



# Projecting Workforce Needs of the Massachusetts Residential Retrofitting Energy Efficiency Programs (2008-2012)

*A Case Study from the New England Clean  
Energy Council's Energy Efficiency Workforce  
Needs Research Project*

*Made possible with generous support from National Grid,  
NStar, JFYNetWorks, Conservation Services Group,  
and The Barr Foundation*

## **NECEC Program Manager**

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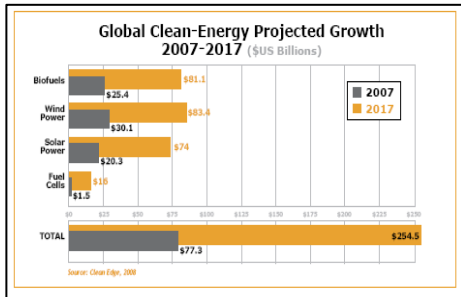
Art Willcox

# New England's 2020 Clean Energy Future

Leadership in VC Investment

100,000 New Clean Energy Jobs

All New Load Growth Met By Efficiency



20%+ Renewable Energy

Emissions 10%+ Below 1990 Levels



# *Today's Objectives*

- (1) A very quick overview of the NECEC goals and workforce development group research agenda
- (2) Understand why environmentalists and “green justice” advocates are equally excited about residential energy efficiency investments.
- (3) Briefly describe the structure of residential energy efficiency employment in Massachusetts in 2008.
- (4) View the probable increase in workforce needs created by dramatic increases in funding for energy efficiency and probable policy changes.
- (5) Review some of the recruitment/training responses to date

# About the NECEC Energy Efficiency Workforce Needs Project



**Purpose:** To explore contractor/employee recruitment and training needs among residential/commercial/industrial energy efficiency employers.

## Project Surveys/Studies

- Low Income Weatherization Assistance Program Job Projection Study  
*(in collaboration with Low Income Energy Affordability Network -LEAN)*
- Residential Conservation Services (MassSave) Workforce Needs Study
- HVAC/R and Plumbing Contractors Survey  
*(in collaboration with GasNetworks)*
- Northeast Energy Engineers and Professionals Survey  
*(in collaboration with Association of Energy Engineers)*
- Survey of Selected Commercial/Industrial Energy Efficiency Contractors  
*(with assistance from Peregrine Energy Group)*

# *Energy Efficiency is Only One Sector of the Larger “Green Economy”*



## Renewable Energy

*Solar*

*Wind*

*Biomass*

*Biofuels*

*Geothermal*

## Energy Efficiency

*Residential*

*Commercial*

*Industrial*

*Government*

## “Green” Building

*LEED certification*

And also....

Organic agriculture/products

Water quality management

Air quality management

Sustainability planning

Forestry

Fisheries

Parks and recreation

Wildlife management

Environmental education

“Eco” tourism/hospitality

“Green” chemistry

Solid waste/recycling

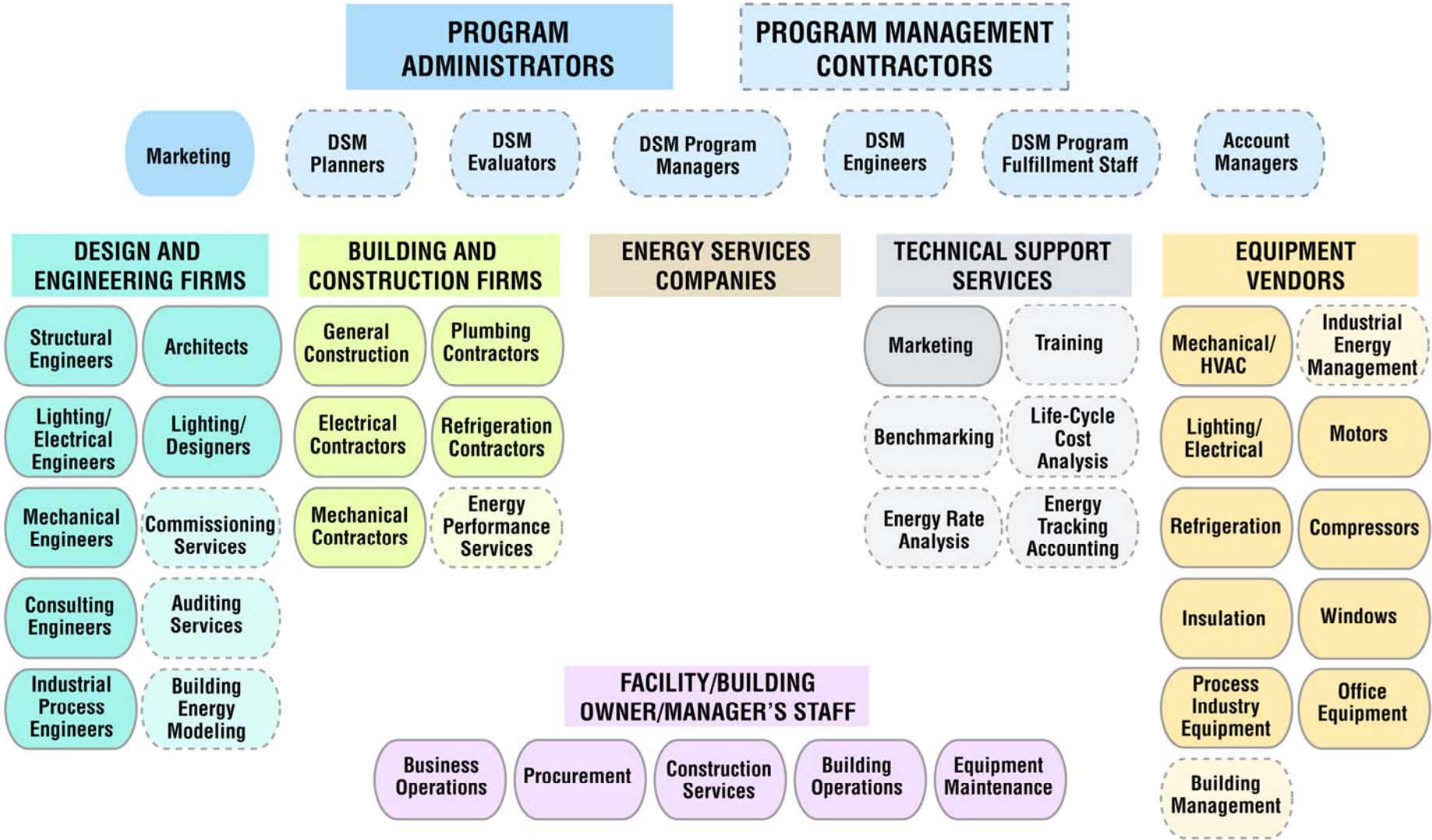
“Smart growth” actions

“Smart grid” actions

Brownfields redevelopment

Haz waste/toxics use reduction

# Energy Efficiency Industry

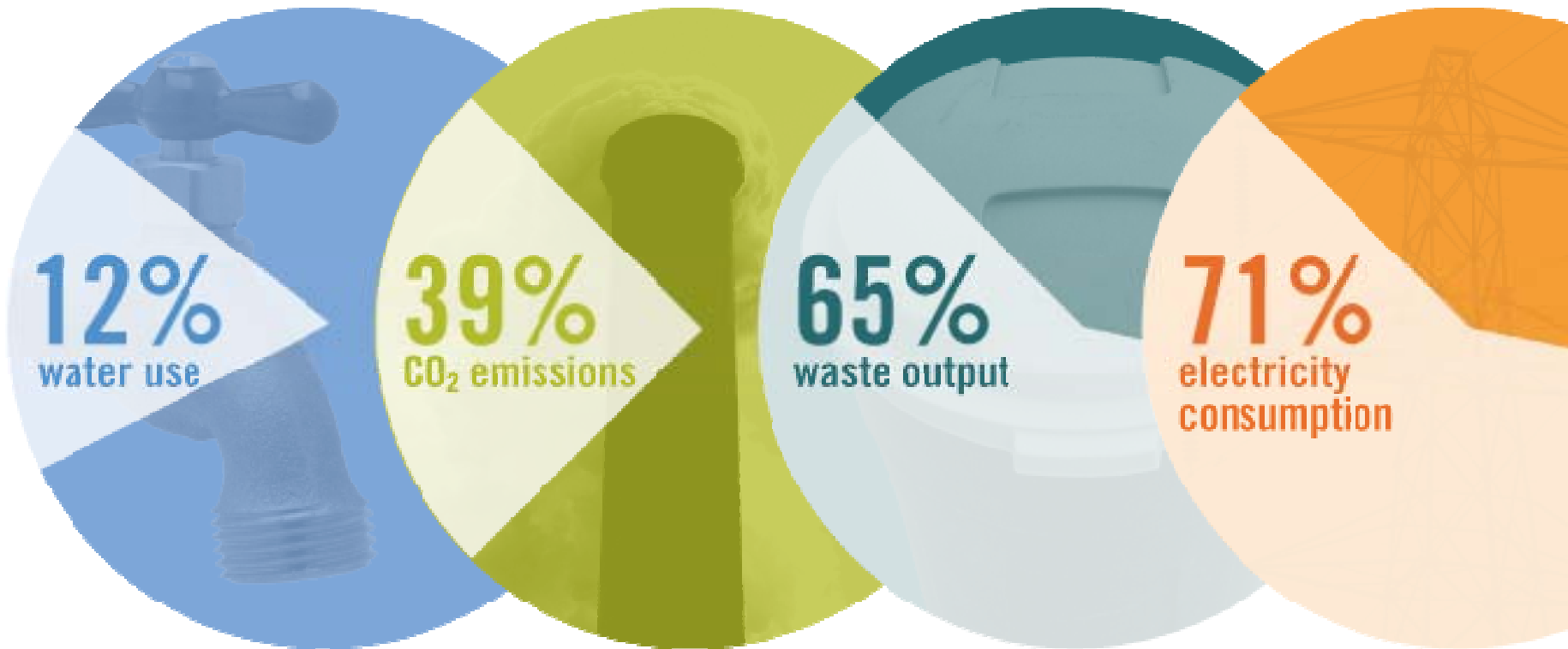


Existing Field  
New Skills Needed

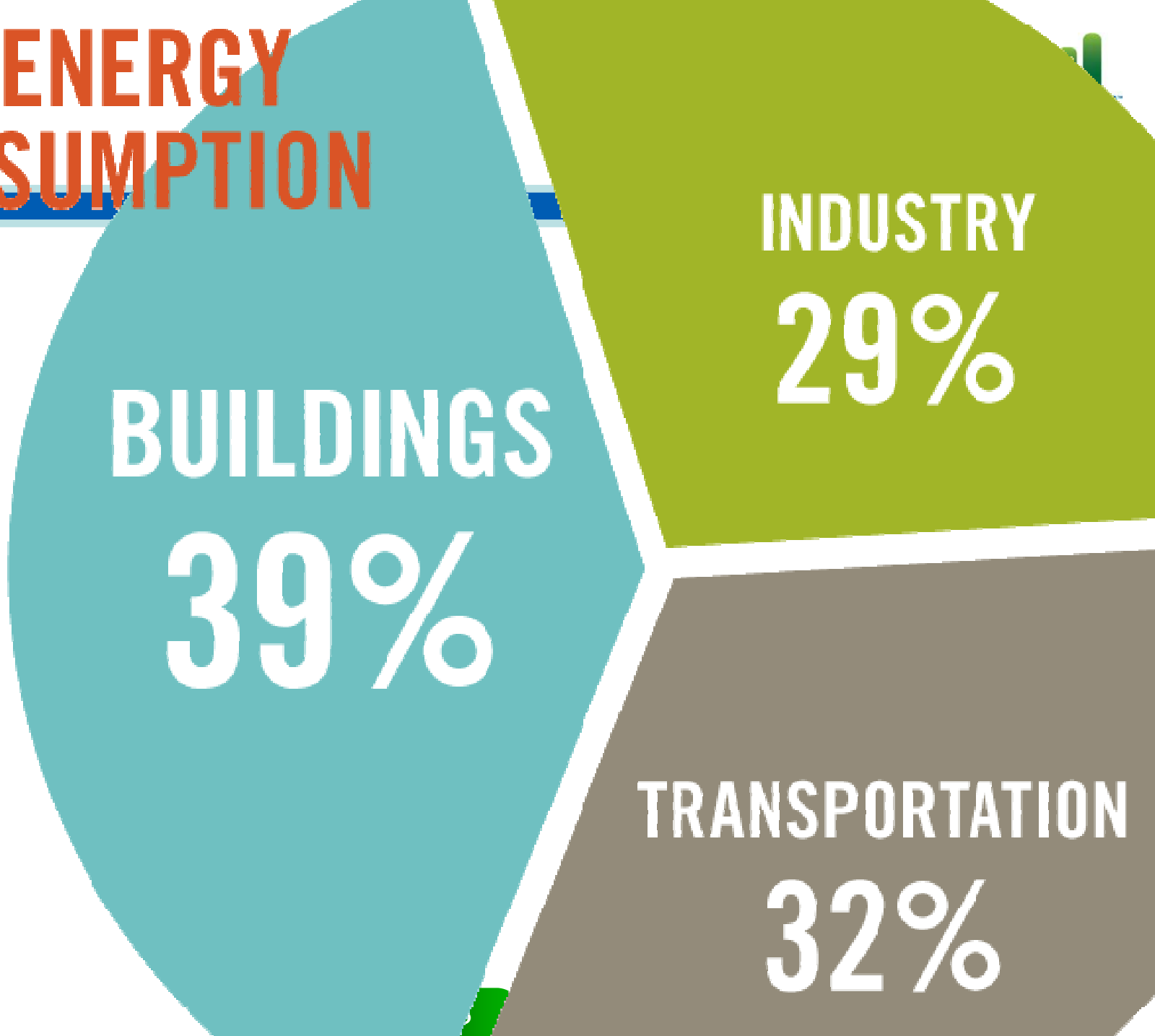


New Specialization  
on Development

# U.S. Building Impacts:



# U.S. ENERGY CONSUMPTION



**BUILDINGS**  
**39%**

**INDUSTRY**  
**29%**

**TRANSPORTATION**  
**32%**

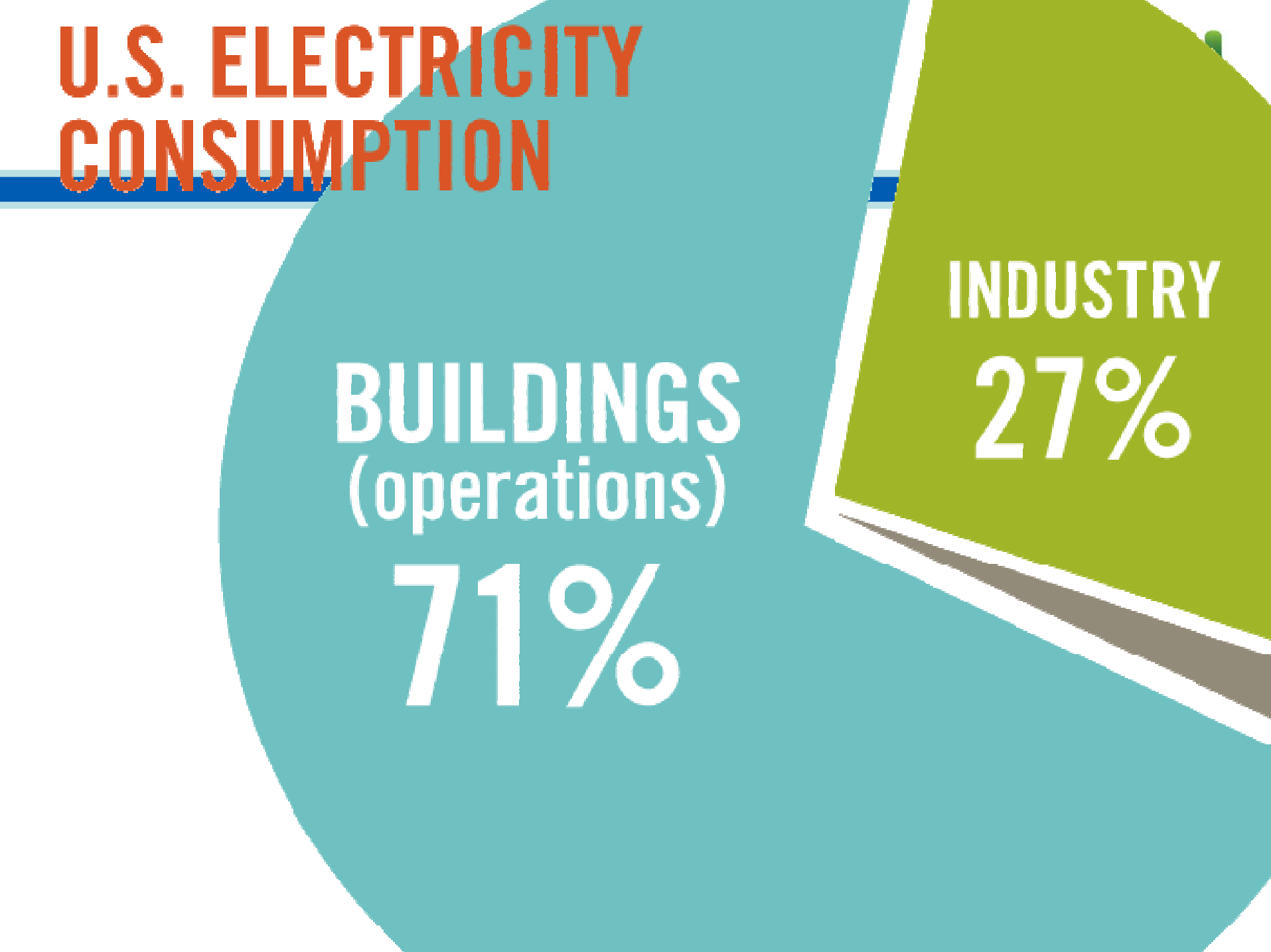
# U.S. ELECTRICITY CONSUMPTION

**BUILDINGS**  
(operations)

**71%**

**INDUSTRY**

**27%**





"Van Jones demonstrates conclusively that the best solutions for the survivability of our planet are also the best solutions for everyday Americans."  
—AL GORE

# THE GREEN COLLAR ECONOMY

—  
HOW ONE SOLUTION  
CAN FIX OUR TWO  
BIGGEST PROBLEMS

VAN JONES

FOREWORD BY ROBERT F. KENNEDY JR.

# The Green Wave Is Coming.



# Will It Lift All Boats?



**U.S. Metro Economies** Green Jobs in U.S. Metro Areas October 2008

Current and Potential Green Jobs in the U.S. Economy

Prepared for:  
The United States Conference of Mayors and the Mayors Climate Protection Center

Prepared by:  
**GLOBALINSIGHT**

THE UNITED STATES CONFERENCE OF MAYORS

**JOB OPPORTUNITIES FOR THE GREEN ECONOMY:**  
A STATE-BY-STATE PICTURE OF OCCUPATIONS THAT GAIN FROM GREEN INVESTMENTS

Robert Pollin & Jeannette Wicks-Lim

Political Economy Research Institute  
University of Massachusetts, Amherst

June 2008

**American Solar Energy Society's Green Collar Jobs in the U.S. and Colorado**  
*Economic Drivers for the 21<sup>st</sup> Century*

Roger H. Bezdek, Ph.D.  
Principal Investigator, Management Information Services, Inc.  
for the American Solar Energy Society



Center for American Progress

**Green Recovery**  
*A Program to Create Good Jobs and Start Building a Low-Carbon Economy*

Robert Pollin, Heidi Garrett-Peltier, James Heintz, and Helen Scharber  
September 2008

**THE GREEN JUSTICE SOLUTION:**  
A WIN-WIN PLAN TO PREVENT CLIMATE CRISIS AND JUMPSTART AN EQUITABLE AND SUSTAINABLE ECONOMIC RECOVERY

A Publication of the Green Justice Coalition and Community Labor United  
December 6, 2008

**Green Justice Coalition**

**A Green Wave IS coming**



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Steve Weisman

# Begin at the end: Study Conclusions

- (1) Under current assumptions, the residential retrofit market will be a good job supporter from 2010-2012, but not phenomenal.
- (2) Of those jobs that are supported, many will go to incumbent workers at contractors already in the field, and/or to workers at contractors in the building trades who will migrate to residential energy efficiency work.
- (3) Many of the training programs currently operating and/or planned for the immediate future are aimed at these contractors and “would be” contractors.
- (4) Community-based job training programs for auditors, weatherization/insulation techs, air sealers, and HVAC techs should be building relationships with employers now so that there is a good fit between training and employment.
- (5) Regulators and utility companies are making changes to the state’s residential energy efficiency retrofit system and dramatically increasing funds for all forms of energy efficiency. It’s critical to track these changes and to let decision makers know about your ideas for innovations that can create more jobs.
- (6) A federal “cap and trade” system would likely produce lots of additional money for the state’s residential energy efficiency retrofitting system.

# Massachusetts Policies



- **Multiple Legislative Efforts.** In 2008, Massachusetts passed 5 new laws to help make the Commonwealth a leader in promoting clean energy and creating green-collar jobs.
- **Green Communities Act.** Massachusetts is remaking the electricity marketplace to favor efficiency over additional power generation as well as to support the use of clean energy.
- **Green Jobs Act.** This bill led to the creation of the Clean Energy Center to grow the green economy in Massachusetts.
- **Global Warming Solutions Act.** Massachusetts is a leader in climate protection by requiring the reduction of greenhouse gas emissions by 80% from 1990 levels by 2050.

# Regulators and Utility Companies are Developing 2010-2012 EE Plans Now



## Residential EE Funding from Electric and Gas Utility Plans

Low-Income Residential + Other Residential are combined

Utility plans do not include ARRA (stimulus) funds

Utility plans do not include DOE funds to the low-income program

*July 16, 2009 draft version*

<u>Year</u>	<u>Total</u>
2010	\$ 163,273,425
2011	\$ 201,987,407
2012	\$ 240,355,004

Visit <http://www.ma-eeac.org/plan716.htm> for draft plans

# Focus of NECEC Residential Retrofit Energy Efficiency Workforce Study

This study focused narrowly on job creation/retention from funds/programs that directly supported residential retrofitting of existing single family homes and 1-4 unit multiple family units.

It did **not** include an examination of:

- Residential energy efficiency programs aimed at new construction
- Commercial/industrial energy efficiency programs
- Residential energy efficiency for buildings with more than 4 units
- Expected pilot programs aimed at deep retrofits
- New municipal programs funded with Energy Efficiency Community Block Grants through ARRA (such as “Renew Boston”)

# Statewide Verification of Employment Need Projections Via Contractor Survey



**Who was surveyed?** Identified contractors and subcontractors serving the Low-Income and RCS programs in all parts of Massachusetts.

**What questions were asked?** The survey included questions about:

- *Work load*
- *Interest/ability to expand production by 25%, 50%, 100%, 150%*
- *Current number of employees*
- *Preferred recruiting sources*
- *Training needs*
- *Opinions related to need for an energy efficiency training center*
- *Inventory of trucks, insulation blowers, blower doors, infrared cameras*
- *Open question for opinions/commentary related to ramp-up needs*

# Work Load Questions

Contractors selected answers from a 5-point scale.

1 = Strong Yes; 2 = Yes; 3 = Neutral; 4 = No; 5 = Strong No

<u>Question</u>	<u>Avg. Score</u>
(1) Are you <i>interested</i> in expanding to meet expected work load?	2.26
(2) Are you <i>able</i> to meet expanded work load?	1.73
(3) Are you able to expand your work by 25%?	1.79
(4) ....by 50%?	2.10
(5) ....by 100%?	2.90
(6) ....by 150%?	3.34
(7) If a group of jobs (e.g. 200, 300) were guaranteed, would this encourage you expand production?	2.33

# Recruitment and Training Questions

Contractors selected answers from a 5-point scale.  
1 = Strong Yes; 2 = Yes; 3 = Neutral; 4 = No; 5 = Strong No

<u>Question</u>	<u>Score</u>
What is the best source for recruiting new crew members?	
Relatives?	3.39
Friends?	2.04
Advertising	2.79
Unemployment office	4.25
Educational institutions	2.92
Co-Workers/Network	2.45
Would a partially subsidized training center be useful to you in expanding your production?	2.16

# 2008 Massachusetts Residential Energy Efficiency Workforce



## ***2008 Low-Income Program Employment (298 FTEs)***

CAP Agency Managers:	28
CAP Agency Administrative Staff:	28
CAP Agency Auditors:	56
Contracted Field Staff (Weatherization):	97
Contracted Field Staff (Windows):	N/A
Contracted Field Staff: (Heating Systems):	70
Contractor Administrative Staff:	21

## ***2008 Residential Conservation Service (498 FTEs)***

Lead Contractor Managers:	37
Lead Contractor Administrative Staff:	50
Lead Contractor Auditors:	39
Lead Contractor Project Coordinators:	42
Lead Contractor Air Sealing Technicians:	17
Subcontractor Insulation Installers:	162
Subcontractor HVAC/R Installers:	114
Subcontractor Administrative Staff:	38

# ***Auditors are Exceptionally Productive***

We were struck by the productivity level of the auditing professionals, in both the low-income and RCS programs. For example, we found that only 39 auditor FTEs were required in the RCS program to complete 19,444 residential audits.

This is a productivity rate of ~500 audits annually per Auditor FTE.

# ***Weatherization/Insulation Installers are Also Extremely Productive***

As with auditors, we noted that the productivity of these subcontractors is fairly high.

Records indicate that at least 9,318 installments were completed in 2008 by an installation workforce that totaled about 259 FTEs. This is a rate of 36 completed installations, per worker FTE, per year.

# ***HVAC Installers are a Big Part of the Residential Energy Efficiency Workforce***



In popular “green job” discussions about the residential energy efficiency workforce, the bulk of attention often goes to energy auditors and insulation/weatherization workers. We noted with interest that the subcontractor HVAC/R workforce is a large part of the total. 184 total field FTEs were required to complete a wide variety of heating replacement, repair and “cleaning and tuning” jobs for the low-income and RCS programs combined.

So, while 46% of the total residential energy efficiency workforce FTEs were devoted to auditing and weatherization/insulation field work (the largest plurality), 23% of the FTEs were dedicated to HVAC/R related field work.

# ***Managerial and Administrative Staff Are Nearly 1/3 of the EE Workforce***



Residential energy efficiency work in the RCS and Low-Income Program requires a significant amount of marketing, “in-take”, management, evaluation, and paperwork.

It's not surprising, then, that nearly one-third (31%) of the total FTEs were devoted to these activities.

# FTEs per Million Dollars of Investment (2008)



In 2008, each million dollars of residential EE investment supported 8.9 direct FTEs.

Each million dollars of investment includes expenditures on supplies, equipment and other costs in addition to labor expenditures on salaries and benefits.

We did not estimate indirect and “induced” FTEs.

# Factors to consider in calculating future residential EE workforce needs

- **Funding** (expected funding available for different activities from various sources);
- **Production** (audits performed, insulation jobs completed, heating systems replaced, windows replaced, etc.);
- **“Uptake” rates** (percentage of audits which result in energy efficiency actions);
- **Worker productivity** (of auditors, insulation techs, HVAC/R techs, air sealers, etc.);
- **Average cost of selected measures** (insulation, air sealing, audits, HVAC actions, etc.);
- **Utility/Government Incentives** (amount of total cost of selected measures subsidized);
- **Consumer co-pays** (amount paid for by consumers under various incentive programs)
- **Staffing structures** (including distribution of work among “leads” and subcontractors).

# Estimating Funding Increases RCS and Low-Income Programs



<b>Funding Sources Include:</b>	<b>2008:</b>	<b>\$ 86,155,556</b>
<b>Systems Benefit Charge</b>	<b>2009:</b>	<b>\$ 166,225,643</b>
<b>Forward Capacity Market</b>	<b>2010:</b>	<b>\$ 232,368,605</b>
<b>Regional Greenhouse Gas Initiative</b>	<b>2011:</b>	<b>\$ 310,749,938</b>
<b>Energy Efficiency Reconciliation Factor</b>	<b>2012:</b>	<b>\$ 322,336,608</b>
<b>US Department of Energy</b>		
<b>ARRA (Low Income Program actual)</b>		
<b>ARRA (other – estimated)</b>		

# Projected Low Income Residential Efficiency Programs Workforce 2008-2012



		FTE	FTE	FTE	FTE		FTE Field	FTE Field	FTE Field	FTE Field
Program Year	Total \$	Total Employee	Mngr	Adm Ast	Auditors		WAP Empl	Windows Empl	HWAP Empl	Adm Asst
2008	33,500,000	300	28	28	56		97	0	70	21
2009	60,850,646	525	37	37	74		226	16	95	41
2010	86,531,935	736	47	47	96		343	41	104	59
2011	95,813,935	801	52	52	110		365	41	117	63
2012	88,563,645	683	55	55	124		241	13	145	49
2013										

# Projected Residential Conservation Services Program Workforce 2008-2012



Year	Total \$	Total Employees	Mngrs	Adm Ast	Auditor	Project Coord.	Insulate Installers	Air Sealing Installers	HVAC Contract Installers	Admin Staff
2008	52,655,556	498	37	50	39	41	162	17	114	38
2009	105,374,997	911	67	83	51	92	211	51	285	71
2010	145,836,670	1239	91	111	61	132	253	81	412	98
2011	214,936,003	1758	127	153	79	188	329	105	637	140
2012	233,772,963	2020	150	183	103	214	427	137	646	160

# Combined Total of Massachusetts Residential EE Workforce Needs 2009-2012



<u>Year</u>	<u>Low-Income Program</u>	<u>RCS Program</u>	<u>Total</u>	<u>Change</u>
2008	300	498	798	
2009	525	910	1,435	+ 637
2010	736	1,239	1,975	+ 540
2011	801	1,758	2,559	+ 584
2012	683	2,020	2,703	+ 683

# Combined Totals of Workforce Needs by Selected Job Categories

Year	Auditor FTEs	Change	Insulation/AS FTEs	Change	HVAC/R FTEs	Change
2008	95	----	276	----	184	----
2009	125	<b>+30</b>	488	<b>+212</b>	380	<b>+196</b>
2010	157	<b>+32</b>	677	<b>+189</b>	516	<b>+136</b>
2011	189	<b>+32</b>	799	<b>+122</b>	754	<b>+238</b>
2012	227	<b>+38</b>	805	<b>+6</b>	791	<b>+37</b>

## ***Funding Green Collar Job Training Programs***

Massachusetts recently awarded \$1,000,000 to five innovative green jobs training programs to help lift people out of poverty. Programs will begin soon in Worcester, Lowell, Brockton, Pittsfield, and Springfield/Holyoke. The state received 15 applications, totaling \$4.6 million in requests.

## ***Building a Statewide Network of Energy Efficiency Training Centers***

The Commonwealth is investing \$1.875 Million to create three centers that will train people in residential, commercial and industrial energy efficiency skills. This initiative has created an unprecedented level of collaboration in the state's community college/job training community.

# Recruitment and Training Response of the Energy Efficiency Industry



- (1) Auditors have been (and are being) hired, trained and deployed.
- (2) Existing contractors are preparing to ramp up production.
- (3) New weatherization/insulation contractors are being recruited.
- (4) Contractors from related fields are being recruited to pursue EE.
- (5) The RCS and Low Income Programs have jointly supported an EE contractor “boot camp” in Fitchburg.
- (6) Leading energy efficiency employers and government officials are discussing the possibility of a Boston area training center.
- (7) Industry employers are assisting in the development of the Massachusetts Clean Energy Center’s emerging MassGREEN Energy Efficiency Training Centers, coordinated by Springfield Technical Community College (STCC).
- (8) Several industry employers are writing support letters for “green job” training proposals to the US Department of Labor’s “green job” training fund solicitation.

# Additional reforms to the Residential Energy Efficiency system are likely

Utilities, regulators and other stakeholders are ultimately seeking a system which can do an even better job of:

- Targeting homes/neighborhoods that need retrofits
- Using creative social marketing/community approaches
- Increasing the “uptake” rate on audits
- Providing energy efficiency services at time of audit
- Assuring that consumer co-pays are affordable
- Assuring that energy efficiency results are high quality
- Guaranteeing a high “ROI” from energy efficiency work
- Involving more contractors in the state’s system
- Recruiting, training and retaining a high quality workforce

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# Contact Us!



*For more information about the NECEC energy efficiency workforce needs project, contact:*

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