

Manufacturing Climate Solutions

Carbon-Reducing Technologies and U.S. Jobs

CHAPTER 10

Residential Re-Insulation



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Summary

Over 46 million U.S. homes are underinsulated, meaning that proper air sealing and insulation could reduce heating and cooling costs as much as 20% through increased residential energy efficiency. Insulating and air sealing two million homes over the next two years, the target set by the Obama administration, has the potential to reduce carbon dioxide emissions by more than 20 billion pounds annually (or 10,140 pounds per household).

Insulating homes also benefits U.S. employment. Most jobs related to the material supply, manufacturing, distribution, and installation of U.S. residential insulation are located in the United States. Increased demand for insulation has a direct impact on insulation manufacturing workers, distributor networks, and installers needed throughout the country. The 2009 American Recovery and Reinvestment Act investments in the Weatherization Assistance Program (WAP), a federal program to improve energy efficiency in low-income households, anticipates creating over 100,000 new jobs in the WAP network, which includes administrators, auditors, installers, and training professionals. Additional positive employment impacts also may be experienced upstream in the value chain in distribution, manufacturing and material supply. This report will illustrate the residential insulation value chain and highlight opportunities within the industry whereby increasing residential energy efficiency can concurrently increase U.S. job opportunities.

Introduction

Air sealing and adding insulation to an existing home is a cost-effective and quick way to improve a home's energy efficiency and save money on heating and cooling costs (U.S. Department of Energy, 2009c). Residential energy use accounted for more than 21% of all U.S. energy consumption in 2007 (Energy Information Administration, 2008b). Space heating consumes the most residential energy (26%); together, space heating and cooling systems account for approximately 37% of residential energy use (Energy Information Administration, 2008a).

The U.S. Environmental Protection Agency estimates air sealing and insulating attics, floors over crawl spaces, and basement rim joints can reduce home heating and cooling costs up to 20% (ENERGY STAR, 2009b). Approximately 46 million homes in the United States are underinsulated (Levy, Nishioka, & Spengler, 2003), or lack sufficient insulation and air sealing to achieve the greatest potential energy efficiency for their home heating and cooling systems. Improving household energy efficiency through air sealing and greater home insulation has the potential to reduce carbon dioxide emissions annually by 10,140 pounds per household (Consumers Union of the United States, 2008; King, 2009)

Residential Insulation

Home insulation reduces the flow of heat between temperature-controlled areas of the home and the outdoor environment, thus reducing heating and cooling needs. Heat naturally flows from warmer areas to cooler areas. Without insulation, heat flows out of the home in the winter and into the home from outdoors during the summer. There are many different types of insulation including blankets, blow-in or loose-fill, spray foam, rigid foam insulation, and reflective insulation (Oak Ridge National Laboratory, 2008) Insulation is composed of a variety of materials including fiberglass, cellulose, rock wool, plastic foams, films and aluminum.

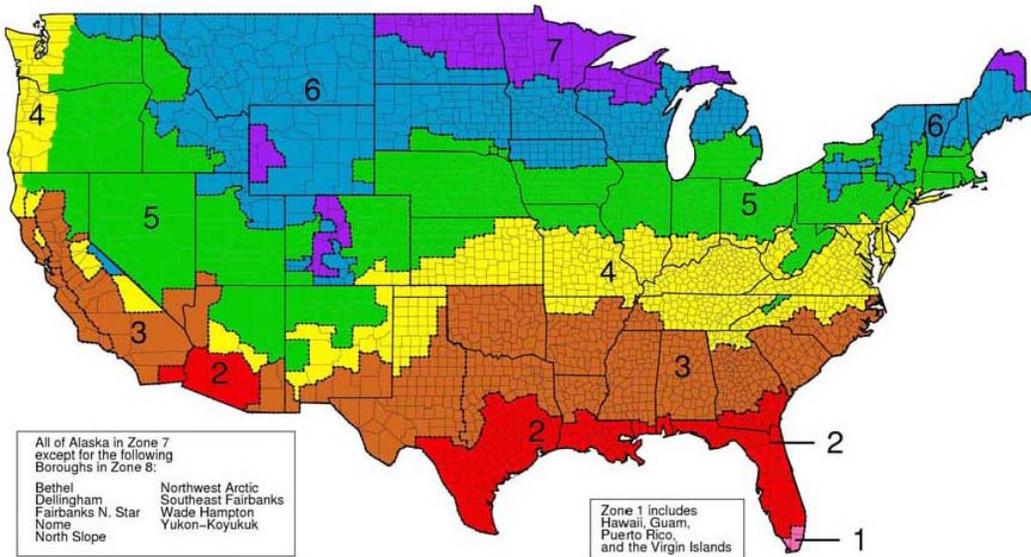
The type of insulation most appropriate for a home varies based on a number of factors including whether or not it is being installed in an existing home or new construction, which area of the home is being insulated (e.g., attic, walls, floors), installed cost and the surrounding climate. This report will focus on insulating existing homes, termed re-insulation.

The U.S. Environmental Protection Agency's ENERGY STAR program notes that the full value and benefit of residential insulation cannot be achieved without also air sealing a home. Air sealing limits air penetration in a home by sealing holes and cracks that allow heat to leave and enter the home. A blower door test can be used to identify areas of the home in need of air sealing and evaluate the effectiveness of air sealing and insulation installation services.

Map 1 illustrates the U.S. Department of Energy's (DOE) insulation recommendations by climate zone and Table 2 indicates the R-value recommended for each climate zone based on where in the home insulation is to be installed. The R-value is the thermal value or energy saving potential of the insulation and higher R-values achieve greater energy savings. The DOE recommendations are based on the most cost effective insulation for each climate.

Within existing homes, the attic is the most cost-effective place to improve a home's energy efficiency. A crawl space below the floor of a home is another cost-effective location for additional insulation if it is dry. The walls of a home also offer an opportunity to increase energy efficiency; however the cost is higher because it requires removing siding, drilling and patching holes in existing walls, and replacing siding.

Map 1. Insulation Recommendation for Existing Wood-Framed Houses



Source: (Oak Ridge National Laboratory, 2008)

Table 1. Insulation Recommendations for Existing Wood-Framed Houses

Zone	Add Insulation to Attic		Floor
	Uninsulated Attic	Existing 3-4 Inches of Insulation	
1	R30 to R49	R25 to R30	R13
2	R30 to R60	R25 to R38	R13 to R19
3	R30 to R60	R25 to R38	R19 to R25
4	R38 to R60	R38	R25 to R30
5 to 8	R49 to R60	R38 to R49	R25 to R30

Wall Insulation: Whenever exterior siding is removed on

a) An uninsulated wood-frame wall:

- Drill holes in the sheathing and blow insulation into the empty wall cavity before installing the new siding, and
- Zones 3-4: Add R5 insulative wall sheathing beneath the new siding.
- Zones 5-8: Add R5 to R6 insulative wall sheathing beneath the new siding.

b) Insulated wood-frame wall:

- For Zones 4 to 8: Add R5 insulative sheathing before installing the new siding.

Source: (Oak Ridge National Laboratory, 2008)

U.S. Residential Insulation Market

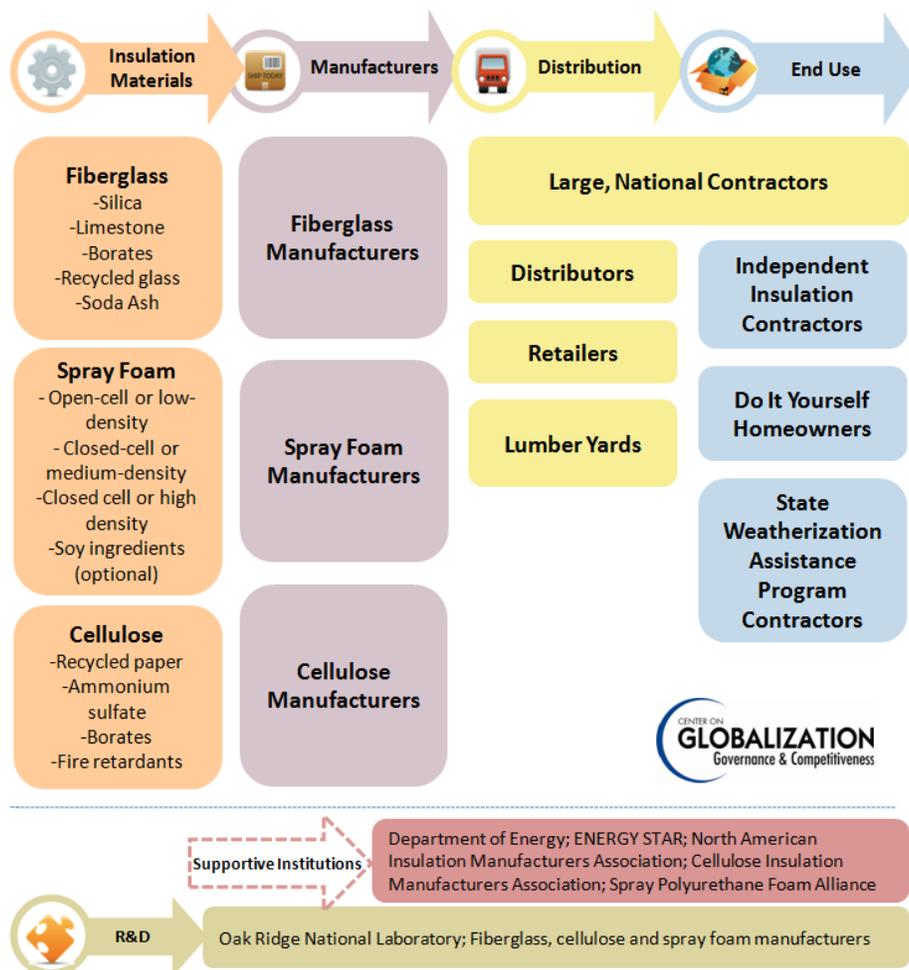
Within the larger U.S. residential insulation market, including both new construction and re-insulation, fiberglass insulation accounts for 52% of national insulation demand (The Freedonia Group, 2008). Foamed plastic insulation materials account for another 43% of the market and the remaining insulation materials, including cellulose, rock wool and slag wool, account for 5%.

Attic re-insulation, the most common re-insulation project, accounts for 18.5% of the total insulation market (The Freedonia Group, 2008). Fiberglass dominates this sector of the market; 95% of attic re-insulation (based on square footage) uses fiberglass products. Cellulose accounts for 3% of the market and spray foam is less than 1%. Advantages of fiberglass include the lighter weight by comparison to cellulose and less dust when it is blown in (Flowers, 2009). Furthermore, the fiberglass industry is more developed than the other two industries, has a more extensive network of distributors and contractors, and is more widely recognized by consumers.

Value Chain

The residential re-insulation value chain incorporates four main stages: materials, manufacturers, distribution, and end use (See Figure 1). A detailed value chain including companies and organizations participating in the industry appears at the end of this report. The vast majority of companies at all stages of the value chain are located within the United States. Thus, increasing opportunities for re-insulating U.S. homes will have a positive impact on U.S. jobs at each stage of the value chain.

Figure 1. Simplified Residential Re-Insulation Value Chain



Materials & Material Suppliers

The U.S. re-insulation industry relies largely on domestic suppliers for fiberglass materials and on cellulose and spray foam material providers to a lesser extent. The principal materials for fiberglass by percent content are silica sand (40%), recycled glass (40%), also known as cullet, and soda ash (10%) (Penner, 2009). Other additives, such as limestone, calcined alumina, borax, feldspar, nepheline syenite, magnesite and kaolin clay, may be included. The United States is the largest silica sand supplier in the world. Illinois, Texas, Wisconsin, Oklahoma, Minnesota, North Carolina and Michigan represent 63% of domestic silica sand supply. Top suppliers of silica sand are Unimin Co. (New Canaan, CT), US Silica Co. (Berkeley Springs, WV) and Oglebay Norton Industrial Sands, Inc. (Cleveland, OH) (U.S. Geological Survey, 2004). The United States is also the world's leading soda ash supplier. The world's largest soda ash deposits are located in the Green River Basin of Wyoming and Searles Lake and Owens Lake in California. The top five U.S. suppliers are listed in Table 2 (U.S. Geological Survey, 2009).

In the past 10 years, 9.5 billion pounds of recycled glass have been used in fiberglass manufacturing (NAIMA, 2005). Recycled glass is generally sold by small suppliers. The two major recycled glass suppliers in the United States are Strategic Materials and Dlubak Glass Company. Strategic Materials (Houston, TX), the largest U.S. recycled glass supplier, has 33 branches across the country and Dlubak Glass Company (Upper Sandusky, OH) has five U.S. branches. Both companies buy the waste glass from automobiles, industrial windows and post-consumer glass (Strategic Materials, 2002). Dlubak Glass Company also recycles glass from cathode ray tubes, televisions, and computer monitors (Dlubak Glass Company, 2009). Strategic Materials mainly recycles glass waste collected from within 150 miles of its plants (Goertz, 2009).

Table 2. Top Suppliers of Fiberglass Insulation Materials

Material	Company Name	Headquarters City, State	Total Company Sales * (USD mil)	Employees*
Silica sand	Badger Mining Corp.	Berlin, WI	\$70.0	180
Silica sand	B.V. Hedrick Gravel and Sand Co.	Salisbury, NC	NA	400
Silica sand	Fairmount Minerals	Chardon, OH	\$380.0	296
Silica sand	J.R. Simplot Company	Boise, ID	\$4,500.0	9,970
Silica sand	Manley Bros. of Indiana, Inc.	Troy Grove, IL	NA	NA
Silica sand	Oglebay Norton Industrial Sands, Inc. (Colorado Silica Sand)	Cleveland, OH	\$22.6	226
Silica sand	Short Mountain Silica Co. (Little Six Corp.)	Mooreburg, TN	\$4.5	25
Silica sand	Unimin Corp.	New Canaan, CT	\$340.0	3,400
Silica sand	U.S. Silica Co	Berkeley Springs, WV	\$1,738.9	51,812
Soda Ash	FMC Corporation	Philadelphia, PA	\$3,115.3	5,000
Soda Ash	General Chemical (Soda Ash)	East Hanover, NJ	\$300.0	734

Table 2. Top Suppliers of Fiberglass Insulation Materials

Material	Company Name	Headquarters City, State	Total Company Sales * (USD mil)	Employees*
	Partners			
Soda Ash	OCI Chemical Corporation	Marietta, GA	\$154.8	550
Soda Ash	Solvay Chemicals, Inc.	Houston, TX	\$ 453.1	977
Soda Ash	Searles Valley Minerals	Overland Park, KS	\$585.4	4,500
Recycled glass (cullet)	Dlubak Glass Company	Upper Sandusky, OH	\$1.7	16
Recycled glass (cullet)	Strategic Materials	Houston, TX	\$2.5	16

Source: CGGC, based on company websites, Dun & Bradstreet and industry interviews.

* Product-specific sales and employee numbers are not available for all companies; thus, the numbers listed are total sales and employees which include all products and divisions.

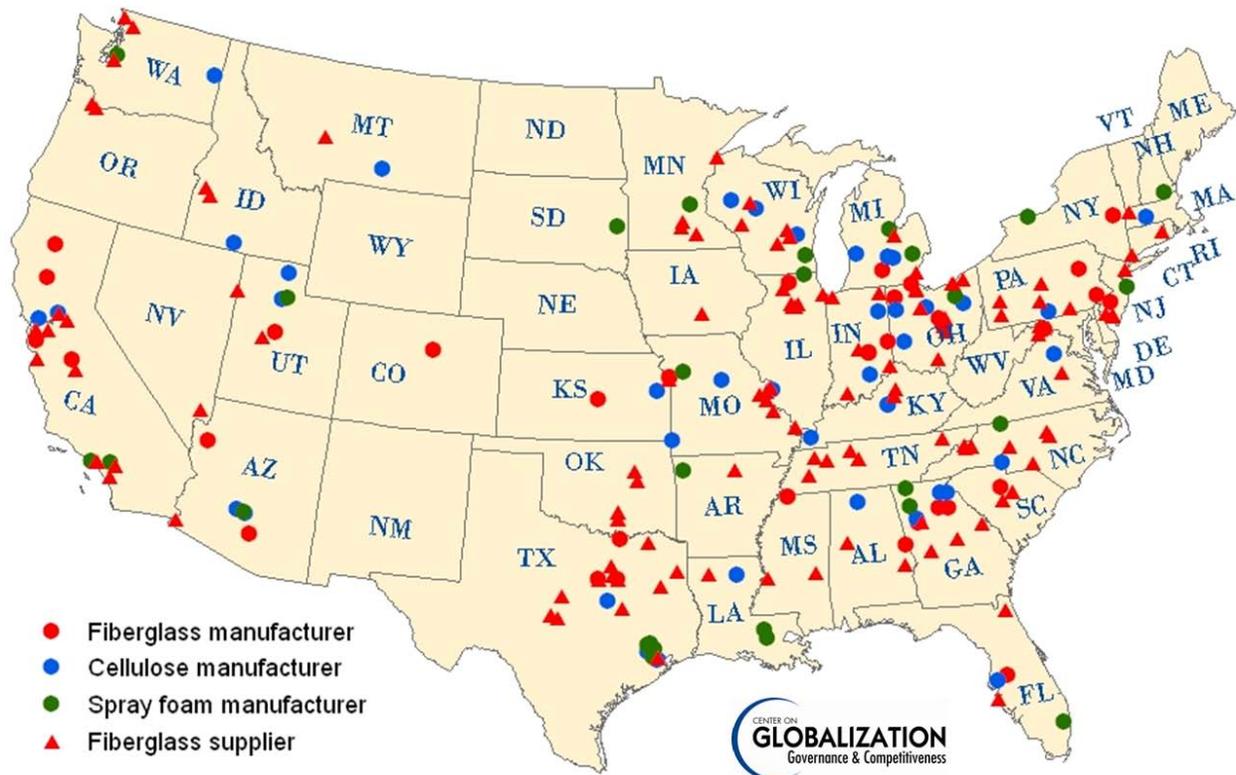
Cellulose insulation is 80% recycled newspaper by weight and 20% fire resistance additives such as borate and, in some cases, ammonium sulfate (U.S. Department of Energy, 2009b). There are many types of recycled paper suppliers, including municipal organizations, private organizations and voluntary collecting routes from local communities. Cellulose insulation manufacturers purchase old newspapers from private retailers and they also collect them from paper drop boxes at local schools, universities, and retail stores near cellulose insulation manufacturing plants. There are large numbers of small recycled paper retailers in the United States, such as Waste Management (Lombard, IL), which sort and mill old papers for recycling (Waste Management, 2008). The fire resistance additive borate is available from a limited number of U.S. suppliers, the largest of which is Rio Tinto Borax, formerly US Borax and now a member of the Rio Tinto group, headquartered in Englewood, Colorado. American Borate Company (Virginia Beach, VA), National BoraXX Corporation (Cleveland, OH) and Pacific Coast Mines Inc. (Valencia, CA) are other borate suppliers.

Spray polyurethane foam (SPF) is principally made on the jobsite from an atomized mixture of petroleum-based chemicals. The two principle chemicals used are the A-side, commonly known as isocyanates (MDI), and the B-side which consists of a proprietary blend of polyols, fire retardants, catalyzsts, surfactants and blowing agents. This mixture expands many times its size to become a solid material (Spray Polyurethane Foam Alliance, 2009). The foam characterization, including density and hardness, depends on the B-side chemical's formulation. There are 18 to 20 major formulators of the B-side material in the United States, and all A-side MDI come from four major chemical companies: Dow Chemical Company, Bay Systems (Bayer), BASF Polyurethane Foam Enterprises LLC, and Huntsman Corporation. Most of the raw materials for SPF originate in oil producing states like Louisiana and Texas. In many cases, the A-side and B-side chemical suppliers also are the dominant spray foam manufacturers, called formulators.

Manufacturers

The majority of U.S. insulation production is domestic. Map 2 illustrates the geographic distribution of U.S. material suppliers and manufacturers for the residential insulation industry, including fiberglass, cellulose, and spray foam.

Map 2. Geographic Distribution of U.S. Residential Insulation Industry Material Suppliers and Manufacturers



Fiberglass

Fiberglass is generally inexpensive, durable, fire-resistant and has good sound absorption. Within the fiberglass insulation market, three major companies dominate sales: Owens Corning (Toledo, OH), Certain Teed (Valley Forge, PA) and Johns Manville (Denver, CO). Together, these companies account for approximately 80% of the U.S. fiberglass insulation market (Deitz, 2009). In total, the six top residential fiberglass insulation manufacturers have 32 residential fiberglass insulation manufacturing plants in the United States (see Table 3). The top four companies are also international companies serving markets across the globe.

Table 3. U.S. Residential Fiberglass Insulation Manufacturers

Company	Headquarters City, State	Total Company Sales* (USD mil)	Employees*	Manufacturing Locations
Owens Corning	Toledo, OH	\$5,244.0	3,675	9 locations (AZ, CA, GA, KS, NY, OH, TX, UT)
Johns Manville	Denver, CO	\$1,178.3	2,776	8 locations (CA, CO, GA, IN, KS, NJ, OH TX)
CertainTeed Corp.	Valley Forge, PA	\$2,642.3	2,200	5 locations (CA, GA, KS, PA, TX)
Knauf Insulation	Shelbyville, IN	\$206.3	775	3 locations (AL, CA, IN)
Guardian Fiberglass	Albion, MI	\$113.2	654	6 locations (MI, MS, WV, AZ, SC, WA)
FiberTEK Insulation, LLC	Lakeland, FL	\$20.7	205	- Nephi, UT

Source: CGGC, based on company websites, Dun & Bradstreet, company interviews, and industry sources.

* Insulation-specific sales and employee numbers are not available for all companies; thus, the numbers listed are total sales and employees which include all products and divisions.

Cellulose

Cellulose offers many benefits similar to fiberglass and is similarly priced. Cellulose also is viewed as more environmentally friendly because it is primarily composed of recycled paper (Kaufman & Health, 2009), and the embodied energy used to produce cellulose insulation is one-seventh that of fiberglass. The main application for blown-in cellulose is residential attic re-insulation. The largest cellulose insulation manufacturer is U.S. GreenFiber, headquartered in Charlotte, North Carolina. The company has 11 manufacturing facilities across the United States and its cellulose insulation products are composed of 85% recycled paper (James & Wyatt, 2003). Other cellulose market leaders include Applegate Insulation, Cell Pak Inc., Regal Industries and Nu-Wool Company (Davis, 2009; Reportlinker.com, 2008).

Table 4. Cellulose Insulation Manufactures

Company	Headquarters City, State	Total Company Sales (USD mil)	Employees	Branch Locations
Advanced Fiber Technology	Bucyrus, OH	\$5.0	13	
All Weather Insulation	Springfield, KY	NA	NA	
Applegate Insulation	Webberville, MI	\$4.9	89	GA, LA, KY, MI, PA, WI
Champion Insulation, Inc.	Fond Du Lac, WI	NA	NA	
Cell Pak, Inc.	Decatur, AL	NA	93	- Springfield, KY - Columbia, MO

Table 4. Cellulose Insulation Manufactures

Company	Headquarters City, State	Total Company Sales (USD mil)	Employees	Branch Locations
Central Fiber Corp.	Wellsville, KS	\$9.0	60	- Canton, OH
Energy Control Insulation.	Ossian, NJ	\$8.7	25	
Fiberlite Technologies, Inc.	Joplin, MO	\$10.0	11	
Hamilton Manufacturing	Twin Falls, ID	\$3.0	18	
International Cellulose Corp.	Houston, TX	NA	40	
Mason City Recycling Center	Mason City, IA	\$3.6	37	
Modern Insulation	Spencer, WI	NA	NA	
Mountain Fiber Insulation	Hyrum, UT	\$7.2	44	
National Fiber	Belchertown, MA	\$4.2	25	
Nu-Wool Company	Jenison, MI	\$16.8	68	
Regal Industries	Crothersville, IN	\$4.6	100	
Tascon Industries, Inc.	Houston, TX	\$4.9	50	
Thermoguard Insulation Co., LLC.	Spokane, WA	NA	35	- Billings, MT
Thermo-Kool of Alaska	Anchorage, AK	NA	NA	
United Fiber	Chandler, AZ	\$3.0	12	
US GreenFiber, LLC.	Charlotte, NC	\$182.8	40	AZ, CA, FL, GA, IL, OH, TX, UT, VA

Source: Source: CGGC, based on company websites, Cellulose Insulation Manufacturers Association, Dun & Bradstreet, and company interviews.

Spray Polyurethane Foam

Spray polyurethane foam (SPF) provides high R-values and also seals as it insulates. Closed-cell foams are important vapor retardants for moisture control, they are resistant to water, and they add structural strength. The installed cost of SPF is about three times higher than cellulose and fiberglass (Duncan, 2009). In 2006, estimated production of U.S. residential SPF wall insulation was 55 million pounds of SPF, with a density of 0.5 - 0.75 pounds per cubic foot (pcf), and 20 million pounds of SPF with a density of 1.5 - 2.0 pcf (Center for the Polyurethane Industry, 2007). Despite the economic downturn, The Center for the Polyurethane Industry expects data in an upcoming market survey report to reflect an increase in the amount of residential SPF produced between 2006 and 2008 (Candelori, 2009). There are two major applications of SPF: low-slope roofing (generally on commercial buildings) and perimeter surfaces of walls, floors, and underneath the roof deck of buildings. For residential insulation, both open-cell (low-density) and closed-cell (middle density) SPF's are used. The open-cell foam has a density of about 0.5 pcf, and has an R-value performance of about 3.6 per inch, similar to that of fiberglass (Duncan, 2009). Closed cell foam generally has higher density (1.75-2.25 pcf) and an R-value almost twice that of open cell foam (more than 6.0 per inch) (Fuzzy's Foam Insulation, 2004).

Manufacturers of spray foam are called formulators because their major function is developing a chemical formula for spray foam. There are many more B-side chemical formulators because the B-side chemical formulation can be changed to better serve different climates or for other specific applications. Table 5 lists the spray foam insulation formulators serving the U.S. market.

Table 5. Spray Foam Insulation Formulators

Company	Headquarters City, State	Total Company Sales (USD mil)	Employees	Branch Locations
Arnette Ltd., Inc.	Richmond, MO	\$1.7	26	
BASF Polyurethane Foam Enterprises, LLC	Minneapolis, MN	\$19.7	45	- Houston, TX
BaySystems North America, LLC	Spring, TX	\$52.0	17	
BioBased Insulation	Fayetteville, AR	\$9.0	17	
Burtin Polymer Laboratories, Inc.	Cartersville, GA	\$1.5	14	
CertainTeed Corp.	Valley Forge, PA	\$2,642.3*	500*	
Demilec LLC	Arlington, TX	NA	NA	
Fomo Products, Inc.	Barberton, OH	\$8.7	58	
Gaco Western	Seattle, WA	NA	30	- Rochester, NY
Huntsman Corporation	Salt Lake City, UT	\$10,215.0*	12,900*	5 branch locations (IL, LA, MI, NH, TX)
Icynene	Canada	\$100.0	100	
LaPolla Industries, Inc.	Houston, TX	\$31.8	NA	- Tempe, AZ
NCFI Polyurethanes	Mount Airy, NC	NA	NA	4 manufacturing locations (NC, GA, UT)
Polyfoam Products, Inc.	Tomball, TX	NA	NA	- Coral Springs, FL
Henry Company / Resin Technology Company	El Segundo, CA	\$14.6	560	- Ontario, CA
The Dow Chemical Company	Midland, MI	\$57,514.0*	46,102*	- Dalton, GA
Urethane Soy Systems Company	Volga, SD	NA	NA	

Source: CGGC, based on company websites, Spray Polyurethane Foam Alliance, and Dun & Bradstreet.

* Spray polyurethane foam products are not a large percentage of the company's product mix, thus, publicly available sales and employee figures overstate the company's importance to the SPF industry.

Distribution

Fiberglass, cellulose and spray foam insulation products are distributed through a variety of pathways, which may include direct sales to large contractors, distributor networks, large retailers, and lumber yards. Some of the major distributors include Blue Linx (Atlanta, GA), Boise Cascade (Boise, ID), IDI Distributors (Eden Prairie, MN), and Service Partners Supply (Glen Allen, VA). Table 6 includes an expanded list of distributors and their branch locations.

Table 6. Illustrative U.S. Insulation Distributors

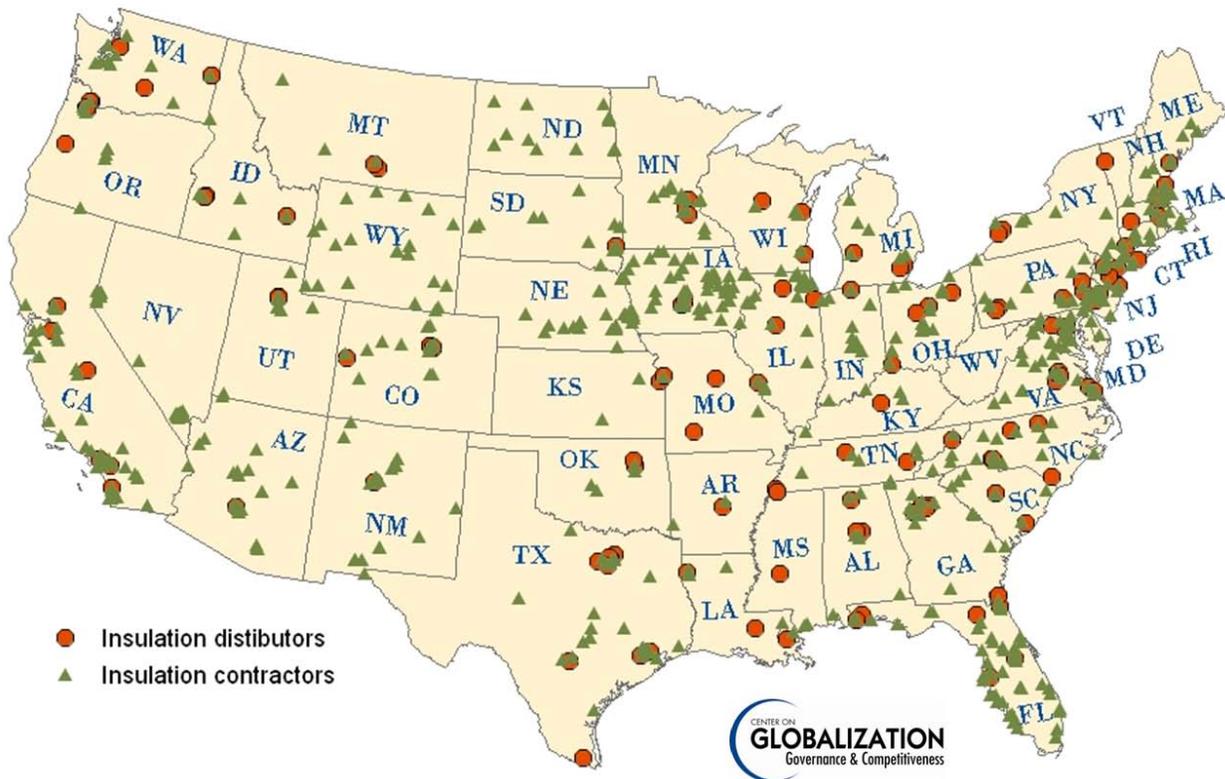
Company	Headquarters City, State	Total Company Sales* (USD mil)	Employees*	Branch Locations
Aeroflex USA, Inc.	Sweetwater, TN	\$18.0	15	
Allied Insulation Supply Co.	Milwaukee, WI	\$13.0	48	3 branch locations (IA, NE, WI)
Atlantech Distribution, Inc.	Charlotte, NC	\$17.8	7	7 branch locations (FL, MD, NJ, SC, VA)
Bay Industries, Inc.	Brookfield, WI	\$19.6	45	
BlueLinx	Atlanta, GA	\$3,833.9	800	52 branch locations (AL, AR, CA, CO, CT, FL, GA, IA, ID, IN, KY, LA, MA, MD, MI, MO, NC, NJ, NY, OR, PA, SC, TN, TX)
Boise Cascade	Boise, ID	\$5,413.5	500	32 branch locations (AZ, CA, CO, FL, GA, ID, IL, MA, MD, MI, MN, MT, NC, NH, NM, NJ, OH, OK, OR, TN, TX, UT, WA)
C S Behler Inc	Lancaster, NY	\$35.0	8	
Central States Insulation Supply, Inc.	Blaine, MN	\$7.0	7	
Cold Storage Industries, Inc.	Midlothian, VA	\$30.0	3	
Hart & Cooley, Inc.	Grand Rapids, MI	\$21.8	50	- Sanger, CA
IDI Distributors, Inc.	Eden Prairie, MN	\$59.0	100	23 branch locations (AL, AZ, CA, FL, GA, IL, KS, LA, MA, MN, MO, OH, OK, PA, TX, VA, WI)
Insulating Products, Inc.	Plano, TX	\$2.6	6	
Insulation Solutions, Inc	East Peoria, IL	\$2.2	17	
J&S Supply Corp	Long Island City, NY	\$7.9	32	
Moore Products, LLC	Suwanee, GA	NA	NA	5 branch locations (IA, NJ, OH, TX, VA)
River City Materials Inc	Little Rock, AR	\$19.7	30	5 branch locations (CO, IL, MS, TN, WI)
Service Partners, LLC	Glen Allen, VA	\$500	50	10 branch locations (AL, KY, MO, MT, PA, OR, WA)
Shook & Fletcher Insulation Co	Birmingham, AL	\$36.3	12	4 branch locations (AL, GA, TN)
TD Supply, Inc	Carrollton, TX	\$35.6	225	

Source: CGGC, based on company websites, Dun & Bradstreet, company interviews, and Insulation Contractors Association of America.

* Product-specific sales and employee numbers are not available for all companies; thus, the numbers listed are total sales and employees which include all products and divisions.

The three largest contractors within the fiberglass market are MASCO Contractor Services, United Subcontractors, Inc. (USI) and Installed Building Products (IBP). These contractor groups have a combined total of over 300 locations throughout the United States. Other avenues through which insulation materials are sold include lumber yards and retail sellers like Home Depot, Lowes and Menards. Map 3 illustrates the U.S. footprint of the three largest fiberglass contractors, members of the Insulation Contractors Association of America, and the insulation distributors and branch locations included in Table 6.

Map 3. Illustrative U.S. Insulation Distributors and Contractors*



**Note: This map includes the largest U.S. distributor and contractor network members, independent contractors who are members of the Insulation Contractors Association of America, and a limited portion of unaffiliated independent contractors. As such, it reflects only a portion of U.S. insulation distributors and contractors.*

Federal Funds for Residential Re-Insulation

Currently, there are a number of federally-funded programs available to stimulate the residential re-insulation market. These include, but are not limited to, the Weatherization Assistance Program, insulation tax credits for homeowners, ENERGY STAR programs, and Energy Efficiency and Conservation Block Grants (EECBG). Most of these programs are receiving funding through 2010 by the 2009 American Recovery and Reinvestment Act. Other federal programs using federal money to focus broadly on energy efficiency improvements include the U.S. Department of Housing and Urban Development, and the U.S. military.

The Weatherization Assistance Program (WAP), founded in 1976, was created to help low-income households invest in home energy efficiency to reduce their energy costs and improve their overall health and environment (U.S. Department of Energy, 2009a). Air sealing and installing insulation are two of the typical improvements made to homes through the WAP. President Obama set a goal to weatherize 1 million homes per year during 2009 and 2010 through the WAP, funded by \$5 billion from the 2009 American Recovery and Reinvestment Act (ARRA). Funding is directed primarily through the Department of Energy and the Department of Health and Human Services via the Low Income Home Energy Assistance Program (LIHEAP) Block Grants. Households at or below 200% of the federal poverty line qualify for the WAP, with ARRA funding at \$6,500 per household, up from the former \$2,500. The WAP requires that work funded through the program be completed by trained professionals. Weatherization is estimated to save 30.5 million Btu each year with an average annual household savings of \$350 (Weatherization Assistance Program, 2009b).

For those who do not meet the WAP low-income qualifications, the 2009 ARRA instituted an insulation tax credit that enables homeowners to deduct 30% of the cost of insulation and air sealing products, purchased during 2009 and 2010, for their home up to \$1,500 (ENERGY STAR, 2009a). The credit is applicable only for products whose primary purpose is for insulation or air sealing and the tax credit cannot be applied to labor costs.

The Seal and Insulate with ENERGY STAR program is an ongoing program whose mission is to increase homeowner awareness of the energy saving impact of air sealing and insulation (ENERGY STAR, 2007). The Home Performance with ENERGY STAR (HPwES) program also is available to help middle- and upper-income families identify qualified home energy auditors who can determine the most cost-effective ways to improve energy efficiency in their homes. Currently, HPwES is running in 22 states. In partnership with ENERGY STAR, state-sponsored organizations develop programs to help homeowners decrease their energy use through changes such as adding insulation, air sealing, replacing heating or cooling systems, repairing ducts and replacing windows (ENERGY STAR, 2007)

Finally, the Energy Efficiency and Conservation Block Grants (EECBG) and the State Energy Program, also supported by the 2009 ARRA, allow states to finance weatherization or other residential home energy efficiency projects in their communities. The 2009 ARRA is providing \$3.2 million for the EECBG and \$3.1 million for the State Energy Program through the U.S. Department of Energy.

Employment Opportunities

Employment opportunities in the residential re-insulation industry are growing despite the housing downturn. Much of the growth in 2009 and 2010 will be in response to funding from the 2009 American Recovery and Reinvestment Act. According to the Bureau of Labor Statistics, in

2006 there were 32,000 insulation workers who worked on installing floor, ceiling, and wall insulation in the United States (Bureau of Labor Statistics, 2009). The states with the greatest number of insulation workers per capita in 2008 were Montana, Nebraska, Wyoming, Delaware, Idaho, Vermont, Utah, Alabama, Colorado, and Louisiana.

Weatherization Assistance Program Employment

The 2009 American Recovery and Reinvestment Act (ARRA) and supplemental funding proposed by President Bush in 2008 account for an unprecedented increase in support for weatherization. These funds will create demand for new workers in all levels of the weatherization market and will have a measurable impact on the re-insulation industry. According to the Weatherization Assistance Program (WAP) Economic Stimulus Expansion Plan, weatherizing 1,000,000 homes per year will require more than 68,000 part-time or full-time jobs in the WAP network, approximately 55,000 new positions since 2008 (Weatherization Assistance Program, 2009a). Table 7 highlights the types of positions and the WAP’s anticipated increase in jobs by type. The position expected to be the most difficult to fill is that of an energy auditor, which requires meeting strict competency requirements and completing six to eight months of formal training.

Table 7. Impact of ARRA Funds on the Weatherization Assistance Program Labor Force

	2008 Program Year	2009 Program Year with ARRA
Number of weatherized homes	150,000	1,000,000
Intake and eligibility workers	1,000	> 4,000
Energy auditors	1,000	3,000
Quality control inspectors	900	2,000
Weatherization crews and staff	2,150 crews 5,700 staff	14,285 crews 38,570 staff
Program management	2,580	5,000
Additional technical and administrative monitoring staff	-	650
Additional Weatherization trainers	-	700
New Weatherization training centers	-	50 to 60
Total labor force	13,330	68,205

Source: Weatherization Assistance Program Economic Stimulus Expansion Plan: Discussion Paper. <http://www.waptac.org/si.asp?id=1244>

The Indiana WAP offers a state-level illustration of the new job opportunities due to the 2009 ARRA; it expects to hire an additional 300 home energy auditors, a 400% increase from its current staff of approximately 60. Furthermore the Indiana WAP anticipates needing to train 2,000 new contractors to carry out home weatherization.

Senator Sherrod Brown from Ohio noted that the 2009 ARRA funds are expected to create 600 new jobs in the state as agencies look to hire more technicians to keep up with weatherization

demands (Gadd, 2009). Tom Calhoun, the housing programs manager of a non-profit, community program implementing weatherization in Ohio, says his organization already hired more than 100 new workers and expects to hire at least 100 more to keep up with demand as more funding becomes available from the Department of Energy (Gadd, 2009).

Material Supply and Insulation Manufacturing Employment

Insulation manufacturing and material suppliers also may be affected by increased funding for weatherization and demand for homeowner energy efficiency improvement projects. Dave Bell, the owner of Energy Control Insulation, a cellulose manufacturer from Indiana, says the company expects to hire between 10 and 12 new employees to keep up with the increased demand for their products as a result of the additional weatherization funding (Bell, 2009). Adding 10-12 new employees constitutes almost a 50% increase in staff for a company that only reports having 25 employees. For other contractors, consumer energy efficiency interests enable them to retain employees, rather than lay them off as they anticipated needing to do in the current economic climate.

Weatherization Assistance Program funds may not impact all manufacturers equally. In interviews, fiberglass manufacturers anticipated little, if any, increase in demand for their products as a result of federal funding for weatherization. By contrast, cellulose manufacturers and contractors expected significant impacts on demand for cellulose products and installation projects. Fiberglass manufacturers do foresee some increase in demand for their products as the weather becomes colder and more households consider the value of insulation and savings from the 2009 ARRA insulation tax credit. Manufacturers have found in the past that clear and easily understood government incentives associated with tax credits and energy efficiency have favorably impacted their products. Therefore, some fiberglass manufacturers are working closely with distributors to market products that would qualify for the federal insulation tax credit.

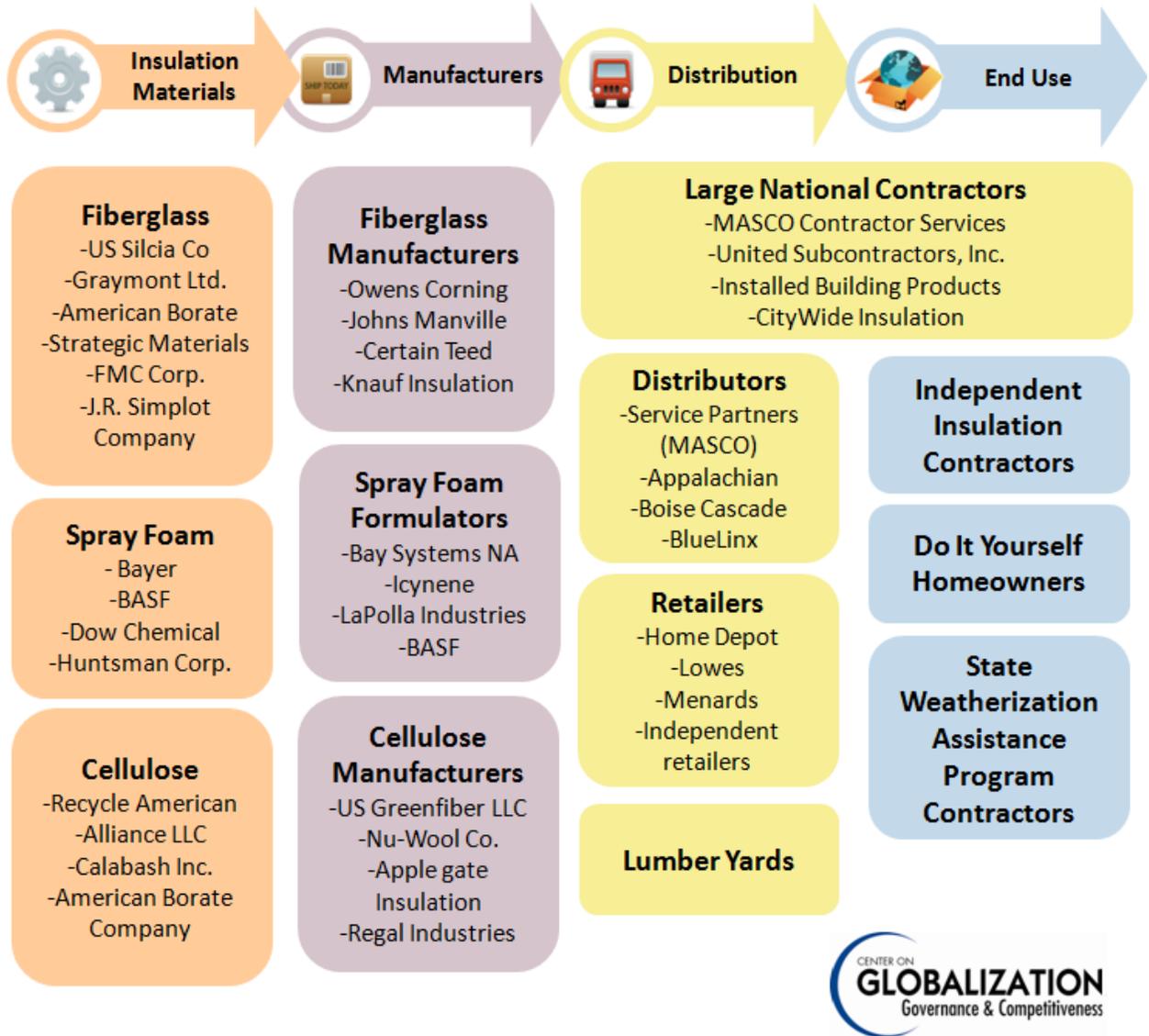
Distributor & Contractor Employment

Employment opportunities in distributor and contractor networks will vary based on involvement in the Weatherization Assistance Program and homeowner demand for insulation products. For those contractors that are closely involved, the WAP has the potential to increase revenue as much as 30%. Some contractors indicated with satisfaction that despite the current economic downturn they were able to keep or increase the number of insulation workers they employed. Other contractors note that federal programs such as the 2009 ARRA insulation and air sealing tax credit effectively stimulate consumer demand for insulation and air sealing products. Thus, they expect to see an impact even after government funding is gone in two years because of increased consumer awareness of the financial savings from re-insulation and air sealing.

Conclusion

There are several federal programs providing short-term financial support to assist growth in the residential re-insulation market. The 2009 American Recovery and Reinvestment Act funding for the Weatherization Assistance Program (WAP) will have the largest impact through its efforts to weatherize 2,000,000 homes by the end of 2010. This initiative is estimated to reduce carbon dioxide emissions by 20 billion pounds annually and create 100,000 new WAP-related jobs. In addition, the ENERGY STAR insulation tax credit and the Home Performance with ENERGY STAR program will likely increase consumer awareness of and interest in air sealing and insulation. However, the target of weatherizing two million homes is still less than 5% of the potential market of underinsulated homes. There is significant room to grow the re-insulation market and it would benefit from additional incentives to increase consumer interest in improving home energy efficiency. Future increases in energy prices have the potential to further spur demand for this industry if households become more aware of home energy costs. All of these factors will impact the demand for jobs across the residential insulation value chain, including among material suppliers, manufacturers, distributors, and contractors, most of which are located in the United States.

Figure 2. Residential Re-Insulation Value Chain, with Illustrative Companies



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