



Rebuild and Renew:

The Impact on Job Creation in the Building Industry of the Waxman-Markey Energy Bill

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Summary

Energy and climate legislation currently before Congress presents an opportunity to invest in the sustainability of buildings, which according to the U.S. Department of Energy, accounts for nearly 70 percent of U.S. electricity consumption.¹ They also create jobs for a wide range of professions, from designers and engineers to construction managers, contractors, carpenters, HVAC specialists, and others.

This study explores the job creation potential of two major provisions of the House-passed American Clean Energy Security Act (H.R. 2454): the State Energy and Environment Development (SEED) program and the Green Resources for Energy Efficient Neighborhoods (GREEN) program. Although precise numbers for job creation are difficult due to the challenges in determining actual funding levels and their impact on employment in the real world, using existing studies and data, this study concludes that these two sections of H.R. 2454 could create or save as many as 270,000 jobs in the design and construction industry per year.

Introduction

On June 26, the U.S. House of Representatives passed the American Clean Energy Security Act (H.R. 2454; also known as the Waxman-Markey bill), comprehensive legislation to promote energy efficiency and renewable energy and to create a nationwide cap-and-trade system to reduce greenhouse gas (GHG) emissions.

H.R. 2454 includes numerous provisions that would provide funding, either through the sale of allowances under the cap-and-trade scheme or through separate authorized appropriations, for the design, construction, and/or retrofit of buildings to make them more energy efficient. These provisions not only will contribute to a reduction in greenhouse gas emissions caused by the built environment; they also will create or preserve thousands of jobs in the building design and construction industry.

¹ http://buildingsdatabook.eren.doe.gov/docs/xls_pdf/1.1.9.pdf

The American Institute of Architects' plan for economic recovery (www.aia.org/rebuildandrenue) calls for investments in infrastructure that create greener buildings, vibrant communities, and a 21st century transportation network that is good for both the environment and economy. The AIA believes that investing in such projects will create both jobs and reduce energy consumption and greenhouse gas emissions from the built environment.

This study analyzes the potential impact of job creation in the building design and construction sectors from two programs in the Waxman-Markey bill: the State Energy and Environment Development (SEED) program (Secs. 131-133) and the Green Resources for Energy Efficient Neighborhoods (GREEN) plan (Secs. 281-299(I)).

Analyzing the Data

In order to measure the potential job creation impact of H.R. 2454 on the building design and construction sector, it is necessary to first analyze the amount of funding that could potentially be invested in building design, construction, and/or retrofit from the legislation; and then calculate the potential number of jobs that would be created or preserved from this investment.

There are certain limitations to this approach: First, the precise amount of funding that will accrue to building projects from the legislation is unclear, because (in the case of SEED) it is dependent both on the value of allowances and how states and localities use SEED money on building projects as opposed to other projects; and (in the case of the GREEN program) actual funding amounts are dependent on the annual appropriations process, and it is often the case that appropriations do not match the authorized amount.

This study uses the Alliance to Save Energy's estimate that the SEED program will receive approximately \$148 billion from 2012-2050, or an average of \$3.8 billion per year.² Funding for the GREEN program is based on authorized levels.

Second, there is no clear consensus on how investments in building projects, particularly retrofits, create jobs. This study bases its estimates on two recent studies that measure the extent of job creation in the building industry: a 2007 study by the Center for Regional Analysis at George Mason University³, which found that every \$1 million in investments in new construction creates 28.5 jobs; and a 2009 study by the Center for American progress and the Political Economy Research Institute⁴ that found that every \$1 million spent on retrofits creates 16.7 direct, indirect, and induced jobs.

² http://ase.org/uploaded_files/5612/waxman_markey.pdf

³ <http://www.naiop.org/foundation/contdev.pdf>

⁴ http://www.americanprogress.org/issues/2009/06/pdf/peri_report.pdf

Building-Related Funding in the Waxman-Markey Bill

This study analyzes potential building-related funding in two sections of H.R. 2454: the SEED program (Secs. 131-133) and the GREEN program (Secs. 281-299(I)). There are other provisions in the legislation that could potentially lead to investments in buildings⁵; however, the two sections analyzed here offer the greatest opportunity for building-related funding.

State Energy and Environment Development (SEED)

Section 131 of H.R. 2454 directs the Administrator of the U.S. Environmental Protection Agency to establish a program under which a state, through its State Energy Office or other agency the state designates, may operate a State Energy and Environment Development (SEED) account to serve as a state and local-level repository for managing and accounting for all emission allowances designated primarily for renewable energy and energy-efficiency purposes.

Sec. 132(c) of the bill outlines the allowable uses of SEED monies:

Section	Use	Required Amounts
(2)	Energy Efficiency	At least 20%
(A)	Building Code Implementation & Enforcement (Sec. 201)	
(B)	Energy Efficient Manufactured Homes Program (Sec. 203)	
(C)	Building Energy Performance Labeling Program (Sec. 204)	
(D)	Low-income Community Energy Efficiency Programs (Sec. 264)	At least 1%
(E)	Retrofit for Energy and Environmental Performance (Sec. 202)	At least 5.5%
(3)	Renewable Energy and Electricity Storage	At least 20%
(1)	Distribution by States to Localities for Energy Efficiency and Renewable Energy Uses in (2) and (3)	At least 12.5%
(4)	Miscellaneous	No more than 47.5%
(A),(B)	Energy Efficiency and Renewable Energy Uses in (2) and (3)	
(C)	Energy Efficiency Programs for End-Use Consumers of Utilities	
(D)	Smart Grid for Public Buildings	
(E)	Non-Federal Portion of Surface Transportation programs	No more than 10%

Of these programs, the two that would most directly invest in building design, construction, and/or retrofits are the Low-Income Community Energy Efficiency programs (Sec. 264) and the Retrofit for Energy and Environmental Performance (REEP) program (Sec. 202).⁶

⁵ For example, the Sec. 101 renewable energy and energy efficiency standard and provisions that require natural gas utilities and states that receive allowances based on home heating oil and propane consumption to invest part of their allowances in energy efficiency

⁶ Other SEED monies also may be used for direct or indirect building projects, including energy efficiency manufactured homes, energy efficiency programs for end-use customers of utilities, Smart Grid for public buildings, and the non-Federal portion of surface

- Under the Sec. 264 Low-Income Community Energy Efficiency programs, funds may be used by private, nonprofit, mission-driven community development organizations to provide financing to businesses and projects that improve energy efficiency; identify and develop alternative, renewable, and distributed energy supplies; provide technical assistance and promote job and business opportunities for low-income residents; and increase energy conservation in low income rural and urban communities.
- The Retrofit for Energy and Environmental Performance (REEP) program is intended to facilitate the retrofitting of existing buildings to achieve maximum cost-effective, energy-efficiency improvements and significant improvements in water use and other environmental attributes.

Potential Funding for Building-Related Programs

Sec. 132 provides states and localities with a high degree of flexibility in allocating funding between allowable programs, making it challenging to predict precisely how much SEED money will flow to any specific program. This study, therefore, uses two approaches to analyzing potential funding for building-related programming. First, it establishes the minimum and maximum possible levels of funding for such programs. Second, it calculates the amount of funding that would flow to each program if funds were split evenly and equally by each jurisdiction.

Maximum/Minimum Approach

Under the funding requirements, at least 1 percent of SEED monies must be used on Sec. 264 activities and at least 5.5 percent on the REEP program. (At least 12.5 percent of SEED monies must be sent to localities for use on these and other projects, but the legislation does not explicitly specify that localities must devote minimum shares of this allocation toward these projects; this study assumes that localities could be free to spend any portion, or none, of this 12.5 percent allocation on Sec. 264 and REEP.)

The 1 percent and 5.5 percent figures are minimums; in theory, all of the funding in the 20 percent minimum energy-efficiency account (Sec. 132(C)(2)) could be used for these two programs, as could all of the 12.5 percent allocated to localities and the 47.5 percent reserved for miscellaneous uses. The 20 percent required minimum for renewable-energy programs (Sec. 132(C)(3)) is the only pot of money that could not be used for these two programs. Therefore, the most funding that conceivably could go toward building-related, energy-efficiency programs is 80 percent of SEED allocations (74.5 percent for Sec. 264, or 79 percent for REEP), while the minimum would be 6.5 percent.

transportation programs, but the amounts are likely to be much lower than those listed above.

According to the Alliance to Save Energy, the SEED program could receive \$148 billion in allowance monies during the 2012-2050 time period, or an average of \$3.8 billion per year during that timeframe.⁷

This means that the amount of funding that could go toward building-related energy-efficiency programs under SEED would range from a **low of \$9.62 billion** over the 2012-2050 time period, for an average of **\$246 million per year** (based on the 6.5 percent minimum) to a **high of \$118.4 billion** over the 2012-2050 time period, for an average of **\$3.04 billion per year** (based on the 80 percent maximum).

Based on these figures, the maximum and minimum possible amounts that could be allocated to the Sec. 264 program and REEP are as follows:

Program	Maximum SEED Funding (%)	Minimum SEED Funding (%)	Max funding 2012-2050	Min Funding 2012-2050	Max Average Annual Funding	Min Average Annual Funding
Low-Income Energy Efficiency	74.5	1	\$110,260,000,000	\$1,480,000,000	\$2,827,179,487	\$37,948,718
REEP	79	5.5	\$116,920,000,000	\$8,140,000,000	\$2,997,948,718	\$208,717,949

Equal Split Approach

Under the “Equal Split” scenario, it is assumed that each state and locality would divide funding equally among each allowable program under each account. The percentages of SEED monies that would flow to each program under this scenario are as follows:

Use		Amount Based on Required Minimums (%)	Amount Per Program (%)
Energy Efficiency		20	
	Building Code Implementation & Enforcement (Sec. 201)		3.625
	Energy Efficient Manufactured Homes Program (Sec. 203)		3.625
	Building Energy Performance Labeling Program (Sec. 204)		3.625
	Low-income Community Energy Efficiency Programs (Sec. 264)		3.625
	Retrofit for Energy and Environmental Performance (Sec. 202)		5.5
Renewable Energy and Electricity Storage		20	20
Distribution by States to Localities for EE/RE Uses in (2) and (3)		12.5	
	Energy Efficiency	6.25	
	<i>Building Code Implementation & Enforcement (Sec. 201)</i>		1.25
	<i>Energy Efficient Manufactured Homes Program (Sec. 203)</i>		1.25
	<i>Building Energy Performance Labeling Program (Sec. 204)</i>		1.25
	<i>Low-income Community Energy Efficiency Programs (Sec. 264)</i>		1.25
	<i>Retrofit for Energy and Environmental Performance (Sec. 202)</i>		1.25

⁷ http://ase.org/uploaded_files/5612/waxman_markey.pdf

	Renewable Energy and Electricity Storage	6.25	6.25
Miscellaneous		47.5	
	Energy Efficiency and Renewable Energy Uses in (2) and (3)	12.5	
	<i>Energy Efficiency</i>	6.25	
	<i>Building Code Implementation & Enforcement (Sec. 201)</i>		1.25
	<i>Energy Efficient Manufactured Homes Program (Sec. 203)</i>		1.25
	<i>Building Energy Performance Labeling Program (Sec. 204)</i>		1.25
	<i>Low-income Community Energy Efficiency Programs (Sec. 264)</i>		1.25
	<i>Retrofit for Energy and Environmental Performance (Sec. 202)</i>		1.25
	<i>Renewable Energy and Electricity Storage</i>	6.25	6.25
	Energy Efficiency Programs for End-Use Consumers of Utilities	12.5	12.5
	Smart Grid for Public Buildings	12.5	12.5
	Non-Federal Portion of Surface Transportation programs	10	10
TOTAL			100

Therefore, the total percentages that would be made available for the following building-related programs and the amount of funding based on the Alliance to Save Energy's estimates would be as follows:

Program	Percent of SEED Funding	Total funding 2012-2050	Average annual funding
Low-income Community Energy Efficiency Programs (Sec. 264)	6.125	\$9,065,000,000	\$232,435,897
Retrofit for Energy and Environmental Performance (Sec. 202)	8	\$11,840,000,000	\$303,589,744
TOTAL	14.125	\$20,905,000,000	\$536,025,641

Green Resources for Energy Efficient Neighborhoods (GREEN)

Secs. 281-299(I) are based on legislation introduced by Rep. Ed Perlmutter (D-CO) (H.R. 2336). It promotes green and energy-efficiency housing programs and initiatives.

Several provisions within the GREEN program would provide authorized funding for the design, construction, and/or retrofit of buildings:

- *Residential Energy Efficiency Block Grant Program (Sec. 296)*. Sec. 296 establishes a residential energy-efficiency block grant program to distribute grants for activities that improve the energy-efficiency of single-family or multifamily housing.
- *Sustainable Low-Income Community Grant Program (Sec. 298)*. Sec. 298 authorizes the Secretary of Housing and Urban Development (HUD) to make grants to nonprofit organizations to use for a number of activities, including training, supporting, and providing financing to eligible community development organizations and qualified youth service and conservation corps in improving energy efficiency.
- *Alternative Energy Sources State Loan Fund (Sec. 299(D))*. Sec. 299(D) authorizes HUD to provide loans to States and Indian tribes to provide

incentives to owners of single-family and multifamily housing, commercial properties, and public buildings to provide renewable-energy sources, energy-efficiency and energy-conserving improvements, and features for such structures, or infrastructure related to the delivery of electricity and hot water for structures lacking such amenities.

- *Green Guarantees (Sec. 299(I)).* Sec. 299(I) authorizes HUD to guarantee mortgages used to finance sustainable building elements for housing that is subject to the mortgage. HUD is prohibited from guaranteeing a mortgage unless the borrower has demonstrated the amount of savings attributable to incorporation of the sustainable building elements to be financed by the green portion of the mortgage.

Section	Provision	Annual Authorization	Length
296	Residential Energy Efficiency Block Grant Program	\$2,500,000,000	FY 2010 (such sums in following years)
298	Sustainable Low-Income Community Grant Program	\$10,000,000	FY10-14
299(D)	Alternative Energy Sources State Loan Fund	\$5,000,000,000	N/A
299(I)	Green Guarantees	\$500,000,000	FY10-14
TOTAL		\$8,010,000,000	

Potential Job Creation in the Building Design and Construction Sectors

Based on the figures above, it is possible to establish a potential range of job creation from the SEED and GREEN provisions of H.R. 2454.

As stated earlier, this study uses figures from two recent studies to determine the job creation impacts from the design, construction, and/or renovation of buildings.

- *The Contribution of Office, Industrial and Retail Development and Construction on the U.S. Economy*, a 2007 study by the Center for Regional Analysis at George Mason University for the National Association of Industrial Office Properties (NAIOP), found that every \$1 million in investments in new construction creates 28.5 jobs.⁸
- *The Economic Benefits of Investing in Clean Energy*, a 2009 study by the Center for American Progress and the Department of Economics and Political Economy Research Institute at the University of Massachusetts, Amherst, found that every \$1 million spent on building retrofits creates 16.7 direct, indirect and induced jobs.⁹

As indicated, the two studies analyze different types of projects: the Center for Regional Analysis looks at job creation for new construction, while the Center for American Progress looks at job creation from retrofits. Therefore, it is necessary

⁸ <http://www.naiop.org/foundation/contdev.pdf>

⁹ http://www.americanprogress.org/issues/2009/06/pdf/peri_report.pdf

to make a determination on whether programs in H.R. 2454 would provide funds for new construction, retrofits, or a combination of both.

For the SEED programs, it is clear that, by definition, the REEP program covers retrofits only. For the Sec. 264 low-income program, the legislative language is unclear, allowing funds to be used on “energy efficiency projects and energy conservation programs.” For other programs in SEED that may involve buildings, the legislative language, too, is unclear.

For the GREEN programs, the Sec. 296 Residential Energy Efficiency Block Grant Program, the Sec. 298 Sustainable Low-Income Community Grant Program, and the Sec. 299(D) Alternative Energy Sources State Loan Fund authorize funds for energy efficiency improvements, suggesting, though not explicitly stating, that funding will go primarily toward retrofits. The Sec. 299(I) Green Guarantee program does not indicate whether funding can go toward mortgages for new or existing homes.

Based on the above job creation figures and the allowable uses for SEED and GREEN funding, it is possible to develop an estimate of potential job creation in the building design and construction industries based on the SEED and GREEN programs.

SEED Job Creation

Maximum/Minimum Scenario

Program	Max Average annual funding	Min Average Annual Funding	Maximum Retrofit Jobs ¹⁰	Min Retrofit Jobs ¹⁰	Max New Construction Jobs ¹¹	Min New Construction Jobs ¹¹
Low-income EE	\$2,827,179,487	\$37,948,718	47213.9	633.7	80574.6	1081.5
REEP	\$2,997,948,718	\$208,717,949	50065.7	3485.6		
TOTAL	\$ 5,825,128,205	\$246,666,667	97279.6	4119.3	80574.6	1081.5

Equal Split Scenario

Program	Average annual funding	Retrofit Jobs ¹⁰	New Construction Jobs ¹¹
Low-income Community Energy Efficiency Programs	\$ 232,435,897	3881.7	6624.4
Retrofit for Energy and Environmental Performance	\$ 303,589,744	5069.9	
TOTAL	\$ 536,025,641	8951.6	6624.4

¹⁰ Annual, based on Center for American Progress study

¹¹ Annual, based on Center for Regional Analysis study

GREEN Program Job Creation

Provision	Annual Authorization	Jobs From Retrofits ¹⁰	Jobs From New Construction ¹¹
Residential Energy Efficiency Block Grant Program	\$2,500,000,000	41750	
Sustainable Low-Income Community Grant Program	\$10,000,000	167	
Alternative Energy Sources State Loan Fund	\$5,000,000,000	83500	
Green Guarantees	\$500,000,000	8350	14250
TOTAL	\$8,010,000,000	133767	14250

Conclusion

Although it is difficult to precisely predict job creation and retention that will arise from complex legislation, such as H.R. 2454, based on existing research and data, it is clear that the major building-related, energy-efficiency provisions in the bill will have a significant impact on job creation and retention in the design and construction industries.

The large job creation potential per dollar invested in energy-efficient building design, construction, and renovations – combined with the sizable potential for energy savings from building efficiency measures – suggests that the inclusion of significant building-related provisions in the final energy and climate bill will help policymakers achieve the twin goals of sustainability and economic development.

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