to serve a green whole building, green base building, or green tenant space. The amount of the credit allowed under this subsection is 25% of the sum of the capitalized costs paid or incurred by an owner or tenant with respect to each wind turbine installed, including the cost of the foundation or platform and the labor costs associated with installation.

Implementing Regulations

(A) (1) By regulation, the commissioner shall adopt standards for a building to qualify as a green base building eligible for the tax credits under this section that are consistent with the criteria for green base buildings set forth by the united states green building council or other similar criteria.

(2) The regulations adopted under this subsection shall provide that the energy use shall be no more than 65% for new construction of a base building, or 75% in the case of rehabilitation of a base building, of the energy use attributable to a

reference building which meets the requirements of applicable energy efficiency standards.
(B) (1) by regulation, the commissioner shall adopt standards for tenant space to qualify as green tenant space eligible for the tax credits under this section that are consistent with the criteria for green tenant space set forth by the united states green building council or other similar criteria.
(2) The regulations adopted under this subsection shall provide that the energy use shall be no more than 65% for new construction, or 75% in the case of rehabilitation, of the energy use attributable to a reference building which meets the requirements of applicable energy efficiency standards.

[To the extent that the state already has an updated energy code, another model would be to base the regulations directly on improvements beyond the state energy code. States that have used this model include Masachusetts and New York. Legislation for these states can be found, respectively, at: http://www.gbreb.com/greenbuildings/Docs/HouseBill.pdf and http://www.dec.state.ny.us/website/dar/ood/a11006.pdf.]

Certification

(1) INITIAL CREDIT COMPONENT CERTIFICATE. Upon application by a taxpayer, the Commissioner shall issue an initial credit component certificate where the taxpayer has made a showing that the taxpayer is likely within a reasonable time to place in service property which would warrant the allowance of a credit under this section. Such certificate shall state the first taxable year for which the credit may be claimed and an expiration date, and shall apply only to property placed in service by such expiration date. Such expiration date may be extended at the discretion of the Commissioner, in order to avoid unwarranted hardship. Such certificates may be issued in the first four years of implementation. Such certificates shall state the maximum amount of credit component allowable for each of the five taxable years for which the credit component is allowed, under paragraphs two through seven of subdivision (a) of this section.
(2) INITIAL CREDIT CERTIFICATE shall state the maximum amount of credit allowable in the aggregate for all credits allowed under this section.
(3) The Commissioner may not issue initial credit certificates, in the aggregate for more than $25,000,000 worth of credits overt he life of the legislation.
(4) ELIGIBILITY CERTIFICATE. For each taxable year for which a taxpayer claims a credit under this section with respect to a green building, green base building or green tenant space, a fuel cell, or photovoltaic modules, the taxpayer shall obtain from an architect or professional engineer licensed to practice in this state an eligibility certificate. Such certificate shall consist of a certification, under the seal of such architect or engineer, that the building, base building or tenant space with respect to which the credit is claimed is a green building, green base building or green tenant space, respectively, that the fuel cell or photovoltaic modules constitute qualifying

alternate energy sources and remains in service. Such certification shall be made in accordance with the standards and guidelines in effect at the time the property which is the basis for the credit was placed in service. Such certification shall set forth the specific findings upon which the certification was based. The taxpayer shall file such certificate, and the associated initial credit component certificate, with the claim for credit and shall file duplicate copies with [IMPLEMENTING AGENCY]. Such certificate shall include sufficient information to identify each building or space, and such other information as the Commissioner shall prescribe.

(5) WRONGFUL CERTIFICATION. If [IMPLEMENTING AGENCY] has reason to believe that an architect or professional engineer, in making any certification under this subdivision, engaged in professional misconduct, then the Implementing Agency shall report to the [STATE ARCHITECTURAL BOARD]

Record Keeping and Reporting

(1) Report. On or before three quarters of completion of the program the Commissioner shall submit a written report regarding the number of certifications and taxpayers claiming the credit provided for under this section; the amount of the credits claimed, the geographical distribution of the credits claimed; and any other such available information the Commissioner may deem meaningful and appropriate. A preliminary version of such report shall be so issued by halfway through implementation. The Commissioner shall ensure that the information is presented and/or classified in a manner consistent with the secrecy requirements of this chapter. The Commissioner shall also make recommendations regarding the establishment of a permanent green building tax credit program. Recommendations may include methods to enhance the effectiveness, simplicity or other aspects of the program. The report shall be submitted to the Governor, the President of the Senate, the Speaker of the Assembly, the Chairman of the Senate Finance Committee and the Chairman of the Assembly Ways and Means Committee.

(2) RECORD KEEPING. Each taxpayer shall, for any taxable year for which the green building credit provided for under this section is claimed, maintain records of the following information: (a) annual energy consumption for building, base building or tenant space; (b) annual results of air monitoring; (c) annual confirmation that the building, base building or tenant space continues to meet requirements regarding smoking areas, if provided; (d) tenant guidelines referred to in subparagraph (i) of paragraph nine of subdivision (B) of this section, if applicable; (e) all written notification of tenants and requests to remedy any indoor air quality problems; (f) initial and annual results of validation of performance of photovoltaic modules and fuel cells: and (g) certifications as to off-gassing and other contamination, as prescribed in subclause (iii) of clause (ii) of subparagraph (b) of paragraph nine of subdivision (B) of this section, where applicable.

(3) FUNDING FOR REGULATIONS AND EDUCATION. Funding for 2.0 full-time staff positions will be made available to [IMPLEMENTING AGENCY] for completion of the regulations required under this section and for administration of this section. Additional funding of $150,000 will be made available for statewide educational seminars and other education programs to assist developers, tenants, and any others who may participate in the green building tax credit program.

Appendix 9

Green building tax credit act

GREEN BUILDING TAX CREDIT ACT

AN ACT PROVIDING BUSINESSES WITH A GROSS INCOME TAX CREDIT FOR GREEN BUILDING DEVELOPMENTS THAT MEET CERTAIN CRITERIA AS SET FORTH IN THIS ACT.

Be it enacted by the Legislature of <*insert your state here*>:

Section 1. Short Title.

This Act shall be known and may be cited as the "Green Building Tax Credit Act."

Section 2. Findings and Declarations.

The Legislature finds and declares the following:

It is the policy of <*insert your state here*> to encourage the construction, rehabilitation, and maintenance of buildings in this state in such a manner as to:

(A) Promote better environmental standards for the construction, rehabilitation, and maintenance of buildings in the state;

(B) Improve energy efficiency and increase generation of energy through renewable and clean energy technologies;

(C) Increase the demand for environmentally preferable building materials, finishes, and furnishings;

(D) Improve the environment by decreasing the discharge of pollutants from buildings;

(E) Create industry and public awareness of new technologies that can improve the quality of life for building occupants; and

(F) Improve the health and productivity of building occupants by meeting advanced criteria for indoor environmental quality.

In order to facilitate the foregoing policies, the Legislature hereby creates an income tax credit to promote the construction, rehabilitation, and maintenance of buildings that meet the criteria set

forth in this Act.

Section 3. Definitions.

(A) "Applicant" means a taxpayer who is either the owner or contract purchaser of a building, and is applying for a green building tax credit for the building.

(B) "Base building" means all areas of a building not intended for occupancy by a tenant or owner, including, but not limited to, the structural components of the building, exterior walls, floors, windows, roofs, foundations, chimneys and stacks, parking areas, mechanical rooms and mechanical systems, and owner-controlled and/or operated service spaces, sidewalks, main lobby, shafts and vertical transportation mechanisms, stairways, and corridors.

(C) "Commissioner" means the head of the Department of Energy <*or insert your state's equivalent*>.

(D) "Commissioning" means the process of verifying and ensuring that the entire building and the systems within are designed, constructed, functionally tested, and calibrated to operate as intended.

(E) "Credit allowance year" means the year as stated on the preliminary credit certificate by the Commissioner (as defined in subsection (C) of this Section).

(F) "Department" means the Department of Energy <*or insert your state's equivalent*>.

(G) "Economic development area" means an economic development zone <*or your state's equivalent*> as defined in <*insert applicable state statutes here*>.

(H) "Eligible building" means a building located in <*insert your state here*>, which is:

(1) A residential multi-family building with at least four habitable stories that contain at least 10,000 square feet of interior space;

(2) One or more residential multi-family buildings with at least four habitable stories that are part of a single or phased construction project that contains, in the aggregate, at least 20,000 square feet of interior space, provided that, in any single phase of such project, at least 10,000 square feet of interior space is under construction or rehabilitation;

(3) A building used for commercial or industrial purposes; or

(4) Any combination of buildings described in paragraphs (1) through (3).

(I) "Energy and Atmosphere Credit Number One" means the credit awarded by the LEED Green Building Rating System, which requires increased energy performance above the standard as defined in the most current version of the LEED-NC or LEED-EB rating system.

(J) “Energy and Atmosphere Credit Number Three” means the credit awarded by the LEED Green Building Rating System, which requires additional commissioning above the fundamental commissioning prerequisite as defined in the most current version of the LEED-NC or LEED-EB rating system.

(K) “Gold rating” means the rating in compliance with, or exceeding, the second highest rating awarded by the USGBC LEED certification process.

(L) “Green Base Building” means a base building (as defined in subsection (B) of this Section) that meets all requirements in the most current version of the U.S. Green Building Council’s Leadership in Energy and Environmental Design Rating System for Core and Shell (LEED-CS).

(M) “Green building” or “high-performance building” means a building that is designed to achieve integrated systems design and construction so as to significantly reduce or eliminate the negative impact of the built environment on the following:

(1) Site conservation and sustainable planning;

(2) Water conservation and efficiency;

(3) Energy efficiency and renewable energy;

(4) Conservation of materials and resources; and

(5) Indoor environmental quality and human health.

(N) “Green tenant space” means a tenant space (as defined in subsection (V) of this Section) that meets all requirements in the most current version of the U.S. Green Building Council’s Leadership in Energy and Environmental Design Rating System for Commercial Interiors (LEED-CI).

(O) “Green whole building” means a whole building (as defined in subsection (X) of this Section) that meets all requirements in the most current version of the U.S. Green Building Council’s Leadership in Energy and Environmental Design Rating System for New Building Construction and Major Renovations (LEED-NC or LEED 2.1, currently) or which meets all requirements in the most current version of the U.S. Green Building Council’s Leadership in Energy and Environmental Design Rating System for Existing Buildings (LEED-EB).

(P) “LEED-CI” or “LEED Green Building Rating System Version LEED-CI” means the most current Leadership in Energy and Environmental Design Green Building Rating System guidelines developed and adopted by the United States Green Building Council for commercial interiors.

(Q) “LEED-CS” or “LEED Green Building Rating System Version LEED-CS” means the most current Leadership in Energy and Environmental Design Green Building Rating System guidelines developed and adopted by the United States Green Building Council for the core and

shell of buildings (base building).

(R) "LEED-EB" or "Green Building Rating System Version LEED-EB" means the most current Leadership in Energy and Environmental Design Green Building Rating System guidelines developed and adopted by the United States Green Building Council for existing buildings.

(S) "LEED-NC" or "LEED Green Building Rating System Version LEED-NC" means the most current Leadership in Energy and Environmental Design Green Building Rating System developed and adopted by the United States Green Building Council for new buildings and major renovations.

(T) "Platinum rating" means the rating in compliance with, or exceeding, the highest rating awarded by the USGBC LEED certification process.

(U) "Silver rating" means the rating in compliance with, or exceeding, the third highest rating awarded by the USGBC LEED certification process.

(V) "Tenant space" means the portion of a building intended for occupancy by a tenant or occupying owner.

(W) "United States Green Building Council" or "USGBC" means the specific council which measures and evaluates the energy and environmental performance of a building according to its own Leadership in Energy and Environmental Design (LEED) rating system.

(X) "Whole building" means the entire building, as comprised of the base building and tenant space.

Section 4. Green Building Credit.

(A) The green building tax credit shall be available to a taxpayer for either the construction of a green building or the rehabilitation of a building, which is not a green building, into a green building; for the construction or rehabilitation of a base building, which is not a green base building, into a green base building; or, for the construction or rehabilitation of a tenant space, which is not green tenant space, into green tenant space.

(B) A taxpayer may apply for a green building tax credit provided that the facility subject to the green building tax credit is in <*insert your state name here*> and the applicant will be the owner or contract purchaser of the facility at the time of erection, construction, installation, or acquisition of the proposed facility.

(C) If a credit is allowed to a building owner pursuant to this Section with respect to property, and such property (or an interest therein) is sold, the credit for the period after the sale, which would have been allowable under this Section to the prior owner, shall be allowable to the new owner. Credit for the year of sale shall be allocated between the parties on the basis of the number of days during such year that the property or interest was held by each.

(D) If a credit is allowed to a tenant pursuant to this Section with respect to property, and if such tenancy is terminated but such property remains in use in the building by a successor tenant, the credit for the period after such termination, which would have been allowable under this Section to the prior tenant, shall be allowable to the successor tenant. Credit for the year of termination shall be allocated between the parties on the basis of the number of days during such year that the property was used by each.

(E) Notwithstanding any other provision of law to the contrary, in the case of allowance of credit under this Section to a successor owner or tenant, as provided in subsection (C) or (D) of this Section, the commissioner shall have the authority to reveal to the successor owner or tenant any information, with respect to the credit of the prior owner or tenant, which is the basis for the denial in whole or in part of the credit claimed by such successor owner or tenant.

Section 5. Credit Components.

(A) *Green Building Credit* - A taxpayer is eligible for a green building tax credit against an eligible tax provided that they comply with the requirements of Section 6 and provided that the building owned or occupied meet the requirements of an eligible building as set forth in Section 3(H). The amount of the credit shall be determined pursuant to Section 7.

(B) The credit shall be the sum of the following credit components, whichever are applicable:

(1) *Green Whole-Building Credit Component* - The green whole-building credit component shall be available to a taxpayer (whether owner or tenant) for either the construction of a green building or the rehabilitation of a building, which is not a green whole building, into a green whole building. The green whole-building credit component may not be allowed for any taxable year unless all the requirements under Section 6 are met, and the whole building achieves a Silver, Gold, or Platinum rating as approved by the LEED-NC Green Building Rating System (currently LEED 2.1), or the most recent version, for a new building and for major renovations; or, LEED Green Building Rating System Version LEED-EB, or the most recent version, for an existing building.

(2) *Green Base Building Credit Component* - The green base building credit component shall be available to a taxpayer who is the owner for either the construction of a green building or the rehabilitation of a building, which is not a green base building, into a green base building. The green base building credit component may not be allowed for any taxable year unless all the requirements under Section 6 are met, and the base building achieves a Silver, Gold, or Platinum rating as approved by the LEED-CS (Core and Shell) Green Building Rating System, or the most recent version thereof.

(3) *Green Tenant Space Credit Component* - The green tenant space credit component shall be available to a taxpayer (whether owner or tenant) for constructing tenant space or rehabilitating tenant space, which is not green tenant space, into green tenant space. The green tenant space credit component may not be allowed for any taxable year unless all the requirements under Section 6 are met, and the tenant space achieves a Silver, Gold, or Platinum rating as approved by the LEED-CI (Commercial Interiors) Green Building Rating System, or the most recent version

thereof.

(C) For each component eligible to receive credit, such credit component amount shall not exceed the maximum amount specified in the preliminary certificate issued pursuant to Section 8.

Section 6. Requirements.

(A) The green building tax credit may not be allowed for any taxable year unless all of the following are met:

(1) The whole building, base building, or tenant space has achieved a Silver, Gold, or Platinum rating as approved by the applicable and most recent LEED Green Building Rating System as determined in Section 5(A-C);

(2) In achieving its LEED rating, the whole building, base building, or tenant space must earn at least four LEED points for Energy and Atmosphere Credit Number One, or the equivalent points under any subsequent version of LEED;

(3) In achieving its LEED rating, the whole building, base building, or tenant space must earn the point for Energy and Atmosphere Credit Number Three, or the equivalent points under any subsequent version of LEED;

(4) The taxpayer has obtained and filed a preliminary credit certificate issued pursuant to Sections 8-11 of this Act; and

(5) The building is in service, as shown by a certificate of occupancy.

(B) For each component eligible to receive credit in Section 5, once construction is complete and an occupancy certificate is received, such credit component amount shall be allowed for each of the next four succeeding taxable years provided that the taxpayer obtains an eligibility certificate that meets all requirements for an eligibility certificate as described in Section 10(C)(2).

(C) The taxpayer shall file the eligibility certificate and the preliminary credit component certificate, with the claim for credit. Allowable costs in this subsection and for all five years that the credit may be available shall not exceed, in the aggregate, the amount determined pursuant to Section 7.

Section 7. Rulemaking.

Within 60 days of the enactment of this act, the Department shall promulgate rules to:

(A) Determine he amount of green building tax credit available to a taxpayer based on the following:

(1) The amount of floor space in the building;

(2) The square footage of the building;

(3) The level of LEED rating achieved by the building (Silver, Gold, or Platinum), with higher ratings corresponding to greater tax credits; and

(4) Whether the building is located in an economic development area, as defined in Section 3(G), with a higher tax credit corresponding to those buildings located in an economic development area.

(B) Determine allowable credit for each of:

(1) The whole green building credit component;

(2) The base green building credit component; and

(3) The green tenant space credit component.

(C) Determine the criteria by which the Department will determine the maximum aggregate credits allowed for each eligible building, which shall be set forth in the preliminary credit certificate issued pursuant to Section 8.

(D) Determine the maximum amount of the total credit allowed and the maximum amount of credit allowed in any single tax year for all taxpayers.

Section 8. Preliminary Certification.

(A) Prior to construction of a proposed facility, an applicant may apply to the Department for preliminary certification if the applicant will be the owner or contract purchaser of the facility at the time of construction.

(B) An application for preliminary certification shall be made in writing on a form prepared by the Department and shall contain:

(1) A statement that the applicant plans to construct a facility that meets the requirements under Section 6;

(2) A detailed description of the proposed facility and its operation and information showing that the facility will operate as represented in the application;

(3) The estimated start and finish date of the construction of the facility;

(4) Evidence of official registration in the LEED system; and

(5) Any other information determined by the Commissioner to be necessary prior to issuance of an initial certificate.

(C) The Commissioner may allow an applicant to file the preliminary application after the start of the construction of the facility if the Commissioner finds that filing the application before the start of construction is inappropriate because special circumstances render filing earlier unreasonable.

(D) If the Commissioner determines that the proposed construction is technically feasible and should operate in accordance with the representations made by the applicant, and is in accordance with the provisions under Section 6 and any applicable rules or standards adopted by the Commissioner, the Commissioner shall issue a preliminary credit certificate approving the construction of the facility. The preliminary credit certificate shall state the following:

(1) The first taxable year for which the credit may be applied;

(2) The expiration date of the tax credit. Such expiration date may be extended at the discretion of the Commissioner in order to avoid unwarranted hardship; and

(3) The maximum amount of the total credit allowed and the maximum amount of credit allowed in any single tax year.

(E) If the Commissioner determines that the construction does not comply with the provisions under Section 6 and applicable rules and standards, the Commissioner shall issue an order denying certification.

Section 9. Changes Between Preliminary Certification and Final Certification.

(A) To change a project that has already received preliminary certification, the applicant shall file a written request to the Commissioner which states:

(1) A detailed description of the changes;

(2) The reasons for the changes; and

(3) The effects that the changes will have on the amount of tax credit stated by the preliminary certification.

(B) The Commissioner must decide if the changed project complies with the requirements under Section 6.

(1) If the changed project complies with the requirements under Section 6, then the Commissioner shall issue an amended preliminary certification.

(2) If the changed project does not comply with the requirements under Section 6 then the Commissioner shall issue an order that revokes the preliminary certification.

Section 10. Final Certification.

(A) No final certification shall be issued by the Commissioner under this Section unless the

facility was constructed under a preliminary certificate of approval issued under Section 8.

(B) An applicant may apply to the Department for final certification of a facility:

(1) If the Department issued preliminary certification for the facility under Section 8; and

(2) After completion of construction of the proposed facility.

(C) An application for final certification shall be made in writing on a form prepared by the Department and shall contain:

(1) A statement that the conditions of the preliminary certification have been complied with;

(2) An eligibility certificate from the project architect or professional engineer licensed to practice in <*insert your state name here*> that consists of:

(a) A certification by the United States Green Building Council that the building with respect to which the credit is claimed is LEED certified;

(b) A statement of the level of LEED performance achieved by the building (Silver, Gold, or Platinum), to permit determination of the proper credit amount under Section 7;

(c) A certification that, in achieving its LEED rating, the building has earned at least four LEED points for Energy and Atmosphere Credit Number One; and

(d) A certification that, in achieving its LEED rating, the building has earned the Energy and Atmosphere Credit Number Three;

(3) A statement that the facility is in operation; and

(4) Any other information determined by the Commissioner to be necessary prior to issuance of a final certificate, including inspection of the facility by the Department.

Section 11. Revocation of Certificate.

(A) The Commissioner may order the revocation of the final certificate issued under Section 10 of this Act if the Commissioner finds that:

(1) The certification was obtained by fraud or misrepresentation; or

(2) The holder of the certificate has failed substantially to construct the facility in compliance with the plans, specification, and procedures in such certificate.

(B) As soon as the order of revocation under this Section becomes final, the Commissioner shall notify the Department of Revenue <*or insert your state's equivalent*> of such order.

(C) If the certificate is ordered revoked pursuant to subsection (A)(1) of this Section, all prior tax credits provided to the holder of the certificate by virtue of such certificate shall be forfeited, and upon notification under subsection (B) of this Section, the Department of Revenue immediately shall proceed to collect those taxes not paid by the certificate holder as a result of the tax credits provided to the holder under this Act.

(D) If the certificate is ordered revoked pursuant to subsection (A)(2) of this Section, the certificate holder shall be denied any tax credit under this Act in connection with such facility after the date that the order of revocation becomes final.

Section 12. Effective Date.

The provisions of this Act shall be effective immediately upon passage.

Section 13. Severability.

If any provision of this Act, or the application thereof to any person or circumstance, is held invalid, the invalidity shall not affect other provisions or applications of this Act, which can be given effect without regard to the invalid provision or application and, to this end, the provisions of the Act are severable.

This page was last updated on September 14, 2004.

www.serconline.org/grBldg/taxcredit.html