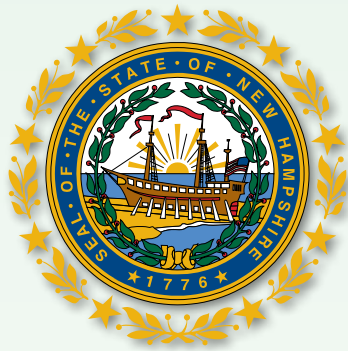


Green Economy

The current status of green jobs in New Hampshire



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Green Jobs in an Emerging Green Economy

“Green” is the current buzz word, much the same as “high tech” and “information technology” were in the 1990s. These days there are plenty of people using the terminology of “green,” from policy makers to marketing strategists, but there is currently no standard definition of what it actually means. At present, the definition is quite vague, making it possible to define almost any activity as “green” and thereby weakening the attempt to promote a specific “green” policy.

Whenever new concepts are introduced or old concepts are re-invented, it is hard to grasp what those concepts might entail, both currently and for the future. The lack of a standard to identify “green jobs” and “green industries” has been a major roadblock to measuring the green economy. A standardized coding system agreed upon by all stakeholders will be needed to capture some of these new trends.

In states such as California, Florida, Connecticut and Washington, extensive work has been done by workforce development agencies and universities, among others, to define green industries and green occupations. In New Hampshire, a first attempt to define and estimate the size of green industries in Rockingham County and New Hampshire was undertaken by researchers at the University of New Hampshire, funded by the Rockingham Economic Development Corporation.¹ In January 2009, *New Hampshire’s Green Economy and Industries: Current employment and future opportunities* was released. This study used the North American Industry Classification System (NAICS) to identify more than 50 relevant industries, and assigned a share of green-related employment, ranging from 10 to 100 percent, to each.² According to this study, there were 16,600 green jobs in New Hampshire in 2007.

With this synopsis we will begin framing a picture of the green economy in New Hampshire. To some extent, technology and innovation are the foundation of each green industry. At this point in time it is most useful to qualify the concept by describing what the green economy is comprised of and why those components are considered green. Whenever possible, New Hampshire statewide covered employment data classified by NAICS industry codes will be used to measure the existing level of employment for those industries



1. Gittell, Ross, Magnusson, Matt, and Shump, Matt, “New Hampshire’s Green Economy and Industries: Current Employment and Future Opportunities,” Whittemore School of Business, University of New Hampshire. <www.redc.com/ceds.htm>

2. The percentage allocations within specific industry codes were based on researcher judgment and not empirically driven. (Gittell, et. al., p. 11)

considered green. However, currently it is not possible to precisely quantify the green economy, because existing coding systems are not well-equipped to do so.

“Green Jobs” Legislation

The Green Jobs Act of 2007, Title X of the Energy Independence and Security Act of 2007, established “an energy efficiency and renewable energy worker training program.”³ The legislation outlines seven energy efficiency and renewable energy industries eligible to participate in the program:

- ✿ the energy-efficient building, construction, and retrofits industries;
- ✿ the renewable electric power industry;
- ✿ the energy efficient and advanced drivetrain vehicle industry;
- ✿ the biofuels industry;
- ✿ the deconstruction and materials use industries;
- ✿ the energy efficiency assessment industry serving the residential, commercial, or industrial sectors; and
- ✿ manufacturers that produce sustainable products using environmentally sustainable processes and materials.

This legislation provides the basis for all discussions and analysis of the green economy. The goals of the Green Jobs Act are to reduce the nation’s dependency on oil; provide a long term solution to the nation’s energy needs through renewable energy sources; promote job growth in the energy sector; and provide workers with necessary skills for renewable energy jobs.

State Legislation

In December 2007, the Governor issued Executive Order Number 2007-3, which established a Climate Change Policy Task Force and charged the Task Force with developing a Climate Action Plan for the State of New Hampshire. This action plan, released in March 2009, includes some discussion of business opportunities related to investing in our own state’s economy versus spending on energy imports. It also discusses related green job creation and economic growth through development of in-state renewable energy and green technology development.



3. Energy Independence and Security Act of 2007, Title X – Green Jobs, P.L. 110-140, H.R. 6, 110th Congress, Enacted December 19, 2007. <frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_public_laws&docid=f:publ140.110.pdf>

The Task Force was also charged with recommending voluntary, regulatory, and policy actions to assist in meeting the requirements of the Renewable Energy Act, the Clean Power Act, the Voluntary Greenhouse Gas Registry, the “25 x ’25” Renewable Energy Program, the EPA Energy Star Challenge, and the Regional Greenhouse Gas Initiative (RGGI).

Putting Legislation into Action

To help meet the goals of Green Jobs legislation, the US Employment and Training Administration (ETA) has developed *Green Jobs: A Workforce System Framework for Action*. The framework identifies foundational and operational elements needed to support the workforce system and its customers, promoting the development of new and existing green jobs and fostering widespread employment in green careers.⁴

One foundational element of the framework is *Transforming Industrial Sectors and Occupations*, which will be the focus of this attempt to identify green economic activity in New Hampshire. This element has been divided into two main categories: *Energy Generation, Efficiency, and Security* and *Environmental Protection*.



Energy Generation, Efficiency, and Security includes the following opportunities for workforce development:

- ✿ Renewable/Green Energy (wind, solar, geothermal and biomass)
- ✿ Sustainable Manufacturing
- ✿ Construction/Skilled Trades (also referred to as green construction and energy efficient retrofitting)
- ✿ Transportation

Environmental Protection includes these opportunities for workforce development:

- ✿ Government Oversight
- ✿ Water Management
- ✿ Materials and Waste Management

The next step is to identify the specific industries that might fall under each of these categories and examine prospects for employment in New Hampshire.

4. US Department of Labor, Employment and Training Administration, <www.doleta.gov/>. Accessed July 13, 2009.

Industries with potential Green Jobs in New Hampshire 2007 Annual Averages

NAICS Code	NAICS Title	Renewable/ Green Energy	Sustainable Manufacturing	Construction/ Skilled Trades	Transportation	Government Oversight	Water Management	Materials & Waste Management
11	Agriculture, Forestry, Fishing and Hunting		<i>1,751</i>					
111	Crop Production		<i>752</i>					
112	Animal Production		<i>371</i>					
113	Forestry and Logging		<i>452</i>					
22	Utilities	<i>2,779</i>						
221111	Hydroelectric Power Generation	<i>52</i>						
221119	Other Electric Power Generation	<i>139</i>						
2213	Water, sewage and other systems						155 - Private 210 - Local	
23	Construction			<i>27,478</i>				
236	Construction of Buildings			<i>6,813</i>				
237110	Water and sewer system construction (inc. Geothermal drilling)	See Water					833	
237130	Power and communication line and related structures constr. (inc wind/solar)	<i>492</i>						
238	Specialty Trade Contractors			<i>17,721</i>				
238221 238222	Plumbing, heating and air-conditioning contractors (inc. Solar heating system installation) Residential and Nonresidential	<i>4,200</i>						
33	Manufacturing		<i>77,762</i>					
42	Wholesale trade		<i>28,324</i>					
44-45	Retail trade		<i>97,697</i>					
4851	Urban Transit system				144			
4852	Interurban and Rural Bus Transportation				184			
4854	School and employee bus transportation				2,054			
4855	Charter Bus Industry				66			
4859	Other Transit and Ground Passenger Transportation				210			
541620	Environmental Consulting Services						503	
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)				804			
562	Waste management and remediation services							1,733 -Private 19 - Local
924	Administration of Environmental Programs					27 - Local 1,157 - State 342 - Federal		

Italics: Number represents total employment and not green jobs

Renewable/Green Energy

Employment Estimates

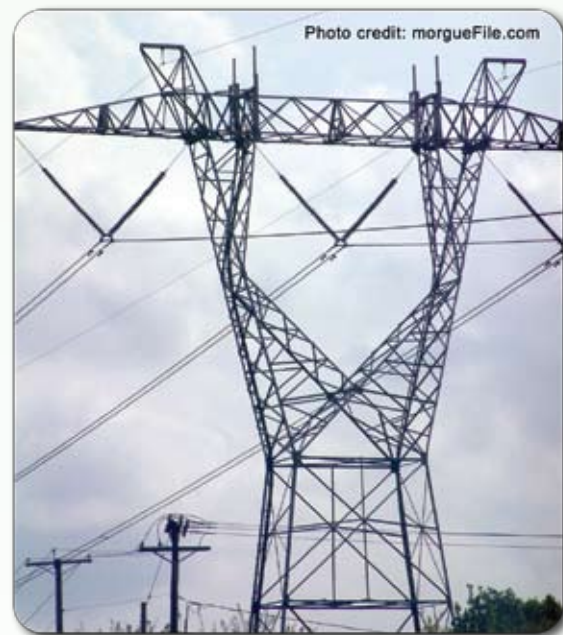
Within NAICS there are two existing codes defining the renewable/green energy industry. These are *Hydroelectric Power Generation* (NAICS 221111) and *Other Electric Power Generation* (NAICS 221119). The 2007 annual average covered employment for these two industries in New Hampshire was only 191, accounting for less than eight percent of the employment in *Electric power generation, transmission and distribution* (NAICS 2211).

Activities in New Hampshire

In 2007, New Hampshire enacted a Renewable Portfolio Standard (RPS) that requires each provider of electricity in the state to supply a specified minimum amount of customer load with electricity from eligible renewable energy sources such as hydro, wind, solar and biomass.⁵ New Hampshire's RPS requires state utilities to generate 25 percent of electricity from renewable resources by 2025. So despite the industry coding of the state's electric utilities in a classification that does not suggest "green energy," a portion of each utility company's power generation will come from renewable sources.

Under RPS regulations, utilities unable to comply with the mandated share of renewable energy may make alternative compliance payments into a Renewable Energy Fund.⁶

One of the RPS renewable energy initiatives to encourage renewable energy use is a rebate to homeowners who install small windmills and/or solar panels with a peak generation capacity of less than five kilowatts. The operation of the installed residential small renewable electricity systems must have started after July 1, 2008. The rebate is a one-time incentive payment of three dollars per watt of nominal generation capacity up to a maximum payment of \$6,000 or 50 percent of system costs, whichever is less.⁷ Rebates are paid out of the Renewable Energy Fund. The New Hampshire Public Utilities Commission is now processing rebate applications, having begun collecting alternative compliance payments from utilities in July 2009.



5. NH RSA 326-F Electric Renewable Portfolio Standard. <www.gencourt.state.nh.us/rsa/html/XXXIV/362-F/362-F-mrg.htm>

6. NH RSA 362-F:10 Renewable Energy Fund. <www.gencourt.state.nh.us/rsa/html/XXXIV/362-F/362-F-10.htm>

7. Ibid.

This is an example of how employment might be affected by renewable energy initiatives, as demand for licensed electricians and equipment installers or repairers able to install and interconnect a small residential renewable electricity system to the electric distribution system may increase in response to the availability of rebate funds.

In addition to RPS requirements, New Hampshire is a participant in the Regional Greenhouse Gas Initiative (RGGI). This initiative gives the state's power plants another incentive to invest in renewable energy sources.⁸ At this early stage in the implementation of new renewable energy initiatives, it is difficult to estimate the number of jobs – green or otherwise – that will be generated.

Wind

Employment Estimates

Construction of wind farms is captured under NAICS industry 237130 - *Power and communication line and related structures construction*. In New Hampshire, 2007 annual average employment in this industry was 492. As this industry includes construction of power lines and towers, power plants, and radio, television, and telecommunications transmitting/receiving towers, it is difficult to specify how many jobs in this industry are actually “green” jobs.

Activities in New Hampshire

In 2008, Lempster Mountain Wind Farm in Sullivan County was completed and began to operate at full capacity. This is an example of alternative energy projects called for under the New Hampshire Climate Action Plan. While under construction, the wind farm used a substantial amount of labor (up to 120 people). But the number of “green jobs” needed to operate such a facility is rather small – only three people work at the site for operations and maintenance.⁹ Despite the small number of jobs created from the operation of Lempster Mountain Wind Farm, this 24-megawatt installation will produce enough “green” electricity to power roughly 10,000 homes each year.¹⁰



8. New Hampshire Climate Change Policy Task Force, “New Hampshire Climate Action Plan,” NH Department of Environmental Services, page 4. Accessed March 2008. <des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm>

9. Brooks, Dave, “Lempster Mountain Wind Farm Producing Some Energy and Jobs,” Nashua Telegraph, May 5, 2009. Accessed July 27, 2009. <www.nashuatelegraph.com/apps/pbcs.dll/article?AID=/20090506/COLUMNISTS03/905069986>

10. Press Release, Iberdrola Renewables, “Governor Lynch, Senator Shaheen, Energy Leaders and Area Families Celebrate New Hampshire’s First Wind Farm at Dedication Event in Lempster,” June 19, 2009. Accessed July 27, 2009. <www.iberdrolarenewables.us/rel_09.06.19.html>

In July, the New Hampshire Site Evaluation Committee (SEC) approved a certificate for wind operation of a larger wind farm project (99-megawatt generation facility) in the northern part of the state. Attached to this approval was a long list of conditions, mainly related to concerns about the environmental and wildlife impacts of the project.¹¹ The placement of all bulk energy facilities and high voltage transmission lines must be approved by the New Hampshire SEC, which is led by the NH Department of Environmental Services. The next step for the project is to obtain a federal permit from the US Army Corps of Engineers.

Geothermal

Employment Estimates

Geothermal drilling is classified in NAICS 237110 - *Water and sewer line and related structures construction*. This NAICS classification includes construction of sewer and water mains, reservoirs, fire hydrant installation, storm drain construction, and irrigation system installation. In New Hampshire, 2007 annual average employment in *Water and sewer line and related structures construction* was 833. Because of the variety of business activity included in this category, it is not possible to estimate what portion of this industry's employment is related specifically to geothermal drilling.



Activities in New Hampshire

According to the *Requirements for Geothermal Systems in New Hampshire Environmental Fact Sheet* from the NH Department of Environmental Services, a geothermal heating and cooling system uses heat stored in the ground to heat or cool a building. Fluid is circulated through a trench or well, gathers heat from the earth, and then transfers the heat to the structure. Air blowers or hot water piping is used to distribute the heat throughout the structure. The process can be reversed to remove heat from the structure for cooling in warm weather.¹²

There are a few companies in New Hampshire providing services related to drilling and installation of geothermal heat for residential buildings. The cost of drilling and installation for geothermal heating and cooling is high, but the fact that continuing operating costs are little to none is an incentive, providing the potential for a substantial return on investment

11. Tracy, Paula, "Panel Gives OK to Coos County Wind Power," NH Union Leader, July 16, 2009. <www.unionleader.com/article.aspx?headline=Panel+gives+OK+to+Coos+County+wind+power&articleId=da6725f5-cbed-4383-adf1-d8d719c3874a>

12. NH Department of Environmental Services, Requirements for Geothermal Systems in New Hampshire, Environmental Fact Sheet WD-DWGB-22-23. Accessed July 17, 2009. <<http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-22-23.pdf>>

over time. In addition, some New Hampshire electric utilities offer rebates for homeowners who install geothermal heat pumps.¹³

Solar

Employment Estimates

Installation of solar heating equipment is classified under NAICS 238221 – *Residential plumbing, heating, and air-conditioning contractors* and NAICS 238221 - *Nonresidential plumbing, heating, and air-conditioning contractors*. Annual average employment in 2007 for New Hampshire in this industry group was 4,200. Construction of large-scale solar power structures is classified under NAICS 237130 – *Power and communication line and related structure construction*, as is construction of wind farms. There is insufficient information to determine the share of employment actually involved in installation or maintenance of solar heating or power equipment in either of these classifications.



Activities in New Hampshire

When fuel prices were rising at an unprecedented rate in the spring of 2008, many individual homeowners were considering investing in alternative methods of generating heat, such as solar or wood heating systems.

There are two major types of solar energy technology, photovoltaic and solar thermal. Photovoltaic systems convert sunlight directly to electricity by means of semiconductor materials. Solar thermal technologies collect the sun's energy by converting it to heat and storing it either in water or some other fluid, or in air.¹⁴

One success story related to solar water heating systems is the Plymouth Area Renewable Energy Initiative (PAREI), a membership organization whose participants work together, sharing labor and skills on renewable energy installations. Members who are provided assistance then provide the same kind of services to other members in turn.¹⁵ But while the Plymouth initiative is based on making installation of solar water heating affordable, it is not generating many green jobs.

13. New Hampshire Incentives/Policies for Renewables and Efficiency, Database of State Incentives for Renewables and Efficiency (DSIRE), Accessed July 17, 2009. <www.dsireusa.org/incentives/index.cfm?state=NH&re=1&ee=1&spv=0&st=0&srp=1>

14. US Department of Energy, Energy Efficiency and Renewable Energy, Solar Energy Technologies Program, "Solar FAQs – Photovoltaics – The Basics" <apps1.eere.energy.gov/solar/cfm/faqs/third_level.cfm/name=Photovoltaics/cat=The%20Basics>

15. Plymouth Area Renewable Energy Initiative (PAREI). Accessed April 20, 2009. <www.plymouthenergy.org>

The cost of labor is an inhibitor to renewable energy use at the residential level. It is likely that the installation cost in relation to fuel cost savings has yet to reach a tilting point, where it becomes worthwhile for the individual homeowner to invest in renewable energy sources. Census 2000 data show less than 200 occupied housing units in New Hampshire¹⁶ and less than 50,000 occupied housing units nationwide use solar energy as the primary source of heating fuel. States and territories with the highest number of occupied housing units using solar heating were Puerto Rico, California, and Hawaii.

As solar energy technologies become cheaper and more efficient over time and traditional fossil fuel costs become more expensive, an expansion of the use of solar energy for electricity generation has the potential for growth in New Hampshire. In June 2009, Public Service of New Hampshire began a project to install a 51,300-watt photovoltaic system on the roof of its corporate headquarters in Manchester's mill yard district. The energy generated will help meet the demand for power within the building. It is estimated that this solar energy system will provide the same amount of energy as is used in about seven average New Hampshire homes.¹⁷

Biomass

Employment Estimates

In 2007, annual average employment in NAICS 113 - *Forestry and logging* was 452. This industry is not, however, the sole source of biomass energy. Any organic material that can be burned and the energy gathered from that process is considered biomass. There are not any other specific NAICS codes related to the use of biomass as an energy source. Also, workers in *Forestry and logging* supply products for many purposes other than biomass energy. Therefore, a complete measure of employment in biomass energy is not currently possible.

Activities in New Hampshire

The National Renewable Energy Laboratory defines biomass energy or "bioenergy" as energy from plants and plant-derived materials. Wood is the largest biomass energy resource, but there are other sources of biomass such as food crops, grassy and woody plants, residues from



16. House heating fuel question was asked for occupied housing units. The data show the type of fuel used most to heat the house, apartment, or mobile home.

17. "PSNH Headquarters to host one of the largest solar arrays in NH." Press Release, Public Service of New Hampshire. Accessed June 17, 2009. <www.psnh.com/AboutPSNH/MediaCenter/PressReleases.asp>

agriculture or forestry, and the organic component of municipal and industrial wastes. Even the fumes from landfills (which are methane, a natural gas) can be used as a biomass energy source.¹⁸

Biomass energy is probably the most-used residential alternative energy source in New Hampshire at present. According to data from the 2000 Census, 4.3 percent of total occupied housing units in New Hampshire (20,226 housing units) used wood as the primary home heating fuel. The NH Department of Environmental Services estimates that up to 25 percent of New Hampshire homes use wood stoves as a primary or secondary source of heat. And although burning biomass does release carbon dioxide, a greenhouse gas, biomass crops capture nearly an equivalent amount of carbon dioxide through photosynthesis. Carbon dioxide emission can be reduced by proper operation of low-emission wood stoves and using good quality firewood.¹⁹

In addition to residential heating, biomass energy is being utilized at the commercial level. In 2006, Public Service Company of New Hampshire converted Schiller Station in Portsmouth from burning coal to burning wood chips and clean low-grade wood materials. The station produces the same amount of electricity, and has substantially reduced emissions.²⁰

Another example of biomass production is the manufacture of wood pellets, a “green” heat source. Wood pellets are manufactured from recycled wood waste and forest thinning byproducts, keeping tons of waste out of landfills. According to the Pellet Fuel Institute, there are 800,000 homes in the US using pellets as a heat source.²¹ In Barnstead, a former saw mill is being converted to wood pellet production, and owners hope to add wood boilers that have the potential to provide heat to town buildings.²²

Wood products are not the only source of biomass energy. In the spring of 2009, the University of New Hampshire began utilizing purified natural gas which will eventually provide up to 85 percent of electricity and heat needs for the campus. The source of the natural gas is through a 12.7 mile pipeline starting at a landfill in Rochester. Waste Management’s Turnkey Recycling and Environmental Enterprise (TREE) collects methane gas, a naturally occurring byproduct of landfill decomposition. The project, known

18. National Renewable Energy Laboratory, “Biomass Energy Basics.” <www.nrel.gov/learning/re_biomass.html> Accessed July 20, 2009.

19. NH Department of Environmental Services, “Clean-Burning Wood Stoves”, <http://des.nh.gov/organization/divisions/air/cb/ceps/npsap/wood_stoves.htm>.

20. Northern Wood Power at Schiller Station, Public Service Co. of NH, <www.psnh.com/Energy/EnergyProject/NWPP/faq.asp>. Accessed July 21, 2009.

21. Pellet Fuel Institute, “What Is Pellet Fuel?” <www.pelletheat.org/3/residential/index.html> Accessed July 21, 2009.

22. WMUR, “Stimulus Funds Could Help Barnstead Plant Create Power, Jobs,” July 13, 2009, <www.wmur.com/money/20041929/detail.html>

as EcoLine™, makes UNH the first university in the nation to use landfill gas as a primary fuel source. In addition to supplying natural gas to UNH, two generating plants at the landfill produce nine megawatts of electricity.²³

The manufacture of pulp and paper products has been part of New Hampshire history and economic activity for over 150 years. As that industry continues to decline, strategies for alternative uses of wood are being developed. Using wood as a renewable resource in the production of green energy is a part of the solution. According to the New Hampshire Climate Action Plan, 84 percent of land in New Hampshire is covered with forest.

Not only are forests a renewable energy resource, but they are also an important component in reducing the amount of carbon in the atmosphere, as trees and plants are able to absorb and store large amounts of carbon.²⁴ It is important that the state develop strategies for sustainable forestry. Preserving healthy working forests is a key strategy in the Climate Action Plan. By using responsible forestry management practices, forests can be harvested, regenerated and re-harvested within 15 to 20 years.

The Northern Forest Center, a non-profit organization working to create partnerships between stakeholders in upstate New York, northern Vermont, Maine, and New Hampshire, estimates that the Northern Forest spans 30 million acres across the four states. The entire region has felt the impact of recent economic change. The goals of the Northern Forest Center include creating knowledge and innovation, promoting sustainable forests and forest products, promoting heritage-based development, and improving education and community involvement.²⁵

As part of promoting sustainable forestry and forest products, the Northern Forest Center created a partnership with the Biomass Energy Resource Center (BERC) and the University of New Hampshire's Carsey Institute to explore the potential for woody biomass as a source of renewable and sustainable energy.²⁶ The biomass energy industry is also involved in



23. UNH Media Relations, "UNH Completes Nation's First Major University Landfill Gas-to-Energy Project." <unh.edu/news/cj_nr/2009/may/bp19ecoline.cfm> Accessed July 21, 2009.

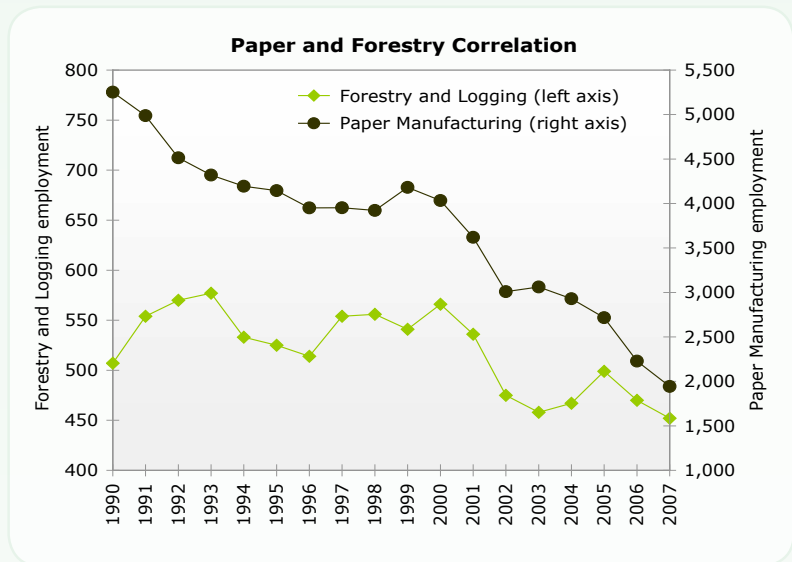
24. New Hampshire Climate Action Plan, NH Department of Environmental Services, March 2009. p. 6-7.

25. Northern Forest Center. <www.northernforest.org/index.shtml>. Accessed April 20, 2009.

26. Northern Forest Center. <www.northernforest.org/alternative-energy.shtml> Accessed April 20, 2009.

trying to promote additional possibilities for expansion of this industry in New Hampshire and the Northeast.

In 2008, spurred by the closure of the Wausau Paper Mill in Groveton, New Hampshire received a Regional Innovation Grant (RIG) from the US Department of Labor to “identify ways to diversify the North County Region economy through workforce development strategies.” The North County Region is defined as Carroll, Coös and Grafton Counties in New Hampshire; Oxford County in Maine; and Essex County in Vermont.



The RIG implementation plan included an outline for linking workforce development strategies with economic opportunities. One of these links was in the area of Forest Products/Alternative Energy. Potential strategies include:

- 1) Creating a sustainable wood and renewable materials industry career pathway, connecting K-12 and college/university training. The proposed program is tentatively titled the *North Country Renewable Energy Careers Initiative*.
- 2) Link the efforts of organizations such as the North Country RC&D (Resource Conservation and Development) and the Biomass Center to business/entrepreneurial opportunities in the region. The proposed program is tentatively titled *Green Entrepreneurs*.²⁷

All of these new strategies being developed to create a sustainable forest economy in the northern part of the state will generate green jobs and help communities increase their vitality.

27. Thomas P. Miller & Associates, “North Country RIG Regional Strategic Plan.” <rigs.workforce3one.org/view/2000909153536282503/info> p. 40.

Sustainable Manufacturing

Employment Estimates

The US Department of Commerce defines sustainable manufacturing as “creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers, and are economically sound.”²⁸

To identify manufacturing as a green business activity, it is important to examine the processes and materials used by individual firms as well as using the traditional definition that classifies industries by output. For example, NAICS coding for *Manufacturing* classifies business by industry outputs such as paper, food or clothing. In some cases, an individual firm may be defined as green despite the fact that the industry output is not. If a firm uses new environmentally-friendly processes and/or sustainable raw materials, such as recycled paper or organic crops, it could be defined as green.

Examples of product outputs from the manufacturing sector can currently be identified, such as solar heating systems manufacturing (NAICS 334413 – *Semiconductor and Related Device Manufacturing*) and wind turbines manufacturing (NAICS 333611 – *Turbine and Turbine Generator Set Units Manufacturing*²⁹). These NAICS industries include more products than the specific green industry product itself.

In New Hampshire, there were 77,762 workers employed in the *Manufacturing* industry sector in 2007. But at present, there is insufficient detail available to evaluate the full scope of sustainable manufacturing in New Hampshire.

The “green” output of sustainable manufacturing extends to wholesale and retail sales of energy efficient products and sustainable goods, as these products are outputs of sustainable manufacturing. Green or organic agricultural food production could also be included in the sustainable manufacturing analysis (NAICS 111 - *Crop production* and NAICS 112 - *Animal production*).



28. International Trade Commission, US Department of Commerce, “How the DOC Defines Sustainable Manufacturing.” <trade.gov/competitiveness/sustainablemanufacturing/how_doc_defines_SM.asp> Accessed July 17, 2009

29. This six-digit industry includes establishments primarily engaged in manufacturing turbines (except aircraft) and complete turbine generator set units, such as steam, hydraulic, gas, and wind.

Activities in New Hampshire

The lean business model is a method of eliminating waste, while delivering quality products on time at the least cost with greater efficiency. Sustainability meshes neatly with this model, as reduction of waste and pollution prevention is a natural result of lean processes.³⁰ In New Hampshire, application of the lean business model is supported by the efforts of the New Hampshire Manufacturing Extension Partnership (MEP). The NH MEP leverages public and private resources and services and makes them available to manufacturers throughout the state, with the ultimate goal of improving profitability and competitiveness by reducing waste, streamlining production processes, and improving customer satisfaction.³¹

For some manufacturers, adopting a lean business model is just the first step. The International Organization for Standardization (ISO) has established guidelines and requirements for environmental management systems. ISO 14001 certification provides assurance to management, employees, customers, suppliers, community, and regulatory agencies that the business is an environmentally responsible organization meeting a standard of conformity.³² In New Hampshire, there are between 50 and 60 registered ISO 14001 certified companies; the majority are manufacturers. For many companies, this standard is corporate policy, and for others, customer demand is the prime motivation. Companies with international customers — particularly the European Union and Japan — have found increasing demand for standard environmental practices. Many others have environmental management systems in place, but have not gone through the process of ISO certification.³³

Construction/Skilled Trades

Employment Estimates

Construction employment is classified in NAICS 23 – *Construction*. This industry sector has three sub-sectors: NAICS 236 – *Construction of buildings*; NAICS 237 – *Heavy and civil engineering construction*; and NAICS 238 – *Specialty trade contractors*. In New Hampshire, Specialty trade contractors had the highest 2007 annual average employment among these industries with 17,721. *Construction of buildings* employed an average of 6,813 in 2007, and *Heavy and civil engineering construction* employed an average of 2,945. Workers in any of these industries might be considered “green jobs,” depending on the specific technologies, materials, and processes used in job performance.

30. National Center for Environmental Innovation, US Environmental Protection Agency, Fact Sheet “Lean Manufacturing and the Environment,” <www.epa.gov/lean/performance/leanfactsheet.pdf>. Accessed July 23, 2009.

31. NH Manufacturing Extension Partnership, <www.nhmep.org/> Accessed July 23, 2009.

32. International Organization for Standardization, ISO 14000 Essentials, <www.iso.org/iso/iso_14000_essentials>. Accessed July 22, 2009.

33. Telephone conversation with Bob Minicucci, NH Pollution Prevention Program, NH Department of Environmental Services. July 22, 2009.

Activities in New Hampshire

In New Hampshire, 28.3 percent of the net energy consumed in 2006 was used for heat.³⁴ According to the New Hampshire Climate Action Plan, existing homes can be made anywhere from 15 to 60 percent more energy efficient by the use of improved air sealing, insulation, and equipment and the initial capital cost is offset by savings on the utility bill.³⁵ Therefore, weatherization or retrofit of existing homes is an easy way to decrease the carbon footprint. Weatherization is effective for both older and newer buildings, including historic structures.



Maximizing energy efficiency in buildings is one of ten strategies in the New Hampshire Climate Action Plan necessary to reduce New Hampshire's annual greenhouse gas emission. The goal is to maximize efficiency of both new construction and existing structures, and recommendations include residential, commercial, industrial and municipal buildings. An example of one action recommended by the Task Force is to retrofit 30,000 existing residential homes annually in order to reduce their net energy consumption by 60 percent.³⁶ An additional recommended action is upgrading building energy codes and to define an even higher, but voluntary, "green" building energy performance standard.³⁷ At this point in time, making New Hampshire's buildings more energy efficient is driven by consumer demand.

The American Recovery and Reinvestment Act (ARRA) has set aside \$5 billion for home weatherization programs, disproportionately benefiting cold-weather areas. It is estimated that New Hampshire will receive \$23.2 million over and above the usual allocation of approximately \$3 million. New Hampshire's Office of Energy and Planning (OEP) is in charge of the Weatherization Assistance Program for New Hampshire. Since 1974, OEP has subcontracted with the state's six regional Community Action Agencies (CAA) as the local agents in charge of delivering the weatherization upgrades.³⁸

34. NH Office of Energy and Planning, 2006 New Hampshire Energy Facts, <www.nh.gov/oep/programs/energy/nhenergyfacts/2006/documents/energy_snapshot.pdf> Accessed July 27, 2009.

35. NH Climate Action Plan, p. 6.

36. New Hampshire Climate Action Plan, p. 39.

37. Ibid. p. 40.

38. NH Office of Energy and Planning, Weatherization Program. <www.nh.gov/oep/programs/weatherization/index.htm> . Accessed July 27, 2009.

The ARRA funds will allow 3,500 or more homes to be weatherized and create approximately 184 new jobs. In 2007, 745 homes were weatherized in New Hampshire. CAA will be in charge of the energy auditors and weatherization professionals. ARRA authorized the average investment allowed per dwelling unit to increase from \$2,500 to \$6,500 and raised eligibility from 150 percent of federal poverty guidelines to 200 percent. Funds must be expended over the course of three years. In addition, the state has received a substantial increase in training and technical assistance funds of approximately \$5 million. These funds will allow OEP to provide annual “Energy Auditor“ field training, as well as other certification training in weatherization material and techniques. OEP wants to encourage weatherization training for workers new to the field, especially by hiring contractors committed to providing on-the-job training.³⁹

With the downturn in the housing market, construction employment has suffered substantially. New Hampshire nonfarm employment data for the month of April 2009 shows that *Specialty trade contractors* have shed 4,300 jobs since April 2008. The intention behind the ARRA funding is to train tradesmen/women in weatherization techniques. The expectation is that jobs will be created to fill the need for workers with these skills. Existing occupations that will easily be able to attain weatherization skills are roofers, carpenters and insulation workers. This is one example of defining the “greening” of the workforce — the addition of “green” skills to an existing occupation.

As the Community Action Agencies assess homes for low-income families, workers able to perform energy audits will be in demand. New Hampshire Residential Energy Performance Association (REPA) is an association made up of individual residential energy auditors, weatherization professionals, Community Action Agency representatives and state officials. The objective of this association is to further the understanding of residential energy efficiency technologies as well as promote consistency in delivery of energy efficiency services.⁴⁰ As the field of energy audits is fairly small in New Hampshire at this point, the state’s weatherization officials are involved in the standardization of residential energy audits through networking with industry experts.

Besides this immediate boost from the ARRA weatherization funding, there are green building initiatives promoted by professional builder associations and other interest groups. These initiatives are centered on promotion of green building techniques in new construction and retrofitting existing homes. One example of an industry-driven initiative is a two-day course for Certified Green Professional (CGP) organized by the National Association of Home Builders. Another industry initiative is Leadership in Energy and Environmental Design (LEED), a nationally-accepted benchmark for the design, construction and operation of green buildings. The US Green Building Council is the

39. OEP American Recovery and Reinvestment Act Resources, State of New Hampshire Office of Energy and Planning, “Weatherization Annual File Worksheet.” <www.nh.gov/oep/recovery/documents/wx_annual_file_worksheet.pdf>. Accessed May 22, 2009.

40. Residential Energy Performance Association <www.repa-nh.org/>. Accessed July 27, 2009.

organization behind the certification of green buildings. There are several different tiers of certification, depending on the type of construction (commercial or residential). The organization offers training for building industry professionals to obtain LEED Professional Accreditation. A certain share of employment for architects, home builders, and civil engineers will be considered green jobs if they are involved in construction and renovation of green buildings. In New Hampshire, as of 2008, seven projects have received LEED Gold certification and eight projects have received LEED silver certification.⁴¹

The state’s non-profit organizations and universities (both private and public) are among those leading by example. Green building projects at the New Hampshire Audubon Society,⁴² the Society for Protection of New Hampshire Forests,⁴³ Plymouth State University⁴⁴ and Dartmouth College⁴⁵ all have received LEED Gold certification.

Transportation Employment Estimates

When defining “green transportation,” most studies include public transportation.⁴⁶ Within NAICS, public transportation can be identified by two industry groups: NAICS 4851 - *Urban transit systems* and NAICS 4852 - *Interurban and rural bus transportation*. *Urban transit systems* includes commuter rail and bus transit systems. In 2007, the annual average employment for *Urban transit systems* was 144 and for *Interurban and rural bus transportation* the annual average employment was 184.



In addition to regularly scheduled public transportation, NAICS 4854 – *School and employee bus transportation*, NAICS 4855 – *Charter bus industry*, and NAICS 4859 – *Other transit and ground transportation*,

41. US Green Building Council, LEED Projects and Case Studies Directory, Certified Project List. <www.usgbc.org/LEED/Project/CertifiedProjectList.aspx> Accessed May 26, 2009.
42. Nobis Engineering, Audubon Society Exploration Center, <www.nobisengineering.com/portfolio/audobon.html> Accessed July 28, 2009.
43. Conservation Center, Society for the Protection of New Hampshire Forests, <www.spnhf.org/ourproperties/ac-conservation-center.asp> Accessed July 28, 2009.
44. Press Release, Plymouth State University Office of Public Relations, “PSU Residence Hall Is First In NH To Strike LEED Gold,” May 15, 2007. <www.plymouth.edu/news/media/kits/leed/>
45. Press Release, Dartmouth College Office of Public Affairs, “New Dartmouth dorm cluster gets gold LEED rating,” May 5, 2008. <www.dartmouth.edu/~news/releases/2008/05/08b.html>
46. Several studies refer to Mass Transit as “green,” for example: “Green Economic Recovery Program – A Program to Create Good Jobs and Start Building a Low-Carbon Economy,” Pollin et. al., Political Economy Research Institute, University of Massachusetts. September 2008. “Green Transportation” is one of the categories defined by Gittell et. al. in “New Hampshire’s Green Economy and Industries.” The presumption is that by using mass transit, congestion can be avoided and carbon dioxide emissions reduced.

including senior and special needs transportation, can be considered “green transportation.” In 2007, annual average employment for these three industry groups together was 2,330.

Activities in New Hampshire

The relatively low number of employees in regularly scheduled public transportation reflects a state that consists of several small cities such as Concord, Nashua, Portsmouth and Manchester, but no major metropolitan center such as Boston or New York. The state’s cities are big enough to have a limited number of intra-city public bus routes, and between these cities there are some interurban bus services available as well. But for the most part, in order to be in the labor force New Hampshire workers are required to have access to a personal vehicle. According to the 2005-2007 American Community Survey, 81.6 percent of New Hampshire workers 16 years and over used a car, truck, or van and drove alone. Less than one percent of workers in New Hampshire 16 years and over used public transportation. In comparison, data from Massachusetts showed that 8.7 percent of workers 16 years and over used public transportation.



In the New Hampshire Climate Action Plan there are several recommendations related to reducing vehicle-miles traveled through an integrated multi-modal transportation system. One suggestion is to expand the park-and-ride infrastructure through education and outreach as well as expansion of new park-and-ride facilities. According to the 2005-2007 American Community Survey, 8.7 percent of New Hampshire workers 16 years and older used a carpool. Park-and-ride programs may not substantially increase the “green” labor force, but is still an important cost and carbon emission cutting measure.

Through the American Recovery and Reinvestment Act, it is estimated that New Hampshire will be receiving \$13,490,304 out of a total \$6.9 billion appropriated nationwide for Transit Capital Assistance.⁴⁷ There was also \$8 billion appropriated in ARRA for Capital Assistance for High Speed Passenger Rail Corridors and Intercity Passenger Rail Service.⁴⁸ These funds will be allocated through a competitive application process and gaining access to these funds is a bit of a long shot for New Hampshire, as there are no “shovel-ready” rail projects on the table.

47. New Hampshire Implementation – American Recovery and Reinvestment Act of 2009, “Transit Capital Assistance Program” <www.nh.gov/recovery/programs/documents/transportation_transit_capital_assistance061509.pdf>

48. New Hampshire Implementation – American Recovery and Reinvestment Act of 2009, “Capital Assistance for High Speed Passenger Rail Corridors and Intercity Passenger Rail Service” <www.nh.gov/recovery/programs/documents/transportation_capital_assistance_high_speed061509.pdf>

Government Oversight Employment Estimates

This category includes people overseeing different environmental protection programs that are managed through federal, state or local agencies. These government oversight programs are classified as NAICS 924 - *Administration of environmental programs*. In 2007, annual average employment for *Administration of environmental programs* in state government was 1,157; in local government it was 27; and in federal government it was 342.

Activities in New Hampshire

The New Hampshire Department of Environmental Services is the agency responsible for working with local communities to enforce environmental rules and regulations and programs such as safe drinking water, land use, pollution prevention and solid waste management. The New Hampshire Fish and Game Department is responsible for conservation and management of the state's natural resources. Occupations in these departments include environmental engineers, biologists, and chemists, as well as planners and public administrators. These jobs could all be considered green, as their function is to improve the environment, promote sustainability, and improve the health of the citizens of New Hampshire.

New Hampshire is moving toward creation of green job opportunities, lowering energy costs, and a sustainable energy future for the state. Legislation with those goals in mind has been enacted, including the New Hampshire Climate Change Action Plan, joining the Regional Greenhouse Gas Initiative, and the "25 by '25" Initiative. Recently, the Governor announced that the state will be obtaining 25 percent of the electricity used by government buildings from renewable energy sources.⁴⁹ In another initiative, the Governor and Executive Council approved \$5.3 million from the Greenhouse Gas Emissions Reduction Fund to create green jobs and help residents and businesses save on energy costs.⁵⁰

49. Press Release, Office of the Governor, "Gov. Lynch Announces that State Government Will Now Get 25 Percent of Its Energy from Renewable Energy," July 2, 2009. <www.governor.nh.gov/news/2009/070209.html>

50. Press Release, Office of the Governor, "Green Jobs Initiatives Move Forward," July 15, 2009. <www.governor.nh.gov/news/2009/071509.html>

Water Management Employment Estimates

Water management is classified under *Utilities* in the industry group *Water, sewage and other systems* (NAICS 2213). Average annual employment for 2007 in *Water, sewage and other systems* was 365 jobs. More than half (57.5 percent) of these jobs were in local government, and the remaining jobs were in privately-owned utility companies.

One of the industries within *Water, sewage and other systems* is NAICS 221330 - *Steam and air-conditioning supply*. New Hampshire data for this industry do not meet disclosure standards. Depending on the type of fuel used in order to produce the supply of steam and air-conditioning, employment in this industry might be considered green. Nearly all of the jobs in *Water, sewage and other systems* could be considered green as the function of their job is to control and conserve the supply of a natural resource and manage removal of the waste in order to protect the environment.

In addition to the management of water systems, development of new water and sewer lines can be considered green. Average annual employment in NAICS 237110 - *Water and sewer line and related structures construction* was 833 in 2007. Over the last ten years, employment in this industry seems to have followed the growth patterns of new residential construction, as many new developments have required expansion of existing water and sewer lines or have had individual water wells drilled. Annual average employment in this industry peaked in 2004 at 955 jobs. While not all development is necessarily viewed as an asset to the environment, upgrading and improving the existing water and sewer lines is viewed as protecting the environment.

Scientific companies doing research and development (R&D) in water usage efficiencies and researching ways to reuse/recycle wastewater would also be considered green jobs. Some of these jobs fall under NAICS 52162 - *Environmental consulting services* and NAICS 541712 - *Research and development in the physical, engineering, and life sciences (except biotechnology)*. These green R&D jobs could also be related to *Materials and waste management*. The 2007 annual average employment for NAICS 52162 - *Environmental consulting services* was 503 and 2007 employment for NAICS - 541712 *Research and development in the physical, engineering, and life sciences (except biotechnology)* was 804.



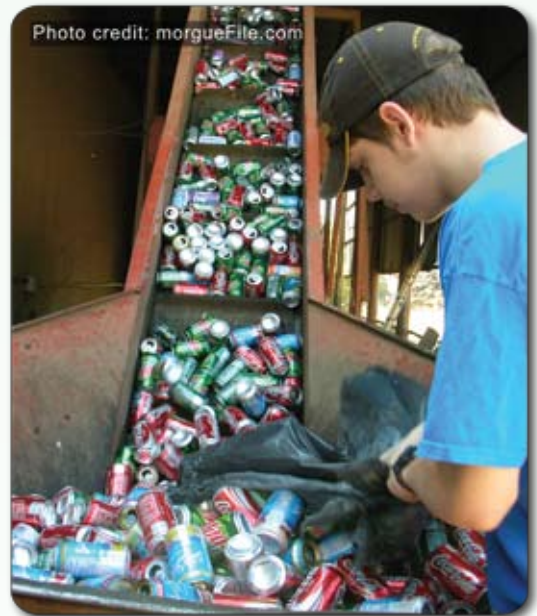
Activities in New Hampshire

The administration and management of water resources can be performed by both private and governmental agencies. Water is becoming a scarce resource in many parts of world and it is essential for all households. Some industries are heavily dependent on this resource as well. There are two parts to the water management life cycle, the extraction and/or purification of water (supply) and the process of controlling/managing wastewater, also referred to as sewage (removal).

In April 2009, New Hampshire started to put \$58 million in American Recovery and Reemployment Act (ARRA) stimulus funds to work by approving 108 different drinking water and wastewater projects across the state. The Clean Water State Revolving Fund program for grants or loans for municipal wastewater system upgrades received \$39 million from ARRA and the Drinking Water State Revolving Fund program for drinking water system upgrades received \$19 million.⁵¹

Materials and Waste Management Employment Estimates

Materials and Waste Management workers are classified in NAICS 562 - *Waste management and remediation services*. This sub-sector consists of three industry groups: NAICS 5621 - *Waste collection*, NAICS 5622 - *Waste treatment and disposal*, and NAICS 5629 - *Remediation and other waste management services*. In New Hampshire, annual average employment for Waste management and remediation services was 1,733 for private industries, with an additional 19 jobs in local government.



In 2007, NAICS 5621 - *Waste collection* accounted for more than half of all employment in *Waste management and remediation services*. Since 1994 employment in this industry group has more than tripled. Some increase in employment is likely due to population growth. As the state has become more populated, demand for trash collection services has increased as well. Data from the New Hampshire Department of Environmental Services show that in 1999, New Hampshire residents disposed of 5.0 pounds of municipal solid waste per person per day, including residential, commercial and industrial waste.⁵² In 2005, residents disposed of 6.0 pounds of municipal

51. "Report of the Governor's Solid Waste Task Force," Pursuant to Executive Order 99-6, July 2001. <des.nh.gov/organization/commissioner/pip/publications/wmd/documents/sw_taskforce_report.pdf> Accessed July 28, 2009.

52. Maurer, Donald E., NH Department of Environmental Services, "Solid Waste Report to the Legislature 2005," September 2006. <des.nh.gov/organization/commissioner/pip/publications/wmd/documents/r-wmd-06-2.pdf> Accessed July 28, 2009.

solid waste per person per day. When adding totals for construction and demolition solid waste, the figure rises to 7.7 pounds.⁵³

In 2007, annual average employment for NAICS 5622 - *Waste treatment and disposal* was 341. Close to half of the employment in this industry group was in NAICS 562212 - *Solid waste landfills*. It could be argued that *Solid waste landfill* employment is not good for the environment, as it suggests an expansion of solid waste. However, technological improvements have made possible the capture of biogas (methane) produced naturally in the decomposition process which can be used as a source of renewable energy. Solid waste landfills could be considered green if the gas is used as a source of biomass renewable energy.

The third industry group under waste management is NAICS 5629 - *Remediation and other waste management services*. Annual average employment for 2007 was 436, nearly doubling since the early 1990s. Businesses in this group are engaged in cleaning up contaminated sites, hazardous material removal, separating and sorting recyclable materials, and services such as septic tank pumping and beach cleaning.

Activities in New Hampshire

It is debatable whether or not to include waste collection as a green industry, but the lack of this service might have an even more devastating impact on the environment. The value of solid waste collection is an ongoing debate in many New Hampshire cities and towns. Among New Hampshire's 234 municipalities, 45 have a pay-as-you-throw program in place, and 221 have a voluntary or mandatory recycling program. Curbside trash pickup is provided by 50 municipalities, and in 62 municipalities consumers contract independently for curbside pickup.⁵⁴ The positive side of paying a per-bag fee or paying a waste collection service for the disposal of household trash is that the consumer is more aware of the cost of not recycling and composting, thus improving participation. The negative side is that some may attempt to dispose of trash improperly.

Other Green Initiatives

In addition to green economic activity in private industry and government employment, there are numerous non-profit alliances, citizen groups, professional associations, and colleges and universities that are focusing on increased awareness of living and working green and environmental education. These organizations are not creating any additional green jobs, but they do encourage a change in consumer habits and spending, and therefore have an indirect impact on the demand for green goods and services.

53. Maurer, Donald E., NH Department of Environmental Services, "Solid Waste Report to the Legislature 2005," September 2006. <<http://des.nh.gov/organization/commissioner/pip/publications/wmd/documents/r-wmd-06-2.pdf>> Accessed July 28, 2009.

54. Economic and Labor Market Information Bureau, NH Employment Security, 2008 NH Community Profiles survey data.

Green Jobs: Existing jobs and Emerging occupations

Thus far, the examination of green jobs by industry has proven difficult. Green industries cannot at this time be precisely quantified by traditional output measures used as identifiers in a standard coding system. So, how can better information on green jobs be gathered? An occupational perspective may be one answer. This method has the potential to be a more inclusive way of defining green jobs, since occupational definitions are based on knowledge, skills and abilities.

The usual procedure in a labor market analysis is to define industry demand first and then use a specific staffing pattern for a given industry to estimate the occupational composition of that industry. The prior description of green industries exemplifies how difficult it is to construct an all-inclusive “green industry” benchmark using NAICS industry-based definitions. Instead, an attempt is being made to identify green jobs directly from the perspective of occupational knowledge, skills and abilities.

The National Center for O*Net Development has examined the impact of green economy activities and technologies on occupational requirements, and presented the information in the study, *Greening of the World of Work: Implications for O*NET-SOC and New and Emerging Occupations*. First, the study established a definition of the green economy.

The green economy encompasses the economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy.⁵⁵

The study found that green economy activities and technologies have different effects on different occupations. Thus, a broad application of the “green” label on occupational descriptions was ineffective. Instead, the concept of “greening” occupations was applied three ways.

Green Increased Demand Occupations: Occupations for which the green economy increases employment demand and may change work context, but does not affect tasks. (64 O*NET-SOC occupations qualified)

Example: Bus drivers, Electricians, Environmental scientists, Forest and conservation workers and Millwrights are expected to be in greater demand because of the green economy, but basic job tasks will remain the same.

55. Dierdorff, Erich, Norton, Jennifer, Drewes, Donald, and Kroustalis, Christina, North Carolina State University; and Rivkin, David, and Lewis, Phil, National Center for O*Net Development. “Greening of the World of Work: Implications for O*NET-SOC and New and Emerging Occupations.” National Center for O*NET Development. February 2009. p. 3. <www.onetcenter.org/reports/Green.html>.

Green Enhanced Skills Occupations: Occupations for which the green economy causes significant change to work and worker requirements, but may or may not affect employment demand. (60 O*NET-SOC occupations qualified)

Example: Carpenters, Construction inspectors, Plumbers, Power plant operators and Transportation inspectors are expected to need additional green skills, to acquire working knowledge of green materials, processes, or technologies, or to obtain specific training and certification to qualify as part of the green economy.

Green New and Emerging (N&E) Occupations: Occupations for which green economy activities and technologies create a need for unique work and worker requirements, thus generating a new occupation. These new occupations may be entirely novel or “born” from an existing occupation. (91 O*NET-SOC occupations qualified)⁵⁶

Example: Biofuels processing technicians, Biomass plant technicians, Climate change analysts, Energy auditors, Industrial ecologists and Sustainability specialists are some of the new and emerging occupations that will be part of a green economy.

In New Hampshire, in the third quarter of 2008, an estimated 57,800 workers were employed in those occupations identified as *green increased demand occupations*, and an estimated 68,600 workers were employed in those occupations identified as *green enhanced skills occupations*.⁵⁷ These employment estimates include self-employed workers, which are excluded from industry counts of workers covered by unemployment insurance. And while employment in existing green-related occupations can be estimated, this does not ensure that all of these workers are currently — or in the future will be — engaged in green economic activities.

56. Ibid. p. 4,6, Appendices D, E, F.

57. Economic and Labor Market Information Bureau, NH Employment Security, 2008 Q3 – 2010 Q3 Short-Term Employment Projections by Occupation, June 2009. <www.nh.gov/nhes/elmi/projections.htm>.

The Status of New Hampshire's Green Economy

In this publication, the green economy in New Hampshire was explored from both an industry and an occupational perspective. As in any other labor market analysis, both perspectives are important, as industries focus on economic activity — products and services — and occupations focus on worker knowledge, skills, and abilities.

Quantification of green jobs has proven to be a difficult task. Precise measure of green jobs is limited by the current industry and occupational standardized coding systems. But neither industries nor occupations can be painted with a single green brush. “Shades of green” apply to both industries and occupations, depending on materials, processes, and technology used, or the resulting energy and resource conservation.

In industry sectors such as *Transportation, Government oversight, Water management, and Materials and waste management*, annual average covered employment can be considered nearly all-inclusive of green jobs. For other fields, including *Renewable energy, Sustainable manufacturing, and Construction and skilled trades*, there is still no method of precisely measuring green employment. A more definitive method of identifying green jobs must be developed. This identification may be at the level of an individual firm and be determined by environmental management practices, energy production, green consumer products, or other energy and resource conservation practices.

This attempt at defining green jobs and green activities does not capture every aspect of the green economy in New Hampshire. Some of the industry sectors not discussed, although they are also potential sources of green jobs, are green practices at hotels and restaurants, architectural green building design, and environmental legal specialties.

Overall, green economic activities are expected to grow in New Hampshire. The state has the potential for technological innovation in energy efficiency as well as the creation of new opportunities in renewable energy, which in turn creates employment opportunities. Implementation of new ideas and conservation efforts are already underway, as renewable energy use and energy use reduction is a goal of both government and private establishments.

