

CT Renewable Energy / Energy Efficiency Economy Baseline Study

Phase 1 Deliverable: Executive Summary

March 27, 2009

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Content of Report

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Assignment and Purpose

The analysis herein was performed by Navigant Consulting, Inc. (NCI) under the direction of the Connecticut Clean Energy Fund (CCEF) and Connecticut Energy Efficiency Fund (CEEF). The goal of this part of our study – which is one part of a larger strategic assignment – was to estimate jobs, employment income, and revenue of renewable energy and energy efficiency companies operating in Connecticut.

Context and Limitations

The work presented in this report represents NCI's best efforts based on the best information gathered by NCI and others at the time the report was prepared. NCI prepared this report from January through March 2009. It is important to acknowledge the uncommon economic environment during this period. Many companies were in a state of flux with some reorganizing their operations, others closing their operations and even some who were expanding their operations. Thus, the information presented in this report is from a snapshot in time.

Inquiries

We encourage any questions or comments about this document. They should be addressed to Kim Stevenson, Manager, New Technologies, Connecticut Clean Energy Fund, 860-257-2890.

Contributors

This study was conducted by Navigant Consulting Inc. (NCI) in collaboration with CCEF, CEEF, DECD and utilities CL&P and UI.



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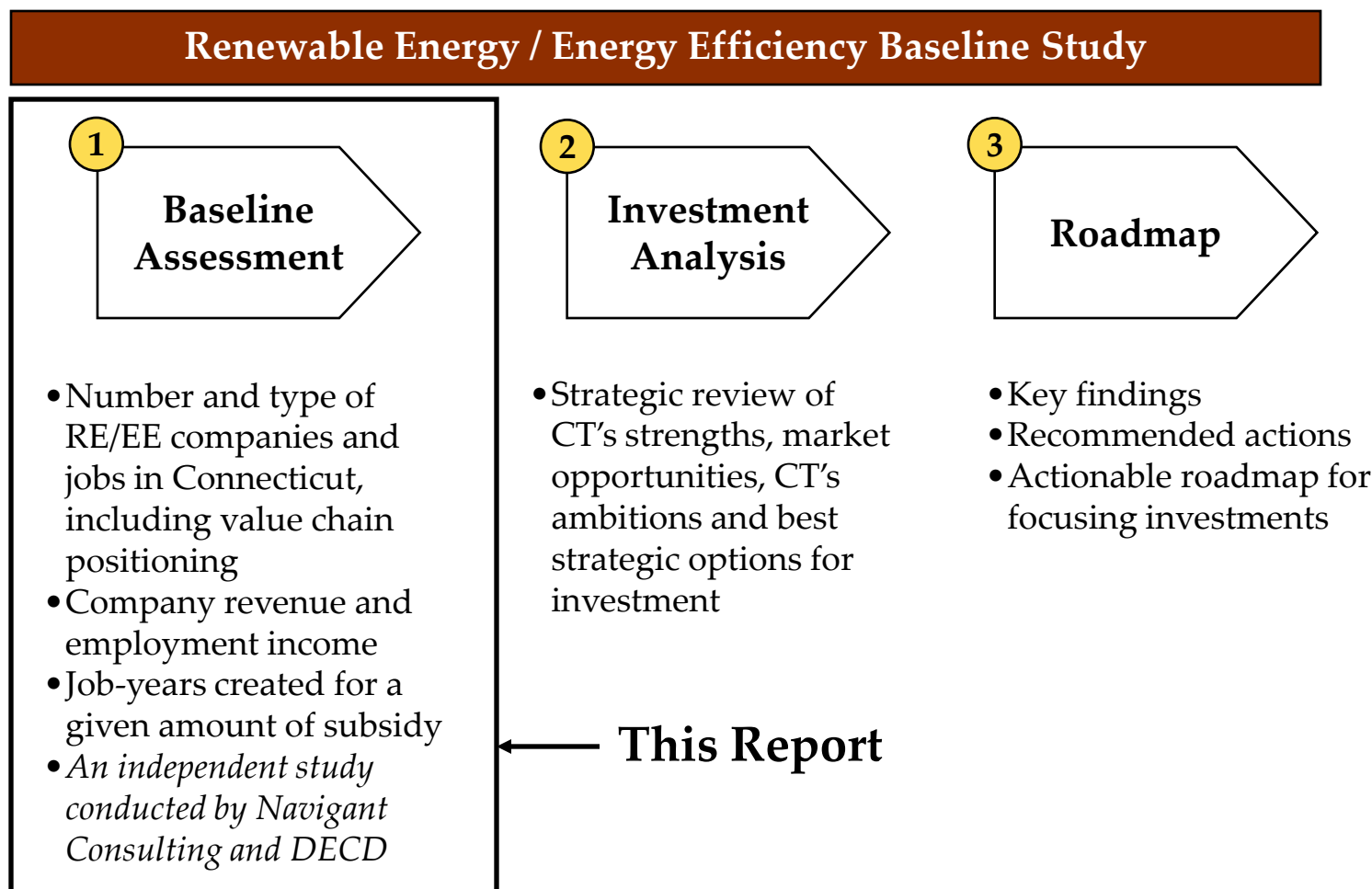
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This report includes a baseline assessment of renewable energy (RE) and energy efficiency (EE) companies, jobs, revenue and employment income in Connecticut (CT).

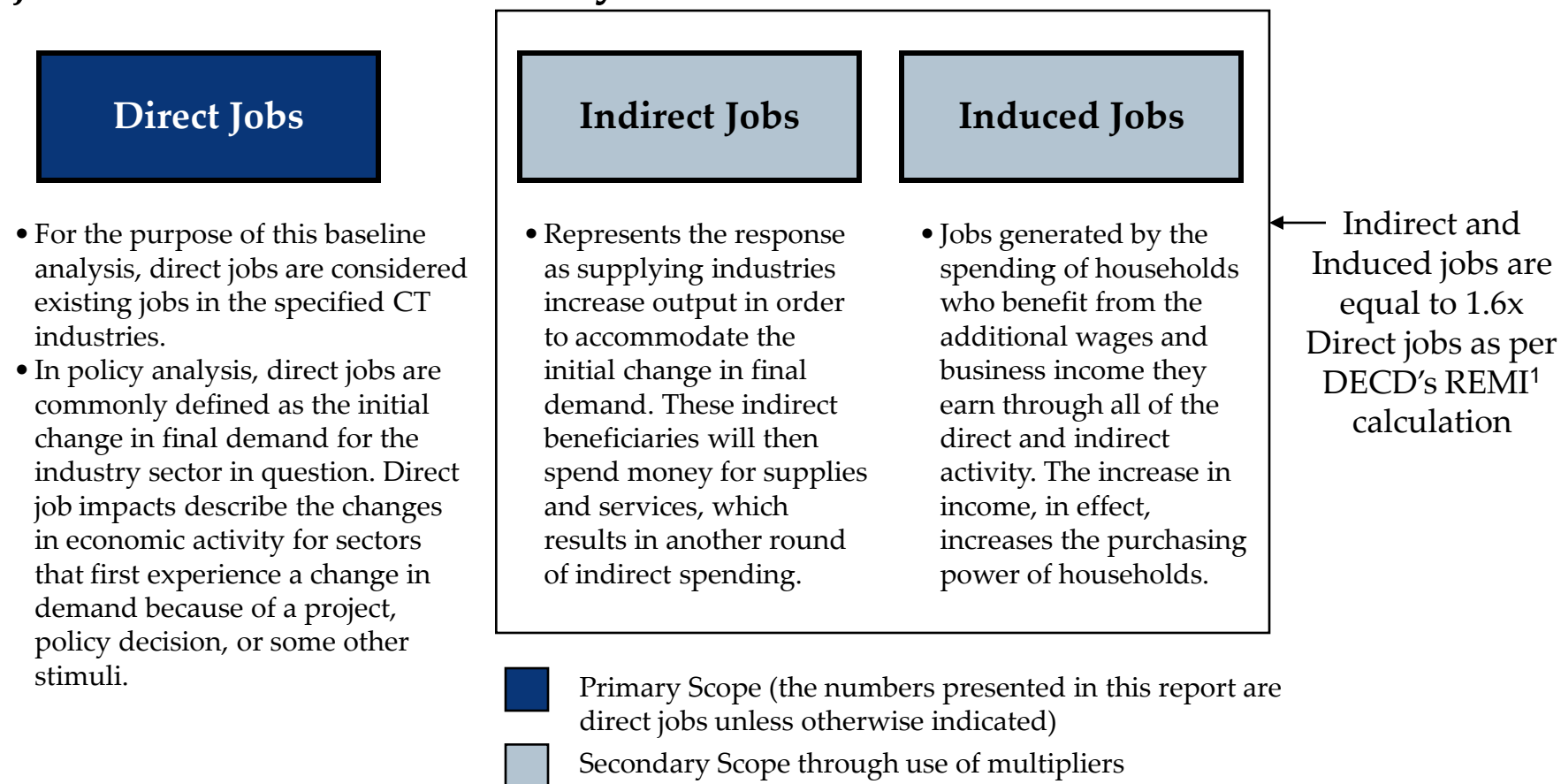
Phase 1 Overview

- This report presents Phase 1 of a three-phase RE/EE Economy Baseline Study for the State of Connecticut. The purpose of the three-phase study is to identify effective ways to support and accelerate growth of the RE/EE industry in Connecticut, including a critical analysis that will guide effective investment strategies by the Connecticut Clean Energy Fund (CCEF).
- This study was commissioned by CCEF, working in partnership with Connecticut Energy Efficiency Fund (CEEF) and the Department of Economic and Community Development (DECD).
- Phase 1 of the study, included in this report, identifies the number of RE/EE companies in Connecticut, the number and types of RE/EE jobs, revenue and employment income generated by this sector.
- Findings for Phase 1 are drawn from interviews and follow-up conversations with executives and key stakeholders from companies and institutions in CT. Data was also provided by local utilities and industry associations, DECD and the Connecticut Department of Labor.

Phases 2 and 3 of this study are scheduled to be completed in Mid April and Mid May 2009, respectively.



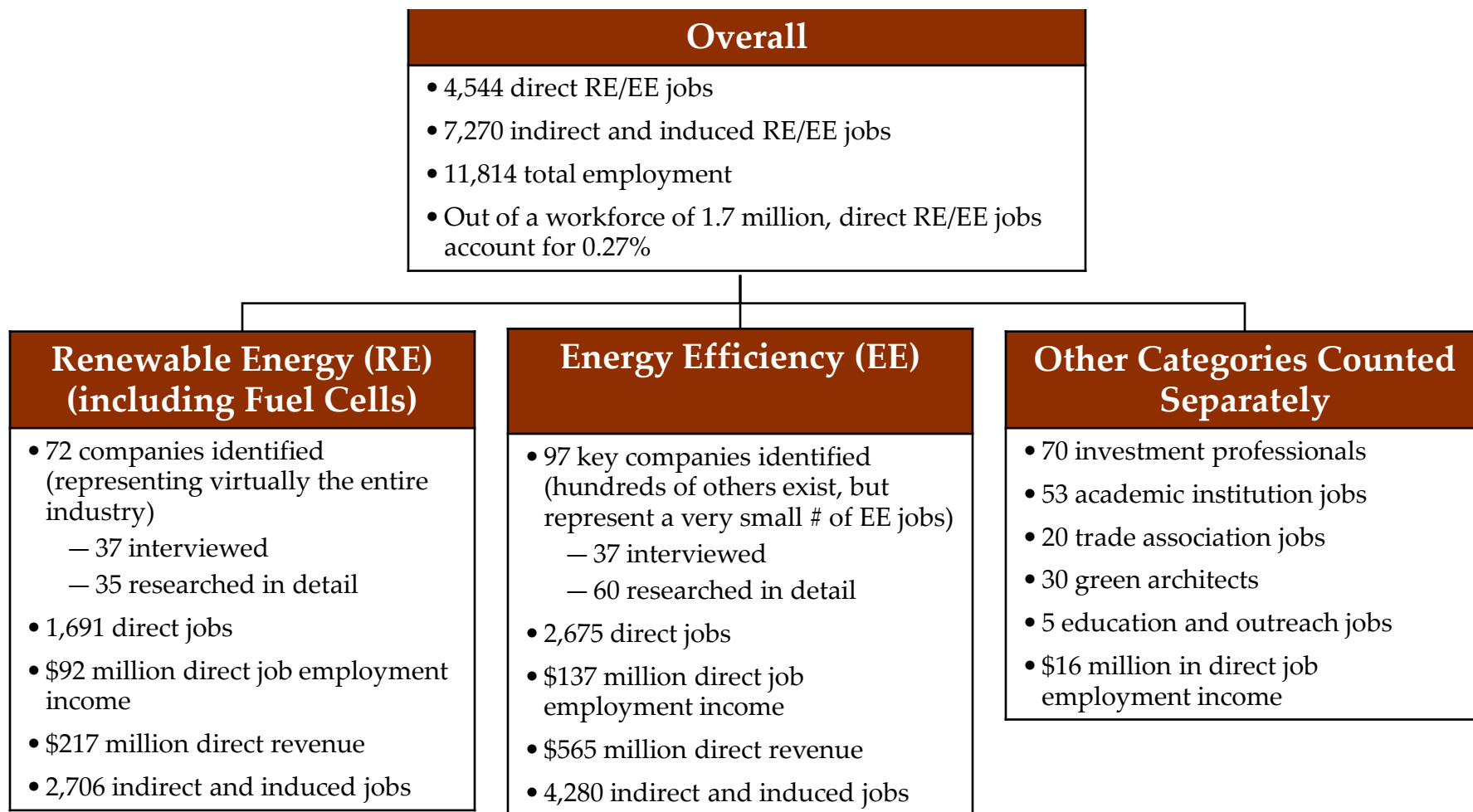
The baseline assessment considers direct, indirect, and induced jobs in CT's RE/EE economy.



Source: S. Grover, "Energy, Economic, and Environmental Benefits of the Solar America Initiative", August 2007, NREL/SR-640-41998.

1. The REMI model is an analytical tool developed by Regional Economic Models, Inc.

Overall, this analysis estimates CT has 4,544 direct jobs in the RE/EE sector, which is about 0.27% of the overall CT workforce of 1.7M.



NCI employed a “bottom-up” approach based on primary research.

- Over 300 companies, institutions, and organizations were identified as active players in the renewable energy and energy efficiency economy.
 - 74 key RE/EE companies were interviewed
 - 95 additional key RE/EE companies were researched in detail
- Rigorous cross-checking was conducted using DECD resources, Navigant Consulting internal databases, and CT industry experts.
- All RE companies identified were analyzed.
- Key EE companies were identified and analyzed, with the overall market size estimated by extrapolation. Assumptions were verified with ECMB, Connecticut Light & Power, and United Illuminating.
- Analysis included only those jobs specific to RE or EE, resulting in lower overall numbers relative to studies that tally by industry code (e.g., while other analyses might include all HVAC installers, we include only those specializing in EE.)

This comprehensive and detailed analysis presents a snapshot of the RE/EE economy during a difficult economic recession.

DECD simultaneously employed a “top down” approach to build an economic model of RE/EE impact. The NCI study and the DECD model were used to mutually complement and verify one another.

Key DECD Economic Modeling Activities

- Mutual comparison/validation of Connecticut RE/EE economic impact estimates
 - Revenue
 - Employment
- DECD used the REMI¹ model and data from the Connecticut Department of Labor.
- Navigant generated employment and revenue estimates based on direct interviews
- The Navigant estimate falls within the range of outcomes generated by the DECD modeling effort

1. The REMI model is a well-known economic analysis tool developed by Regional Economic Models Inc.

The study focused on RE electricity generation and EE, and does not include biofuels or the transportation industry.

Renewable Energy

Technology	Markets
<ul style="list-style-type: none"> • Fuel Cells • Solar (PV & Solar Hot Water) • Wind • Geothermal • Hydro (< 5MW) • Hydrogen • Biomass • Storage • Power Grid Infrastructure 	<ul style="list-style-type: none"> • Residential • Commercial & Industrial (C&I) • Utility • Independent Power Producers • Government and Military
<ul style="list-style-type: none"> • Concentrating Solar Power, Tidal, Wave 	<ul style="list-style-type: none"> • Transportation

Energy Efficiency

Technology	Markets
<ul style="list-style-type: none"> • High Efficiency Heating, Ventilation and Air Conditioning • Efficient Lighting • Efficient Home Appliances • Water Heating • Commercial Refrigeration • Pumps, motors and drives • Building Envelope • Demand Response 	<ul style="list-style-type: none"> • Residential (including Low Income Weatherization) • Commercial & Industrial (C&I) • Small Business • Retail Products / Appliance Retirement • Government and Military



Included



Excluded - limited relevance in CT or beyond scope

The analysis specifically targets Connecticut-based jobs, and revenues generated by Connecticut companies.

Jobs
<ul style="list-style-type: none">• Companies that employ people who are based in CT
<ul style="list-style-type: none">• Companies with staff outside of CT that do work in CT



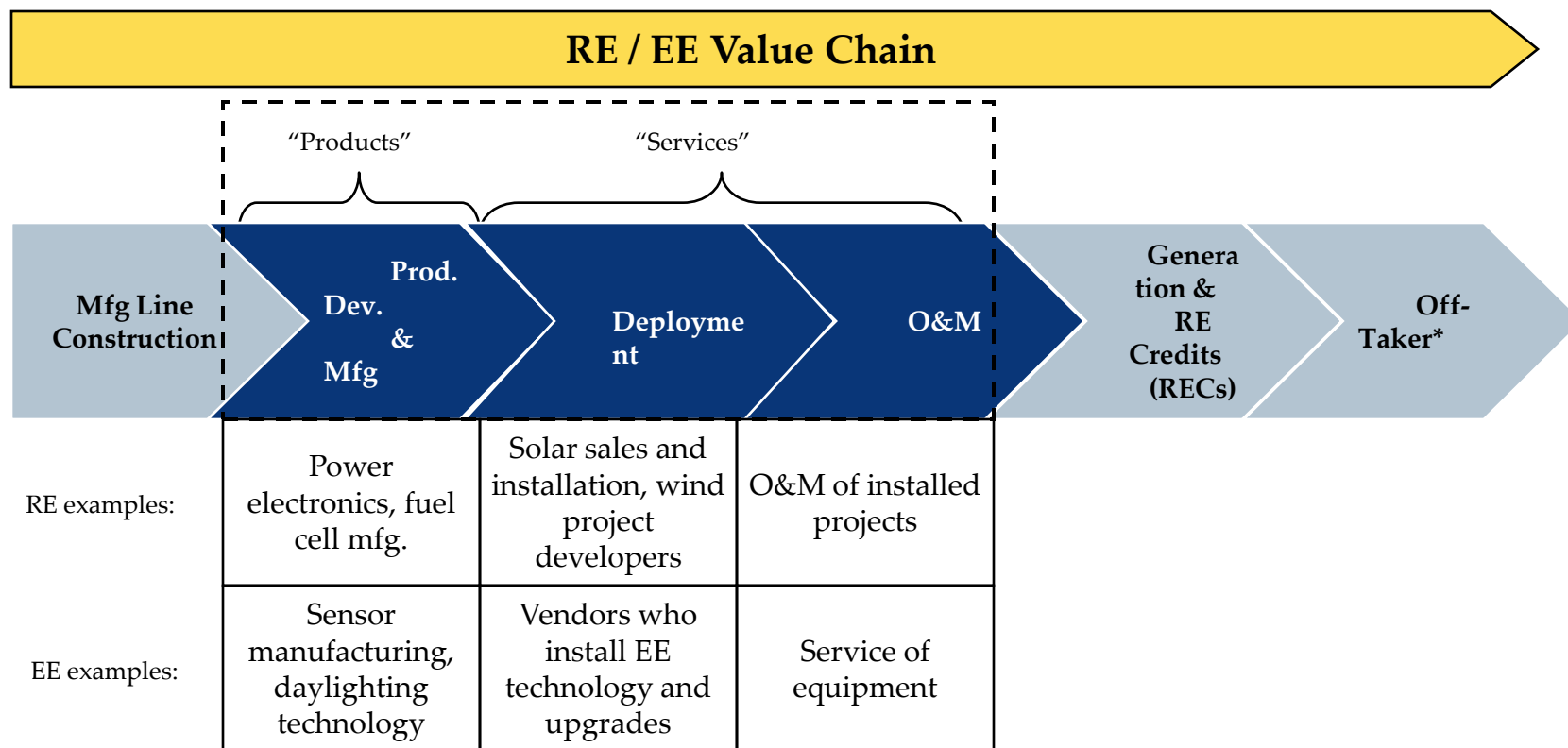
Included



Excluded. Does not directly build the CT RE/EE economy.

Revenues
<ul style="list-style-type: none">• Revenue from products that are manufactured in CT and sold anywhere worldwide• Project and/or operations and maintenance (O&M) revenue produced by CT-based companies• Retail and wholesale suppliers
<ul style="list-style-type: none">• Project and O&M revenue from outside CT• Revenue from products manufactured outside of CT• Revenue from all component suppliers (i.e. “pass through” revenue)

NCI focused on sections of the value chain where the majority of direct jobs are generated.



- Included - the majority of direct jobs occur here
- Excluded - skills are generic and/or jobs are limited

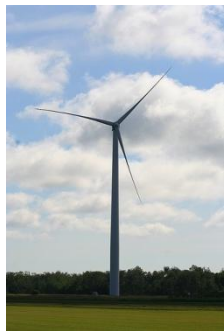
*Note: An off-taker is an entity that purchases electricity or RECs from an independent power producer or marketer

Examples of activity in the renewable energy and energy efficiency economy.

Renewable Energy



Solar installation



Wind project development



Fuel cell research and manufacturing

Energy Efficiency



Building envelope, residential new construction and retrofits



Appliance and lighting sales and install



Commercial and industrial energy efficiency contracting



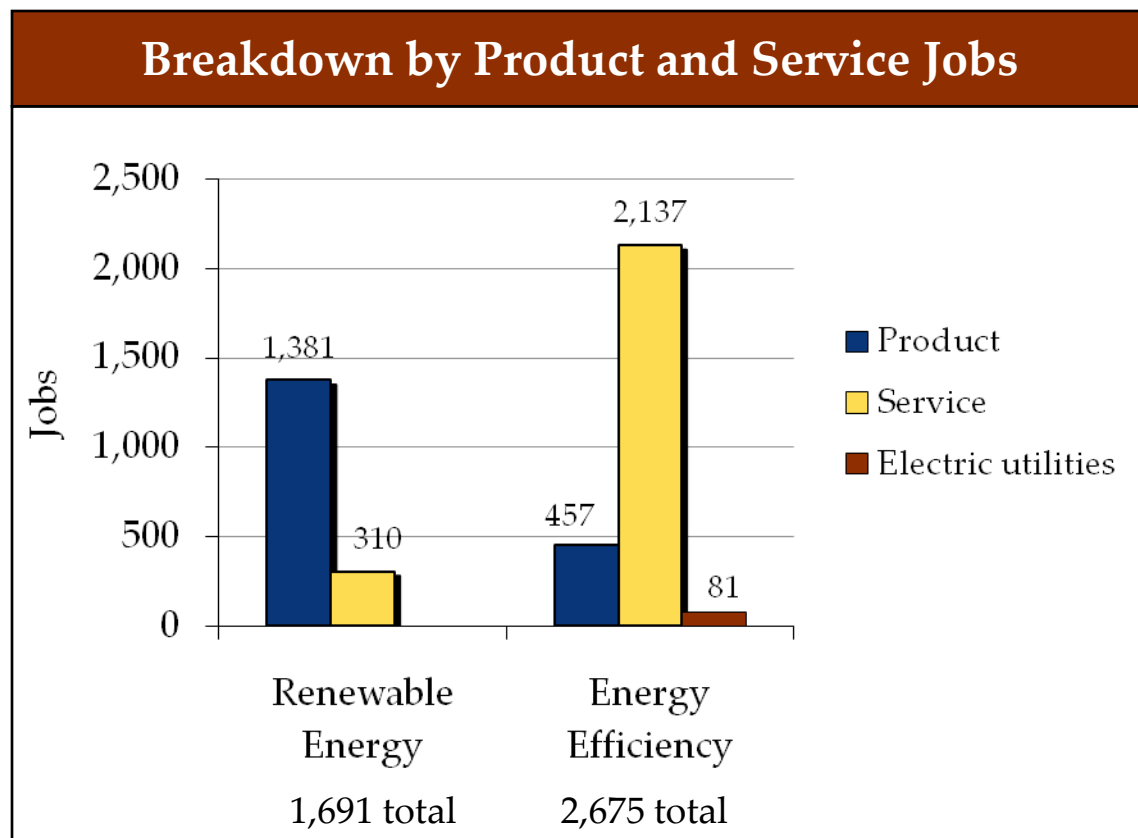
Weatherization

A number of key findings emerged from our assessment of CT's current RE/EE economy.

Key Findings

- **Significant growth potential** – The CT RE/EE economy today directly employs 4,544, or 0.27% of its total labor force (or 0.69% including indirect and induced jobs). The overall RE/EE economy is expanding globally, presenting substantial long term growth opportunities.
- **Industry undergoing significant tumult** – Although the RE/EE industry has significant upside potential, in the current economic downturn, many companies are going through a period of uncertainty and pain. Many companies interviewed were reorganizing operations and some were closing operations. Industries undergoing significant difficulty included fuel cells, solar and biomass. The reasons for this difficulty varied from loss of subsidy to overall economic conditions.
- **Top 10 employers accounted for roughly half of the RE / EE jobs and revenues** – The top ten RE / EE employers in Connecticut account for roughly half of the direct jobs and total revenues (46% and 43% respectively) as defined by this study.
- **Fuel cells aside, the CT RE / EE economy is mostly focused on services** – Fuel cells aside, about 80% of jobs are service jobs. There is limited RE/EE manufacturing in CT at present. Excluding the fuel cell companies, we counted less than fifteen RE/EE companies that manufacture in CT.
- **The dominant RE areas – fuel cells & solar – developed in CT due to strong subsidies** – Fuel cells & solar have been heavily subsidized and will remain dependent on subsidy for the foreseeable future.
- **Targeted subsidies create jobs** – Assuming average subsidies today, \$1 million in subsidy funds creates between 11-39 direct job-years (a job-year is one full-time equivalent working for one year) and is driven by the labor intensity of the jobs (vs. material intensity), depreciation burden, and job wage.

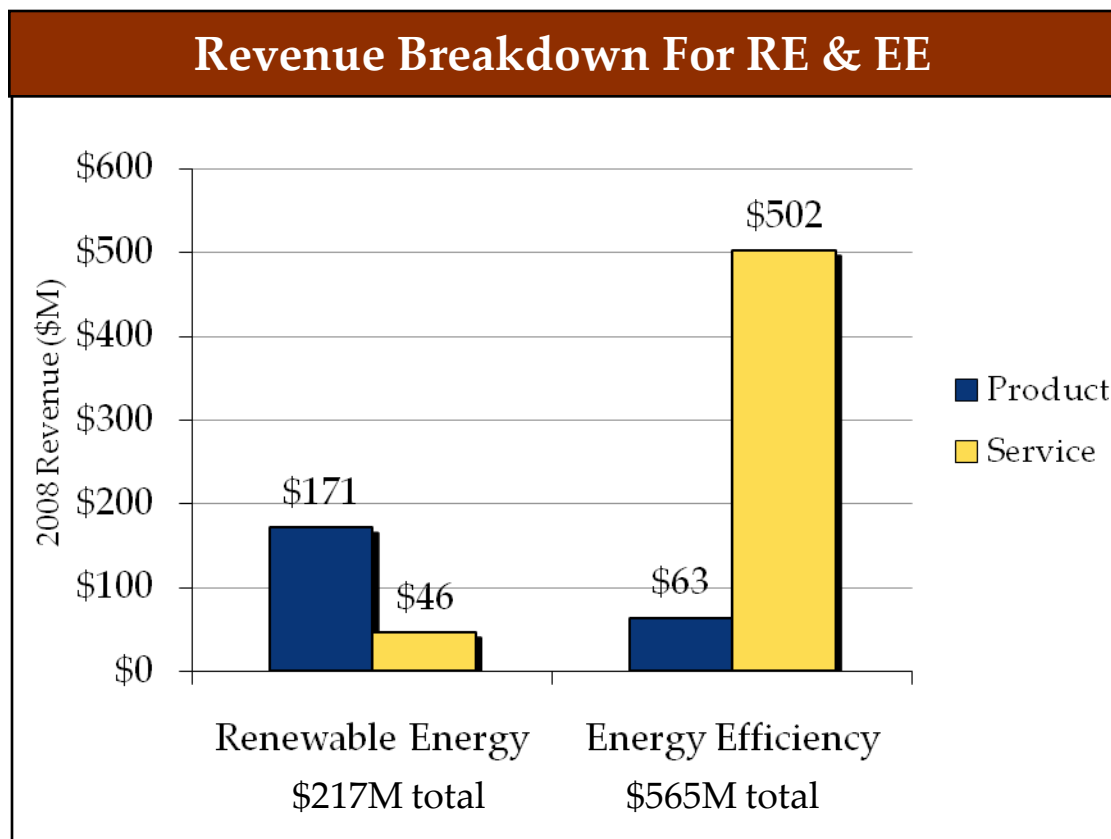
Product jobs dominated in RE (82% of total RE jobs) while most jobs in EE were from service companies (80% of total EE jobs).



- RE sector jobs are dominated by product companies, primarily in the fuel cell sector (1,200 jobs) and solar sector (80 jobs)
- RE services jobs are primarily solar (217 jobs out of 310 services jobs)
- EE sector is mostly service jobs (2,137 of total EE jobs)
 - EE installation, retail/wholesale, and management account for about 1,555 EE of total direct jobs

Note: The “Electric Utilities” category includes 81 utility EE program administration jobs within UI and CL&P.

Connecticut RE industry revenues total ~\$217M. EE industry revenues total ~\$565M, most of which comes from project services.



- Fuel cells account for \$165M of the total \$217M RE revenues. The majority of fuel cell revenue comes from R&D contracts and demonstration units, rather than commercial products.
- Solar is the next largest RE revenue category, accounting for \$44M.
- EE service companies account for \$502M, half of which (~48%) is from the large commercial and industrial (C&I) sector projects.
- EE product companies have a limited presence in CT and account for the remaining \$63M of total revenues.

The top 10 RE / EE companies with the most employees in CT account for 46% of direct jobs and 43% of direct revenues in this study.

Top Ten RE / EE Employers

- United Technologies Corp. (UTC)
 - Carrier Building Services
 - UTC Power
 - Pratt Power
- FuelCell Energy, Inc.
- Sensor Switch
- Schuco USA
- US Insulation Corp.
- Home Depot
- Trane
- Noble Environmental Power
- Alliance Energy Solutions (AES)
- Wal-Mart

- 2,010 RE / EE jobs in CT (46% of total)
- \$337 million of CT-based RE / EE revenue within the scope of this study (43% of total)

A \$1 million investment has a varying impact on job creation, depending on job type.

Job-Years Created Per \$1 Million Invested					
Occupation	Labor	Materials	Average Wage	Fully Burdened Employee Cost	Direct Job-yrs/ \$1M invested
Renewable Energy					
Fuel Cells – Mfg – Low Skilled	50%	50%	\$30,000	\$42,900	11.7
Fuel Cells – Mfg – High Skilled	50%	50%	\$50,000	\$71,500	7.0
Renewable Energy R&D	90%	10%	\$70,000	\$95,500	9.4
Solar Installation – Commercial	20%	80%	\$40,000	\$52,520	3.8
Energy Efficiency					
Residential	85%	15%	\$50,000	\$65,650	12.9
Small business	60%	40%	\$50,000	\$65,650	9.1
C&I (new construction/retrofit)	50%	50%	\$50,000	\$65,650	7.6
<i>EE Weighted Average</i>	60%	40%	\$50,000	\$65,650	9.1

- Job-yrs outcome depends on wages and % labor associated with the type of work.
- For example, with solar installations, 80% of the project cost is equipment and 20% is labor. When funds are invested, fewer jobs are created in comparison to other RE sectors, as they primarily flow to equipment suppliers and manufacturers.
- Lower wages and high labor % result in more job-yrs created.

Note: Assumed values have been based on consultation with CCEF, DECD, and ECMB

Project subsidies leverage private funds, increasing the number of direct, indirect, and induced jobs created.

Job-Years Created Per \$1 Million Subsidy					
Occupation	Direct Job-yrs/ \$1M invested	Average Subsidy Today	Adjusted Direct Job-yrs/ \$1M subsidy	Indirect and Induced Jobs	Total Job-Yrs
Renewable Energy					
Fuel Cells – Mfg – Low Skilled	11.7	60%	19.4	31.1	50.5
Fuel Cells – Mfg – High Skilled	7.0	60%	11.7	18.6	30.3
Renewable Energy R&D	9.4	75%	12.6	20.1	32.7
Solar Installation – Commercial	3.8	35%	10.9	17.4	28.3
Energy Efficiency					
Residential	12.9	70%	18.5	29.6	48.1
Small business	9.1	60%	15.2	24.3	39.5
C&I (new construction/retrofit)	7.6	60%	12.7	20.3	33.0
<i>EE Weighted Average</i>	9.1	65%	14.1	22.6	36.7

- Lower wages associated with low skilled fuel cell manufacturing yields the highest job creation.
- The high labor percent associated with Residential EE yields high job numbers despite high subsidy.
- Indirect and induced jobs are calculated using an economic multiplier of 1.6.

Notes:

1. Assumed subsidy values were provided by CCEF and ECMB. DECD provided multiplier of 1.6 for indirect and induced jobs.
2. For fuel cell projects going forward, the project subsidy levels are 25% to 50%

RE / EE markets will continue to be an excellent investment in the near term for Connecticut.

Why Is Investment in RE/EE Important?

Other studies have also linked significant job creation to renewable energy development

The Stimulus Package combined with state RE/EE incentives will help ensure economic attractiveness

President Obama has made renewable and clean energy one of his main platforms

European and Asian investors are coming to the U.S. as the market opportunities are significant

The U.S. RE/EE industry will continue to see double digit growth, in spite of the economic downturn

Implementation of RE/EE technologies will reduce carbon dioxide and other emissions

- **Job Creation**
- **Expected Strong Returns**
- **Continued Growth**
- **National Visibility**
- **Reduced Emissions**
- **Energy Security**

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