

New York State Clean Energy Technologies Innovation Metrics **2012**

Final Report



NYSERDA's Promise to New Yorkers:

NYSERDA provides resources, expertise and objective information so New Yorkers can make confident, informed energy decisions.

Our Mission: Advance innovative energy solutions in ways that improve New York's economy and environment.

Our Vision: Serve as a catalyst—advancing energy innovation and technology, transforming New York's economy, empowering people to choose clean and efficient energy as part of their everyday lives.

Our Core Values: Objectivity, integrity, public service, partnership and innovation.

Our Portfolios

NYSERDA programs are organized into five portfolios, each representing a complementary group of offerings with common areas of energy-related focus and objectives.

Energy Efficiency and Renewable Energy Deployment

Helping New York to achieve its aggressive energy efficiency and renewable energy goals – including programs to motivate increased efficiency in energy consumption by consumers (residential, commercial, municipal, institutional, industrial, and transportation), to increase production by renewable power suppliers, to support market transformation, and to provide financing.

Energy Technology Innovation and Business Development

Helping to stimulate a vibrant innovation ecosystem and a clean-energy economy in New York – including programs to support product research, development, and demonstrations; clean-energy business development; and the knowledge-based community at the Saratoga Technology + Energy Park®.

Energy Education and Workforce Development

Helping to build a generation of New Yorkers ready to lead and work in a clean energy economy – including consumer behavior, youth education, workforce development, and training programs for existing and emerging technologies.

Energy and the Environment

Helping to assess and mitigate the environmental impacts of energy production and use – including environmental research and development, regional initiatives to improve environmental sustainability, and West Valley Site Management.

Energy Data, Planning and Policy

Helping to ensure that policy-makers and consumers have objective and reliable information to make informed energy decisions – including State Energy Planning; policy analysis to support the Regional Greenhouse Gas Initiative, and other energy initiatives; emergency preparedness; and a range of energy data reporting, including *Patterns and Trends*.

New York State

Clean Energy Technologies Innovation Metrics

2012

Final Report

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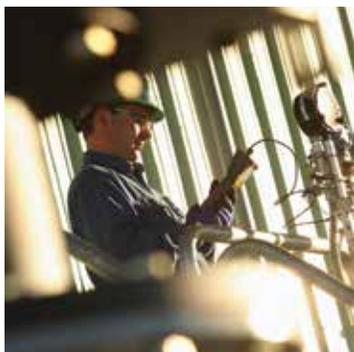
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Tracking the Development of New York State's Cleantech Sectors

The New York State (NYS) Clean Energy Technologies Innovation Metrics report serves as a starting point for tracking the development of NYS cleantech industrial base and innovation system through a suite of indicators that define and promote New York State's strong record of support of existing and emerging clean energy technology companies and an environment conducive to innovation, entrepreneurship and technology-led growth.

New York is well positioned to compete for a substantial share of the expanding global market for clean energy technologies. The State has long been a leader in energy technology innovation and commercialization, with a well-established world-class research infrastructure, and is home to a major financial and venture capital industry. New York also has a superior higher education system and a productive skilled labor force that can readily transition into new energy industries and markets. New York has an opportunity to build upon these assets and other competitive strengths to create a climate for business and innovation that supports the development and growth of globally competitive clean energy industries that drive economic expansion, job creation, and energy independence.

Definition of Cleantech

The term clean technology, or cleantech, is an umbrella term that refers to technologies that generate commercial benefits to customers while addressing environmental concerns, such as global climate change, sustainability and energy security. It spans many vertical industries and includes technologies that fall into the following eight categories, as defined by Kachan & Co. (2012): renewable energy generation, energy storage, efficiency (energy and building), transportation, air and environment (emissions, recycling and waste), clean industry (design, materials, production), water, and agriculture. This report focuses on clean tech energy and has chosen to exclude specific metrics on environment, water and agriculture.

Background

Focus groups were held in Silicon Valley and New York State to determine the metrics to present in this report. The groups involved nearly 100 individuals including entrepreneurs affiliated with cleantech startup companies, cleantech investors (angel, seed, and institutional/corporate investors, and venture capitalists), executives and other representatives of larger, more established technology companies, directors of cleantech incubators, and representatives from cleantech industry consortia, universities conducting cleantech research, and other cleantech organizations.

The objectives of the focus group meetings included bringing an informed, "market" perspective on the information most critical to corporate and investor decision making and to gather input from the private sector in New York on the strengths and weaknesses of the state's existing cleantech business and investment.

The major themes and categories of indicators were developed based on this feedback. The set of cleantech innovation metrics in this report seek to address four key questions:

- **Research and Innovation:** How competitive are New York State companies, research universities, and government labs in winning Federal R&D funding and commercializing new technologies?
- **Business Environment:** How attractive is the New York State business environment for new and expanding cleantech companies?
- **Industry Development:** How developed is the New York State cleantech industrial base and how competitive are enabling economic sectors, such as manufacturing and IT/software?
- **Clean Energy Market:** What is the size of the current and potential market for renewable energy and energy efficiency products and services in New York State and the larger Northeast Region?

The following information was identified as being important to startup companies, existing businesses and venture capitalists:

Startup Companies

- **Resources:** Incubators, universities and other programs with expertise and facilities in areas relevant to the business.
- **Investment:** An active community for pre-seed and seed stage investment, loan funds, or state grants.
- **Talent base:** Specialized talent/workers with domain-specific and a strong pipeline of graduate students working on relevant technology areas.
- **Success stories:** Successful startups and spinouts from universities

Established Companies

- **Talent base:** Information about existing manufacturers, recently closed manufacturers, and community colleges with strong certification programs aligned to industry needs. Universities with strong research programs in areas aligned to clean tech industries would be important to show.
- **Ease of access/proximity to customers:** Transportation networks and shipping.
- **Ease of doing business, which drives “speed to market”:** Permitting process and relevant regulations.
- **University research strengths aligned to industry R&D:** Available expertise for applied research projects and graduate students with applied research experience.
- **Renewable/energy efficiency regulations and incentives that drive regional demand:** Depending on the clean tech segment, companies are interested in state renewable portfolio standards.
- **State grant/loan/incentive programs:** In capital-intensive clean tech segments, companies are interested in state research and development commercialization grants, available tax incentives, favorable loans, and workforce training incentives.
- **“Early adopter” companies that make good demonstration sites:** High-profile companies that would make high-visibility test cases.

Venture Capitalists

- **List of clean tech investors and exits:** Identification of the investors in these deals.
- **Number of repeat entrepreneurs in clean tech:** The number of entrepreneurs that have successfully started two or more companies.
- **IP licensing terms from universities:** Impact of terms on cost and profit margins.
- **Size of regional demand/customers/early adopters:** Regional demand for clean tech, or a large segment of early adopter customers so that it would serve as a good test market.
- **Financing availability by round – angel/seed, series A, series B:** Identification of gaps in funding by round.
- **“All Star” faculty at universities:** University research capabilities in relevant areas, as well as whether universities have flexible policies for faculty to collaborate with startups.
- **Talent base:** A manufacturing base, as well as human capital for other support functions.
- **City/state incentives and tax breaks:** Available tax incentives, favorable loans, workforce training incentives.
- **Ease of doing business:** Permitting process and other bureaucratic processes.
- **Profiles of successful portfolio companies:** Examples of New York research university spinouts or startup companies that moved to New York.

The metrics presented provide a measurement of the category of interest and reflect the recommendations of the focus groups. It is NYSERDA's intent to track and report these metrics annually.

BUSINESS PLAN

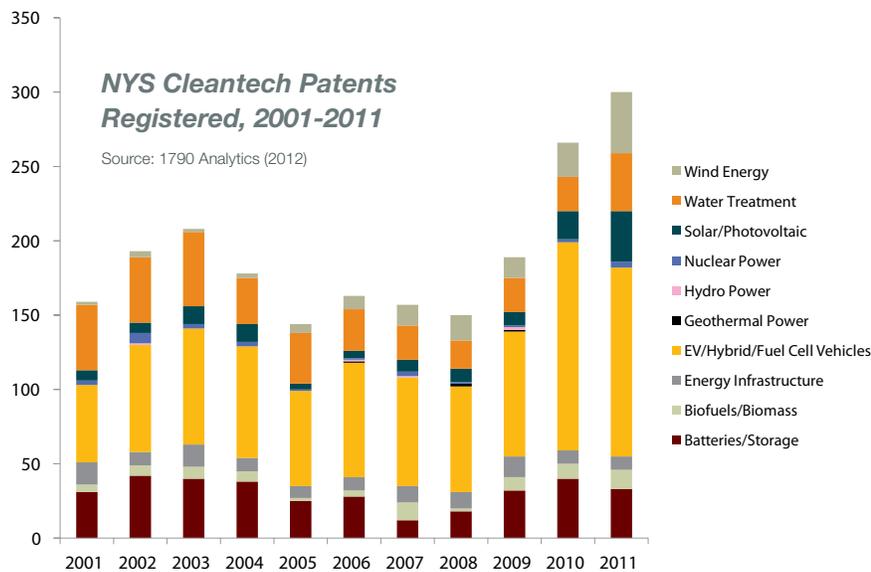


Executive Summary

Research and Innovation:

How competitive is New York State in winning R&D funding and commercializing new technologies?

NYS research universities, government labs, and companies rank in the top ten nationally in several of the Research and Innovation indicators, including university research expenditures and licensing, U.S. Department of Energy (DOE) and Advanced Research Projects Agency-Energy (ARPA-E) R&D funding, cleantech patenting, and Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) seed awards.



NYS ranks 2nd nationally in cleantech patents.

The number of cleantech patents registered each year is on the rise. NYS is the top inventor nationally for wind energy patents registered in the past three years, and 2nd in a number of other clean technologies: alternative vehicles, solar/PV, and energy infrastructure.

Research and Innovation Dashboard

Indicator	Ranking
Total number of clean technology patents	2
Total university research expenditures	2
Number of licenses & options executed by universities	3
Industry-sponsored university research expenditures	4
Total value of competitive DOE awards	5
Total value of ARPA-E awards	5
Total value of SBIR/STTR Phase I/II awards	5
Total number of SBIR/STTR Phase I/II awards	7
Total value of DOE contracts	10
Industry share of sponsored university research expenditures	17

Business Environment:

How attractive is New York State's business environment for expanding cleantech companies?

NYS ranks highly in many business environment categories (e.g., access to risk capital and availability of skilled workforce), with a notable weakness in the total effective business tax rate.

NYS ranks 12th in cleantech venture capital investment, down from 9th in 2011.

NYS companies attracted \$43 million of cleantech venture capital (VC) investment in 2012. The state has experienced significant year-to-year variation in both the level of cleantech venture capital investment and the State's share of the U.S. total.

NYS Cleantech Venture Capital Investment, 2010

Source: Cleantech Group (2013)



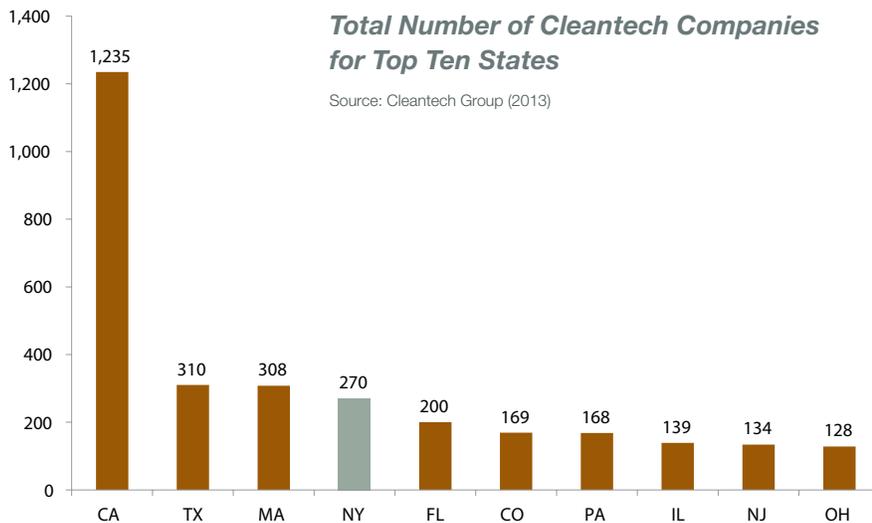
Business Environment Dashboard

Indicator	Ranking
Total number of STEM degrees granted	2
Value of all venture capital investments	3
TechAmerica high-tech employment rank	3
Private sector Green Goods and Services jobs	4
Value of cleantech VC investments	12
Per capita number of STEM degrees granted	19
State and Local Business Tax Competitiveness (weighted by capital)	23
Total Effective Business Tax Rate	41

Industry Development:

How developed is New York State’s cleantech industry base and related sectors?

NYS has the 3rd largest state economy with the 4th largest number of cleantech companies, green goods, and services jobs. Solar, energy efficiency, and advanced materials are among the top five cleantech sectors in NYS in terms of the number of companies.



NYS ranks 4th nationally in number of cleantech companies.

NYS has the 4th highest number (270) of cleantech companies, according to the Cleantech Group. While California is the clear frontrunner with 1,235 companies, NYS is close behind Texas and Massachusetts, which rank 2nd and 3rd respectively.

Industry Development Dashboard

Indicator	Ranking
Size of economy (gross state product)	3
Total number of Technology Fast 500 companies	3
Total number of cleantech companies	4
Private sector Green Goods & Services jobs	4
Per capita real gross state product	6

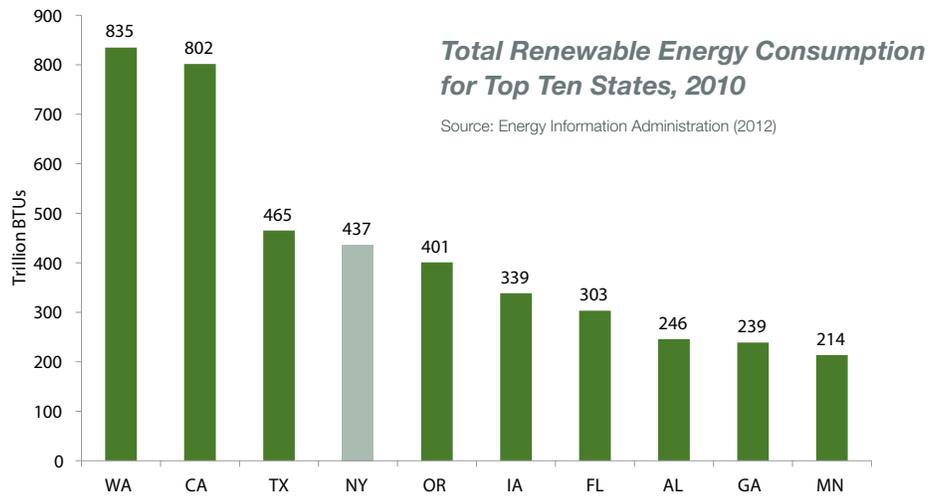
New York State leads the East Coast in renewable energy consumption.

Only Washington, California, and Texas consumed more renewable energy than NYS in 2010. The 437 million BTUs of renewable energy consumed in NYS in 2010 comprise more than 11% of total energy consumption, one of the highest shares in the country.

Clean Energy Market:

What is the size of the market for renewable energy and energy efficiency products and services?

Over the past ten years, NYS has enacted progressive renewable portfolio standards and energy efficiency mandates. NYS represents a sizable market for renewable energy and energy efficiency and ranks 4th in renewable energy consumption and 3rd in energy efficiency policies. NYS lags in some indicators of “early adopter” consumer behavior.



Clean Energy Market Dashboard

Indicator	Ranking
Total LEED-certified square footage	2
Total electric and gas efficiency program	2
ACEEE State Energy Efficiency Policy Score	3
Total renewable energy consumption	4
Total number of net metering customers	5
Number of alternative fuel vehicles	5
Total energy consumption	8
Per capita LEED-certified square footage	10
Per capita number of net metering	18
Alternative fuel vehicles (share of total)	28



Research and Innovation

An innovation system is the network of actors whose activities create, acquire, modify, and diffuse new technologies. These actors include R&D-intensive companies, research universities, government labs, incubators/accelerators, investors, government funding and regulatory agencies, educational institutions (including community colleges), and customers (private sector and government procurement). The strength of a region's innovation system—as measured by the strength of the actors, but also by the strength of the connections between the actors—impacts a region's industrial competitiveness and economic growth.

The Research and Innovation Category benchmarks the relative strength of NYS' research universities, government labs, and companies in winning competitive R&D funding, patenting, and commercializing new technologies overall and with regard to clean technologies specifically.

Key Findings:

Competitive Research and Development (R&D) Awards

- NYS ranks 5th among states in competitive R&D funding from the U.S. Department of Energy (DOE).
- NYS and four other states receive two-thirds of DOE R&D funding annually.
- The state ranks 5th in total value of Advanced Research Projects Agency-Energy (ARPA-E) awards, which fund transformational, high-risk energy research.

University R&D Activity

- NYS universities rank 2nd in total research expenditures, and research funding at NYS universities is trending upwards.
- NYS universities rank 17th in the share of total research expenditures funded by industry (6.9%), on par with California (6.8%) and ahead of Massachusetts (5.5%).

R&D Outputs

- NYS ranks 2nd nationally in cleantech patenting, and the number of cleantech patents registered each year is on the rise.
- Alternative vehicles, wind energy, and solar/photovoltaic (PV) increased their respective shares of total NYS cleantech patents registered from 2001 to 2011.
- NYS is the top inventor for wind energy technology patents registered, and ranked 2nd in electric/hybrid/fuel cell vehicle patents, solar/PV patents, and energy infrastructure patents.
- NYS ranks 4th in battery/energy storage patents, 6th in biofuels/biomass patents, and 7th in both nuclear power technology and water treatment patents.

Commercialization Activities

- NYS companies won the 7th highest number of Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) awards nationally, with the number of energy-related SBIR/STTR awards to NYS companies trending upwards over time.
- The average value of SBIR/STTR awards to NYS companies is higher than most other states.
- NYS universities execute the 3rd highest number of technology licenses and options nationally.

The Research and Innovation Category includes the following indicator groups and their underlying metrics.

Competitive R&D Awards Indicators

DOE R&D Funding

- Total value of federal R&D obligations from DOE by state
- Share of federal R&D obligations from DOE for top five states vs. rest of states/other

DOE Contracts

- Total annual value of contracts from DOE by state

ARPA-E Awards

- Total value of ARPA-E awards by state

University R&D Activity Indicators

Industry-sponsored Research Expenditures at Universities

- Total research expenditures at major research universities by state
- Industry share of total sponsored research expenditures at major research universities, by state

R&D Outputs Indicator

Patents

- Total number of clean technology patent registrations in past three years by state
- Number of clean technology patent registrations for NYS: total and by technology

Commercialization Activities Indicators

University Licenses and Options Executed

- Number of licenses and options executed by major research universities by state

Small Business Innovation Research/ Small Business Technology Transfer (SBIR/STTR) Awards

- Total number of SBIR/STTR Phase I/II awards by state
- Total value of SBIR/STTR Phase I/II awards by state
- Average value of SBIR/STTR Phase I/II awards by state
- Total number of SBIR/STTR Phase I/II awards for NYS

Energy-Related SBIR/STTR Awards (DOD/DOE/NSF/NASA)

- Total number of energy-related SBIR/STTR Phase I/II awards for NYS
- Total value of energy-related SBIR/STTR Phase I/II awards for NYS

New York State ranks 5th in competitive R&D funding from the U.S. Department of Energy.

NYS' federal R&D funding from the DOE totalled \$764 million for 2009, according to the National Science Foundation.

NYS and four other states receive 65% of R&D funding from the U.S. Department of Energy.

NYS is among the top five states that received 60% of available DOE R&D funding in 2009. NYS, with \$764 million trails only California, New Mexico, Illinois, and Tennessee in DOE R&D funding. California and New Mexico, which have multiple DOE national laboratories, lead all states by a wide margin, with \$2.0 billion and \$1.8 billion in funding, respectively.

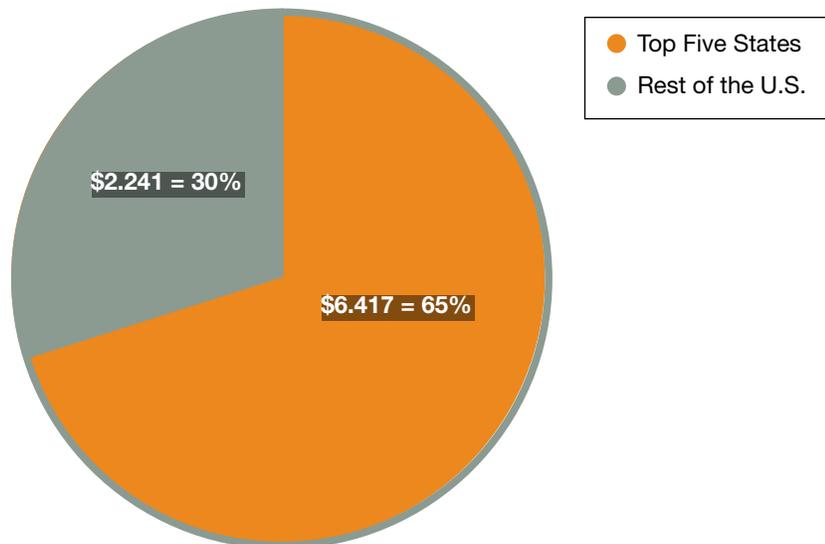
Federal R&D Funding from the U.S. Dept of Energy for the Top Ten States, 2009 (\$ Millions)

1 California	\$2,032
2 New Mexico.	\$1,871
3 Illinois	\$930
4 Tennessee.	\$820
5 New York.	\$764
6 Pennsylvania	\$417
7 Colorado	\$342
8 Idaho	\$262
9 Washington	\$259
10 Nevada	\$178

Source: National Science Foundation (2009)

Top Five States' Share of U.S. Department of Energy R&D Funding 2009 (\$ Millions)

Source: National Science Foundation (2009)



The U.S. Department of Energy is the 3rd largest source of federal funding for NYS.

NYS received a combined \$6.1 billion in federal R&D awards from across all agencies in 2009.

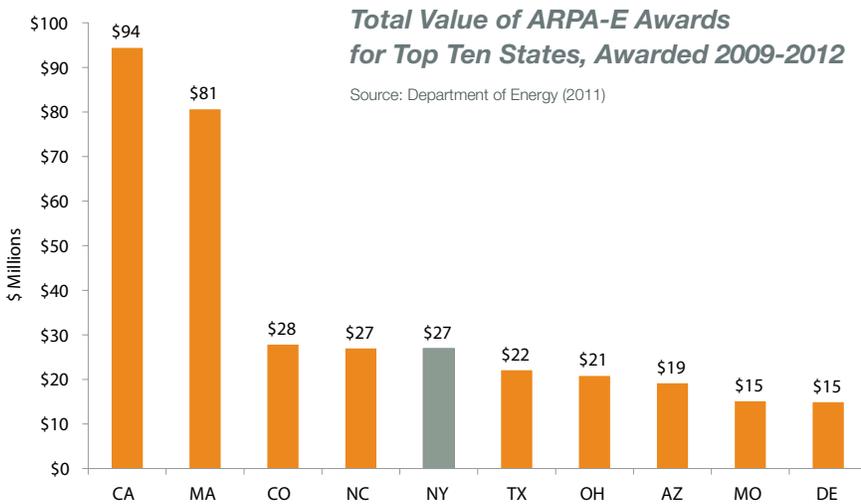
- 1 39.7% – The Department of Health & Human Services
- 2 37.5% – The Department of Defense
- 3 12.5% – The U.S. Department of Energy

New York State ranks 10th in total value of U.S. Department of Energy contracts.

With \$751 million in DOE contracts in 2011, NYS ranks 10th among states in DOE contracting in terms of value. New Mexico is the clear frontrunner with \$5.1 billion in DOE contracts.

NYS ranks 5th nationally in total value of ARPA-E awards.

NYS has ranked 5th in the cumulative value of its ARPA-E awards (nearly \$27 million), since the inception of the program in 2009. The top two states, California and Massachusetts, receive a disproportionate share of ARPA-E awards, amounting to \$174 million, or 36.8% of the nation's total. The top ten states constitute 73.4% of the all ARPA-E awards in value.



Total Value of U.S. Dept. of Energy Contracts for Top Ten States, FY2011 (\$ Millions)

1 New Mexico	\$5,167
2 Tennessee	\$2,978
3 Washington	\$2,943
4 California	\$2,783
5 South Carolina	\$2,211
6 Idaho	\$1,294
7 Illinois	\$1,149
8 Pennsylvania	\$930
9 Virginia	\$854
10 New York	\$751

Source: OMB Watch (2011)

High number of ARPA-E awards in New York State.

ARPA-E is the Advanced Research Projects Agency-Energy within DOE and is modeled after the successful Defense Advanced Research Projects Agency (DARPA). ARPA-E's mission is to fund transformational energy research that industry cannot or will not support due to its high risk. There have been 13 recipients of ARPA-E awards at present, which include Columbia University, Cornell University, CUNY Energy Institute, Brookhaven National Laboratory, Alliant Techsystems, and GE Global Research. The average value of ARPA-E awards in NYS is \$2.0 million.

New York State universities rank 2nd in total research expenditures.

R&D expenditures at major research universities in NYS totaled \$3.8 billion in 2011, placing NYS behind California (\$7.2 billion), according to the Association of University Technology Managers.

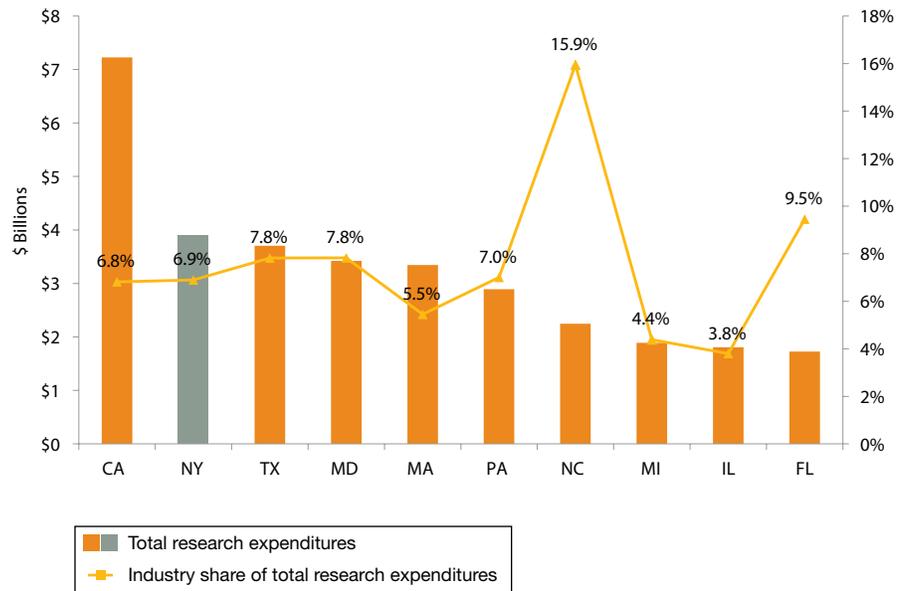
However, NYS ranks only slightly above average in the industry-sponsored share of university research expenditures. In 2011, the share of total research expenditures at NYS universities funded by industry was 6.9%, placing the state at 17th nationally, but on par with California (6.8%) and exceeding Massachusetts (5.5%).

Upward trends in research funding at NYS universities.

Total research funding expenditures have increased every year from \$1.8 billion in 2000 to \$3.8 billion in 2010, representing an annual growth rate of 7.9%. Meanwhile, industrial research funding at NYS universities in 2010 reached its highest share of total research expenditures for the decade, increasing from 4.6% in 2000 to 6.9% in 2010. By comparison, research universities in the top ten states for research expenditures in 2010 have smaller industry-sponsored shares in 2010 than in 2000, with the exception of NYS and Maryland, according to the Association of University Technology Managers.

Total Research Expenditures at Universities and Industry-Sponsored Share in Top Ten States, 2010

Source: Association of University Technology Managers (2011)



New York State ranks 2nd nationally in cleantech patents.

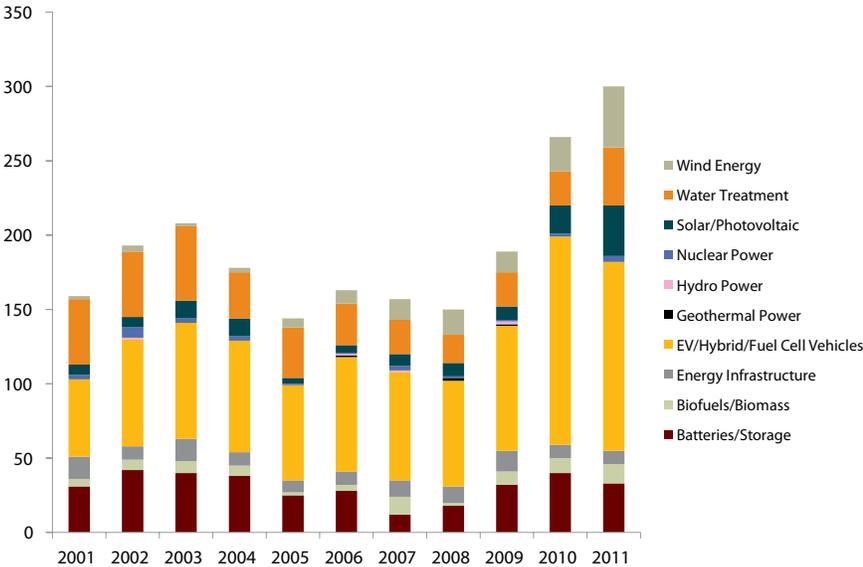
From 2009 to 2011, NYS inventors registered 736 cleantech patents, according to 1790 Analytics. NYS trails only California, which registered 1,564 cleantech patents over the same time period—more than double the NYS number. California and NYS have consistently held the 1st and 2nd rankings, respectively, over the 2001-2003 and 2009-2011 periods.

NYS cleantech patents are on the rise.

In 2011, NYS recorded the highest number of cleantech patents over the past decade with 300 patents registered, representing a 12% increase from 2010 (266 cleantech patents) and an 88% increase from 2001 (159 cleantech patents). According to 1790 Analytics, cleantech patent activity in NYS has been on an upswing since the mid-2000s.

NYS Cleantech Patents Registered, 2001-2011

Source: 1790 Analytics (2012)



Total Cleantech Patents Registered in Top Ten States, 2009-2011

1 California	1,564
2 New York	736
3 Michigan	650
4 Texas	492
5 Ohio	359
6 Massachusetts	358
7 Illinois	343
8 Pennsylvania	343
9 Florida	322
10 Minnesota	279

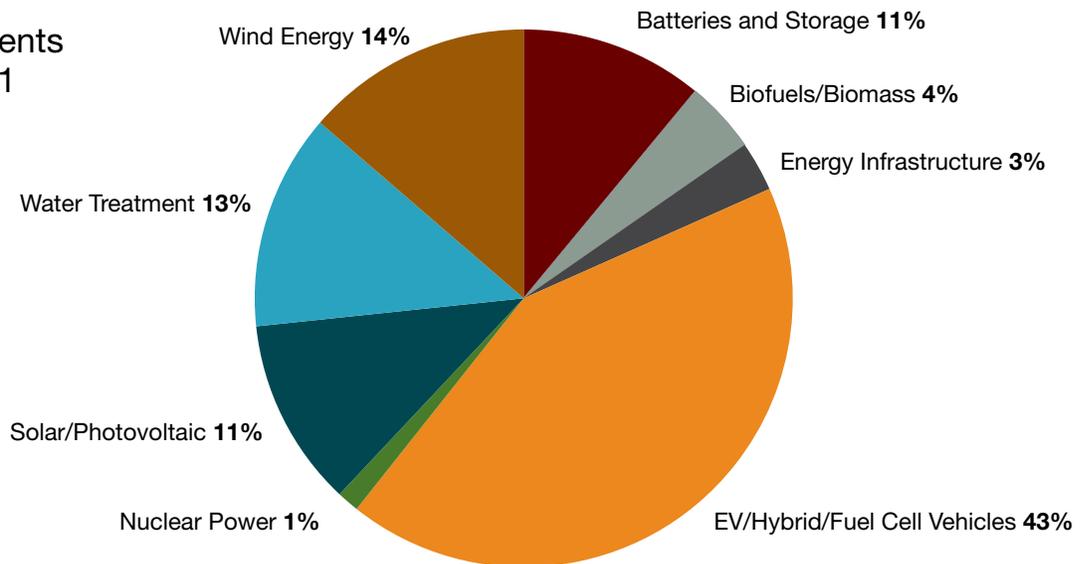
Source: 1790 Analytics (2012)

New York State has a proportionately greater share of cleantech patent activity in EV/hybrid/fuel cell vehicle and wind energy, relative to the U.S.

In NYS, 43% of cleantech patents registered in 2011 were in EV/hybrid/fuel cell vehicle technology; almost double the share nationally (22%). Also, 14% of NYS cleantech patents were in wind energy, relative to the 8% share for the U.S. overall in 2011.

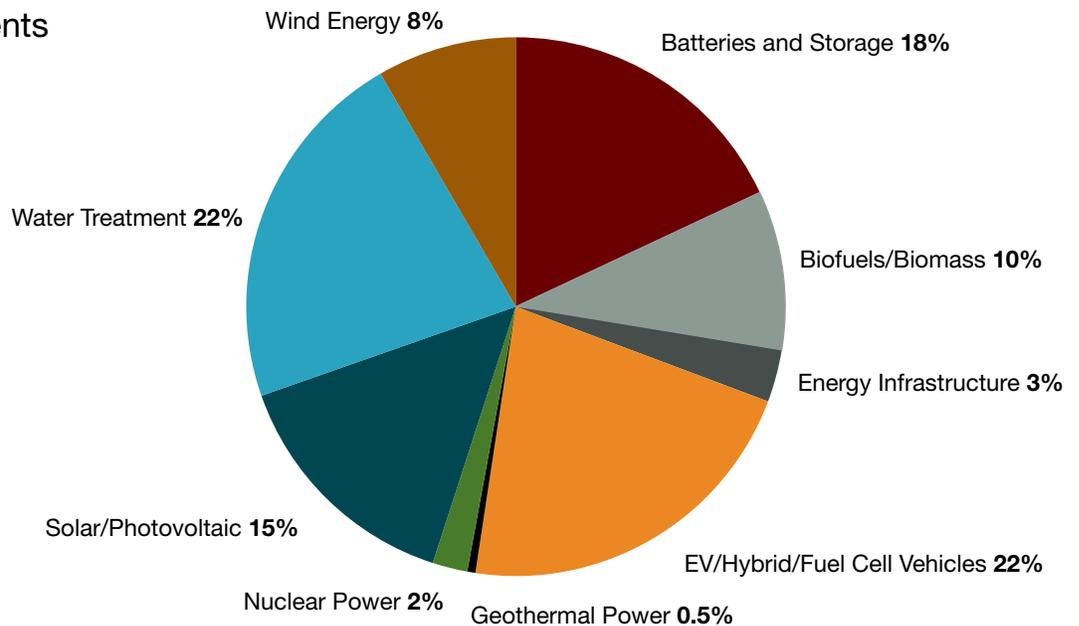
NYS Cleantech Patents by Technology, 2011

Source: 1790 Analytics (2012)



U.S. Cleantech Patents by Technology, 2011

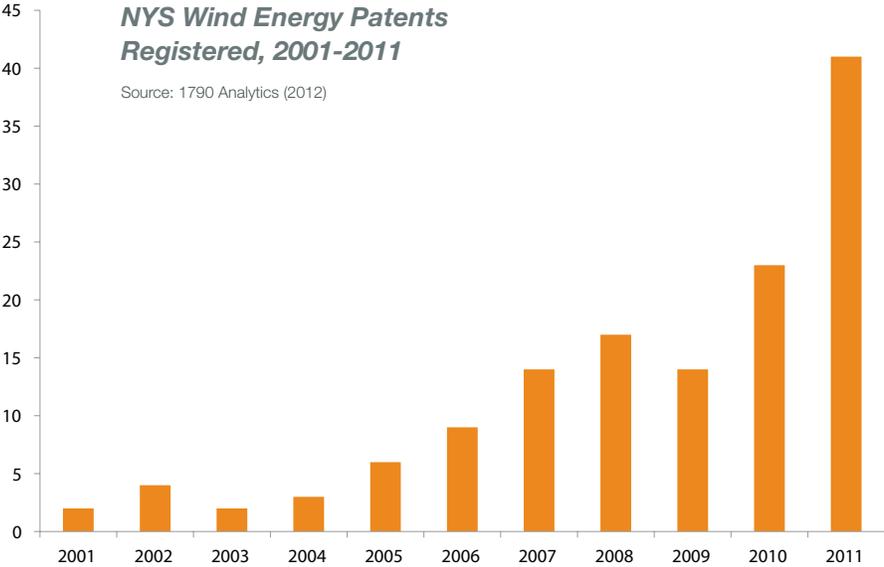
Source: 1790 Analytics (2012)



New York State leads the country in wind energy patents.

NYS registered 78 patents in wind energy technologies from 2009 to 2011, up from just 8 during the 2001-2003 period. Over these two time periods, NYS improved its ranking from 2nd to 1st, demonstrating strong leadership in the wind energy sector.

General Electric is the predominant inventor in NYS, with 105 patents assigned from 2001 to 2011.



Wind Energy Patents Registered in Top Ten States, 2009-2011

1 New York	78
2 South Carolina	75
3 California	66
4 Texas	29
5 Massachusetts	26
6 Virginia	25
7 Florida.	18
8 Ohio	16
9 Pennsylvania	14
10 Connecticut	14

Source: 1790 Analytics (2012)

NYS Top Ten Patent Assignees: Wind Energy, 2001-2011

1 General Electric Company	105	6 Frontier Engineer Products	1
2 Vestas Wind Systems A/S	2	7 H&S Autoshot Mfg. Co.	1
3 Spellman High Voltage	2	8 IBM Corporation	1
4 United Technologies Corp.	1	9 Volt-Aire Corporation	1
5 Dana Holding Corp..	1	10 Omnitek Partners LLC	1

Source: 1790 Analytics (2012)

New York State ranks 2nd nationally in solar/photovoltaic patents.

From 2009 to 2011, NYS registered 61 patents in solar and photovoltaic technologies. While ranking 2nd nationally, and holding its ranking from 2001-2003, the number of solar/PV patents registered by NYS inventors lagged significantly behind California, which registered over six times as many solar/PV patents (380 patents) during the same time period.

General Electric registered the highest number of patents for NYS from 2001 to 2011, followed by IBM, Sunpower, and Lockheed Martin.

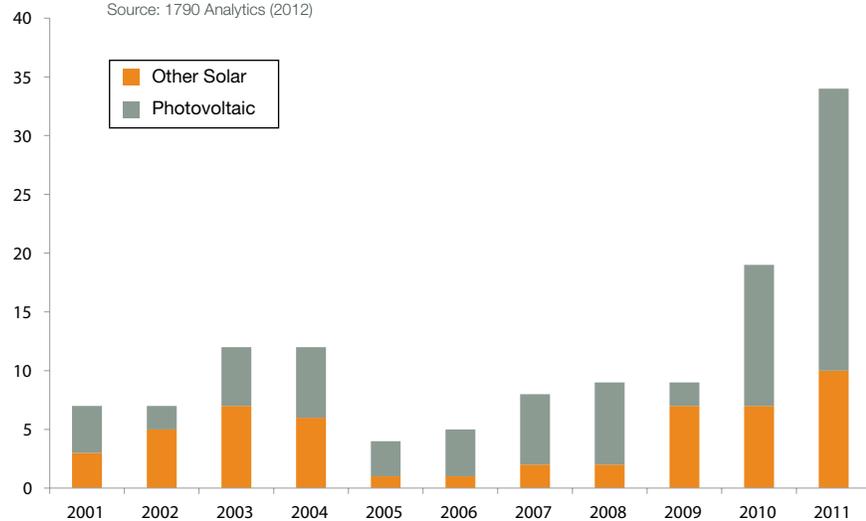
Solar/Photovoltaic Patents Registered in Top Ten States, 2009-2011

1 California	380
2 New York	61
3 Massachusetts	57
4 Michigan	41
5 Colorado	39
6 Texas	34
7 Florida	32
8 New Mexico	26
9 New Jersey	24
10 Pennsylvania	23

Source: 1790 Analytics (2012)

NYS Solar/Photovoltaic Patents Registered, 2001-2011

Source: 1790 Analytics (2012)



NYS Top Ten Patent Assignees: Wind Energy, 2001-2011

1 General Electric Company	32	6 Pinnacle West Capital	3
2 IBM Corporation	10	7 Koninklijke Philips Electronics	2
3 Sunpower Corp.	5	8 Omnitek Partners, LLC	2
4 Lockheed Martin Corp.	4	9 Eastman Kodak Company	2
5 Rensselaer Polytechnic Institute.	3	10 Solaire Generation	2

Source: 1790 Analytics (2012)

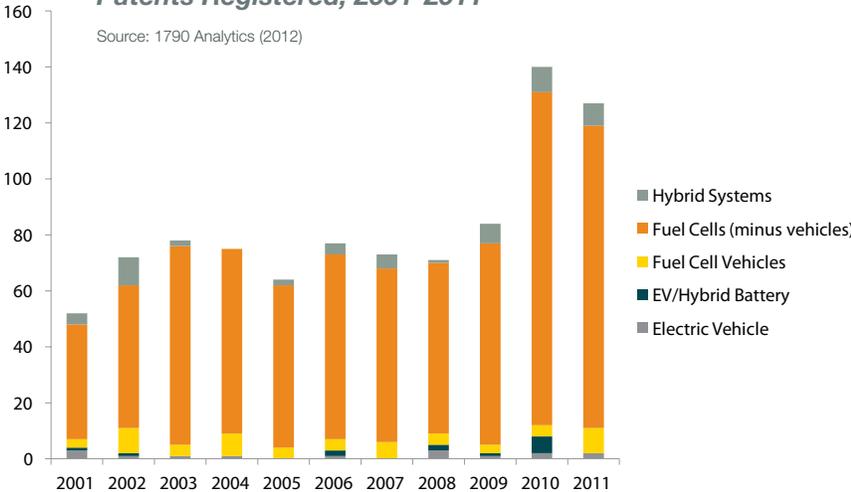
New York State ranks 2nd nationally for electric/hybrid/fuel cell vehicle patents.

NYS registered 340 patents in electric, hybrid, and fuel cell vehicle technologies from 2009 to 2011, a 75% increase from the 194 patents registered from 2001 to 2003. The state maintained its 2nd place rank nationally over both the 2001-2003 and 2009-2011 periods. Only Michigan, which registered 385 patents from 2009 to 2011, outranked NYS.

General Motors leads NYS patent assignees with 369 patents from 2001 to 2011. Other notable assignees include Plug Power, Delphi Automotive, and General Electric.

NYS Electric/Hybrid/Fuel Cell Vehicles Patents Registered, 2001-2011

Source: 1790 Analytics (2012)



Electric/Hybrid/Fuel Cell Vehicles Patents Registered in Top Ten States, 2009-2011

1 Michigan	385
2 New York	340
3 California	299
4 Connecticut	120
5 Massachusetts	86
6 Ohio	69
7 Illinois	68
8 Pennsylvania	62
9 Oregon	52
10 Minnesota	44

Source: 1790 Analytics (2012)

NYS Top Ten Patent Assignees: Electric/Hybrid/Fuel Cell Vehicles, 2001-2011

1 General Motors Corp.	369	6 Mechanical Technology Inc.	42
2 Plug Power Inc.	107	7 Corning Inc.	27
3 Delphi Automotive Plc.	98	8 Brookhaven Science Assoc.	9
4 General Electric Company	49	9 Bae Systems Plc.	8
5 Reveo Inc.	43	10 Procter & Gamble Co.	8

Source: 1790 Analytics (2012)

New York State ranks 2nd nationally in energy infrastructure patents.

Energy infrastructure technology includes power transmission, smart grid, and smart meter technology. Trailing only California, NYS registered 31 energy infrastructure patents from 2009 to 2011. This represents a decline from 39 patents registered from 2001 to 2003, during which time NYS ranked 1st in energy infrastructure patents.

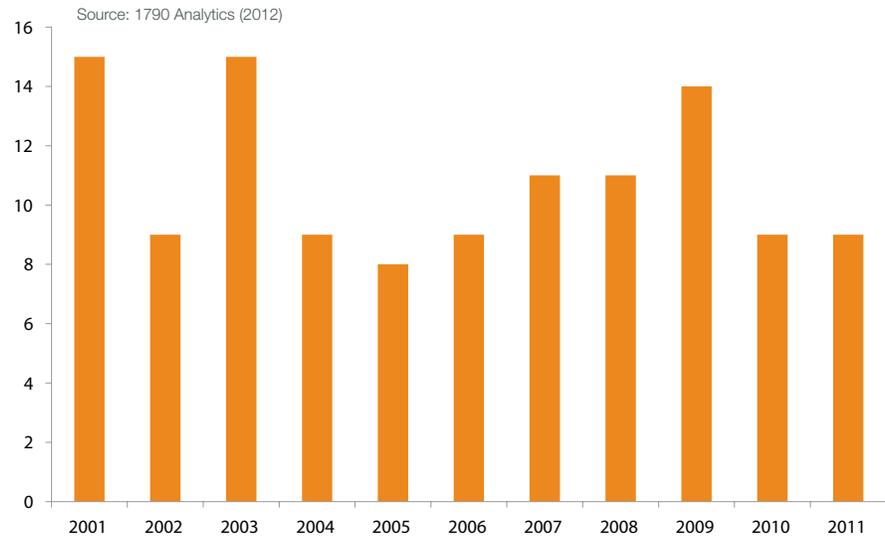
General Electric, Current Communications Group, Electro Industries Gauge Tech, and Legrand are top NYS assignees in this category, measured by patents registered from 2001 to 2011.

Energy Infrastructure Patents Registered in Top Ten States, 2009-2011

1 California	44
2 New York	31
3 Maryland	23
4 Texas	21
5 Georgia	19
6 Washington	15
7 Wisconsin	15
8 Pennsylvania	13
9 Minnesota	11
10 Florida	11

Source: 1790 Analytics (2012)

NYS Energy Infrastructure Patents Registered, 2001-2011



NYS Top Ten Patent Assignees: Energy Infrastructure, 2001-2011

1 General Electric Company	17	6 DGI Creations LLC	6
2 Current Communications Group	15	7 Quadlogic Controls Corporation	6
3 Electro Industries Gauge Tech	13	8 IBM Corporation	4
4 Legrand S.A.	13	9 Honeywell International Inc.	3
5 Leviton Manufacturing Co.	8	10 Nattel Group, Inc.	3

Source: 1790 Analytics (2012)

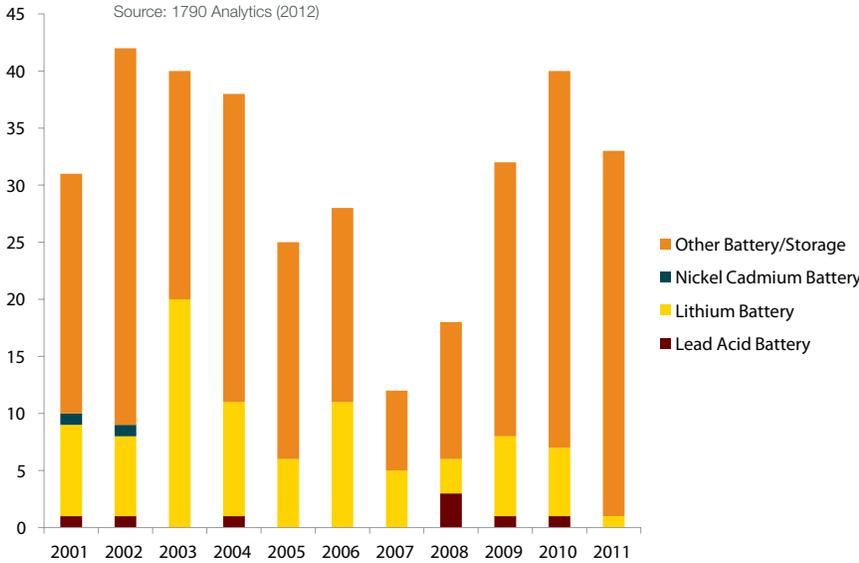
New York State ranks 4th nationally in battery/energy storage patents.

NYS inventors registered 99 patents in battery/energy storage technology from 2009 to 2011, ranking the state 4th nationally behind California (338 patents), Ohio (124), and Texas (105). While still a leader in battery/energy storage technology patenting, NYS' ranking fell relative to the 2001-2003 period when it ranked 2nd.

Greatbatch Inc. is the NYS' top inventor in battery/energy storage technologies, followed by Motorola, General Electric, and Honeywell.

NYS Battery/Energy Storage Patents Registered, 2001-2011

Source: 1790 Analytics (2012)



Battery/Energy Storage Patents Registered in Top Ten States, 2009-2011

1 California	338
2 Ohio	124
3 Texas	105
4 New York	99
5 Minnesota	94
6 Massachusetts	90
7 Michigan	88
8 Illinois	88
9 Wisconsin	77
10 Pennsylvania	72

Source: 1790 Analytics (2012)

NYS Top Ten Patent Assignees: Battery/Energy Storage, 2001-2011

1 Greatbatch Inc.	151	6 Reveo Inc.	7
2 Motorola Solutions Inc.	17	7 Eastman Kodak Company	6
3 General Electric Company	14	8 IBM Corporation	6
4 Honeywell International Inc.	12	9 Koninklijke Philips Electronics	6
5 Energizer Holdings Inc.	9	10 Procter & Gamble Co.	5

Source: 1790 Analytics (2012)

New York State ranks 6th nationally in biofuels/biomass patents.

With 32 patents registered from 2009 to 2011, NYS ranks 6th in the nation in biofuels/biomass patents. California is the leader nationally with 91 such patents over the same time frame, followed by Texas, Illinois, Colorado, and Pennsylvania. NYS also ranked 6th in 2001-2003.

The NYS patent assignees with the highest number of biofuels/biomass patents registered from 2001 to 2011 are Praxair Inc., the State University of New York, and AB-CWT.

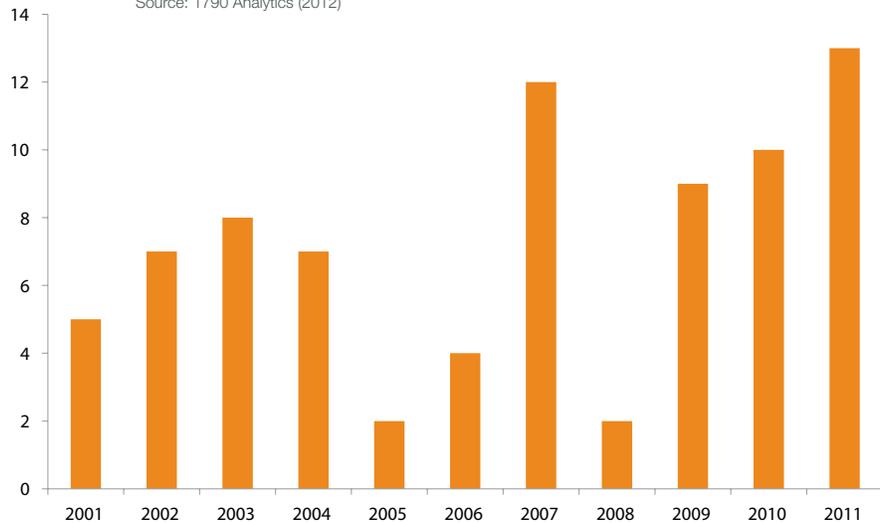
Biofuels/Biomass Patents Registered in Top Ten States, 2009-2011

1 California	91
2 Texas	58
3 Illinois	56
4 Colorado	43
5 Pennsylvania	41
6 New York	32
7 Washington	31
8 Michigan	29
9 Minnesota	28
10 Massachusetts	24

Source: 1790 Analytics (2012)

NYS Biofuels/Biomass Patents Registered, 2001-2011

Source: 1790 Analytics (2012)



NYS Top Ten Patent Assignees: Biofuels/Biomass, 2001-2011

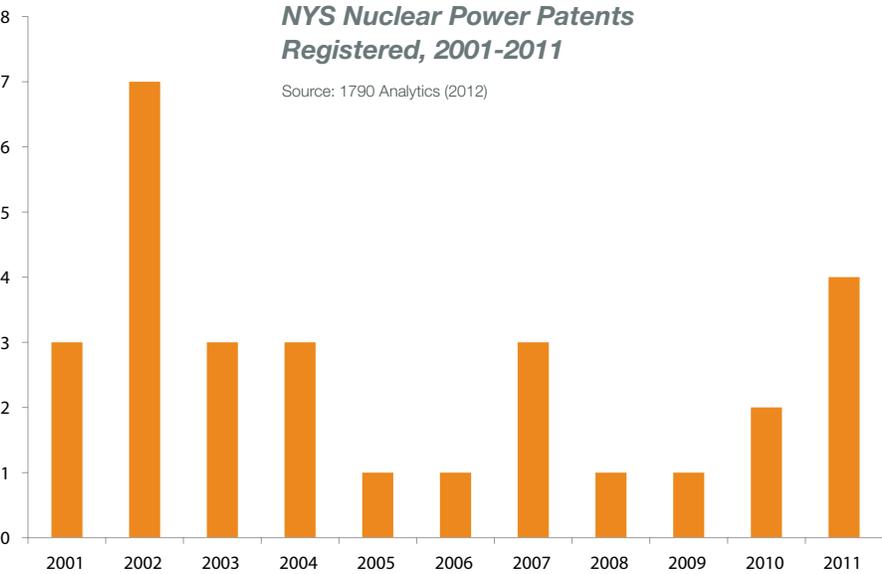
1 Praxair Inc.	16	6 ZeroPoint Clean Tech, Inc. . . . .	.4
2 State University of New York . . . . .	.8	7 ExxonMobil Corp. . . . .	.3
3 AB-CWT LLC . . . . .	.5	8 Casella Waste Systems Inc. . . . .	.2
4 Chevron Corporation . . . . .	.4	9 PowerEnerCat, Inc. . . . .	.2
5 General Electric Company . . . . .	.4	10 Andritz AG . . . . .	.1

Source: 1790 Analytics (2012)

New York State ranks 7th nationally in nuclear power technology patents.

NYS registered seven patents in nuclear power technologies from 2009 to 2011, down from 13 during the 2001-2003 period. As a result, NYS' ranking dropped from 6th during the 2001-2003 period to 7th from 2009 to 2011. California, North Carolina, and Pennsylvania lead the country in nuclear power technology patents.

The primary assignee for nuclear power patents in NYS is General Electric, with 21 patents from 2001 to 2011.



Nuclear Power Patents Registered in Top Ten States, 2009-2011

1 California	52
2 North Carolina	34
3 Pennsylvania	18
4 Virginia	10
4 South Carolina	10
6 Florida.	8
7 New Jersey	7
7 New York	7
9 Washington	6
9 New Mexico.	6

Source: 1790 Analytics (2012)

NYS Top Ten Patent Assignees: Nuclear Power, 2001-2011

1 Greatbatch Inc.	151	6 Reveo Inc.	7
2 Motorola Solutions Inc.	17	7 Eastman Kodak Company	6
3 General Electric Company	14	8 IBM Corporation	6
4 Honeywell International Inc.	12	9 Koninklijke Philips Electronics	6
5 Energizer Holdings Inc.	9	10 Procter & Gamble Co.	5

Source: 1790 Analytics (2012)

New York State ranks 7th nationally in water treatment patents.

NYS inventors registered 85 patents for water treatment technologies from 2009 to 2011, ranking the State 7th nationally. This represents a decline in national rank from NYS' 4th place in 2001 to 2003. California, Texas, and Florida lead the country in water treatment technology patenting, ranking in the top three during both the 2009-2011 and 2001-2003 periods.

In NYS, General Electric, General Motors, and Praxair are the lead inventors of water treatment technologies measured by patents registered from 2001 to 2011.

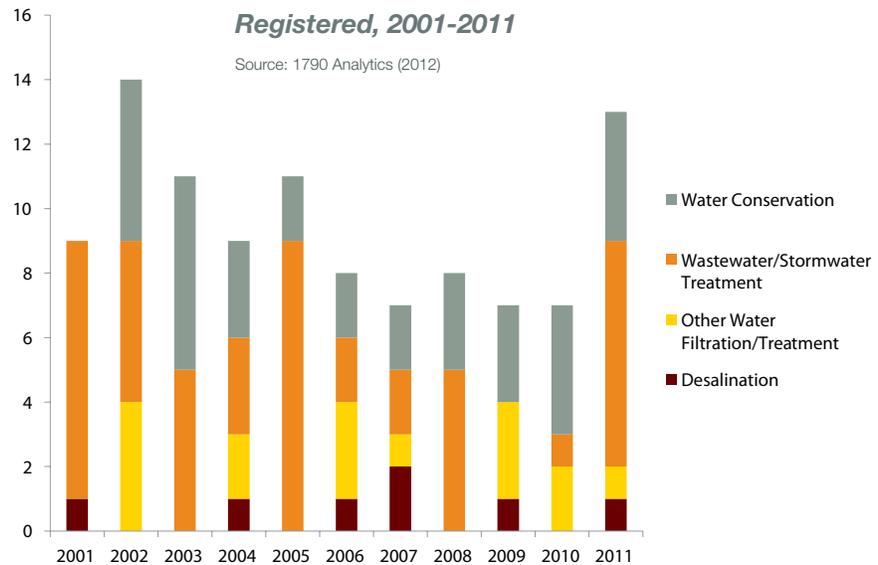
Water Treatment Patents Registered in Top Ten States, 2009-2011

1 California	283
2 Texas	179
3 Florida.	148
4 Illinois	98
5 Pennsylvania	95
6 Ohio.	94
7 New York.	85
8 New Jersey	84
9 Minnesota.	81
10 Michigan.	79

Source: 1790 Analytics (2012)

NYS Water Treatment Patents Registered, 2001-2011

Source: 1790 Analytics (2012)



NYS Top Ten Patent Assignees: Water Treatment, 2001-2011

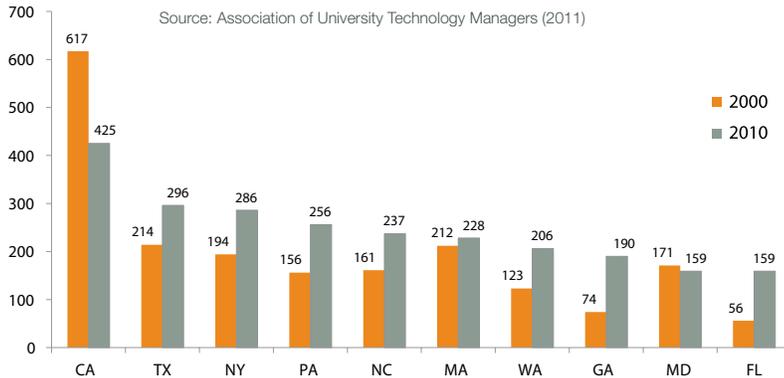
1 General Electric Company	28	6 Eastman Kodak Company	6
2 General Motors Corp	16	7 Cytec Industries Inc.	5
3 Praxair Inc.	11	7 Lonza Group AG	5
4 Mechanical Technology Inc..	9	7 Oxygen8 Inc..	5
5 Corning Inc..	8	10 Columbia University	4

Source: 1790 Analytics (2012)

New York State universities execute the 3rd highest number of technology licenses and options.

In 2010, NYS universities executed 286 technology licenses and options, up from 194 in 2000. On average, this number increased by 4% annually from 2000 to 2010, which is the 5th highest growth rate among the top ten states.

Number of University Licenses and Options Executed for Top Ten States, 2000 and 2010



Hospitals and Research Institutes (4HRI) are not included.

Universities license technologies stemming from research to existing companies and startups. Therefore, the number of licenses and options executed is one indicator of a university's commercial impact. The amount of industry-sponsored research performed at a university is another indicator of commercial impact, and in this case companies may own rights to the intellectual property (IP) without having to license the technology.

This indicator does provide a measure of the strength of a university's technology transfer office and commercial-orientation of the faculty/researchers. On a statewide basis, NYS ranks highly in this indicator.

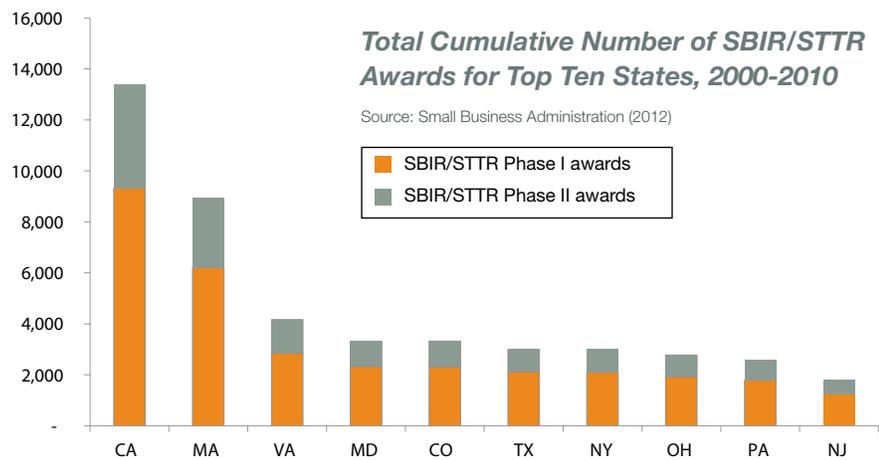
New York State companies won the 7th highest number of SBIR/STTR awards.

The intent of the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) federal program is to provide federal seed capital for technology commercialization by early-stage companies.

From 2000 to 2010, NYS companies received 2,309 SBIR/STTR Phase I and II awards, the 7th highest total in the nation. Cumulatively, SBIR/STTR awards in NYS amounted to \$965 million, the 5th highest value in the U.S.

High average value for SBIR/STTR awards in NYS.

NYS ranks 2nd and 1st nationally in the average values of Phase I and II awards, respectively. NYS companies received an average of \$120,227 per Phase I award and \$764,791 per Phase II award.



Total Number and Value of SBIR/STTR Awards for Top Ten States, 2000-2010

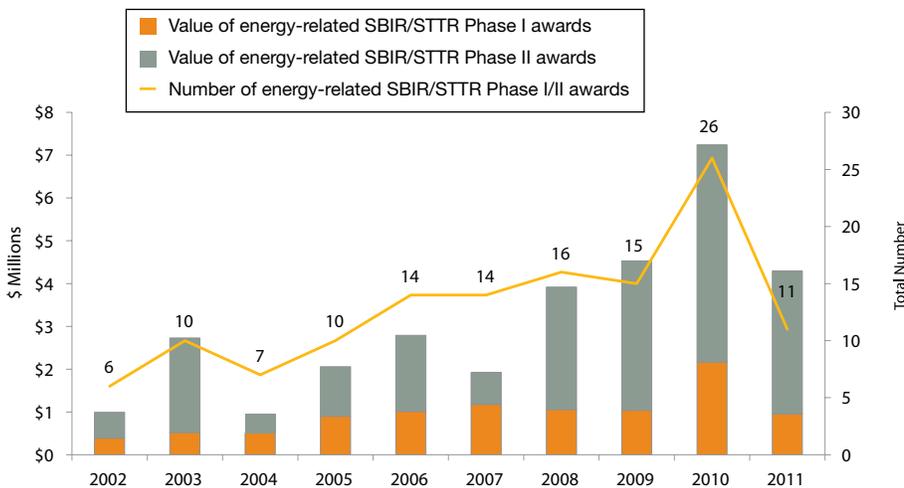
Rank (Based on Total Number of Phase I and II Awards)	Phase I			Phase II		
	Total Number	Phase I Awards Total Value (\$ Millions)	Avg. Value	Total Number	Phase II Awards Total Value (\$ Millions)	Avg. Value
1 California	10,248	\$1,071	\$114,793	4,059	\$2,995	\$737,972
2 Massachusetts	6,888	\$705	\$113,573	2,746	\$2,030	\$739,090
3 Virginia	3,146	\$276	\$96,710	1,307	\$894	\$684,129
4 Maryland	2,596	\$290	\$124,166	984	\$732	\$743,402
5 Colorado	2,542	\$240	\$103,392	1,001	\$714	\$713,277
6 Texas	2,322	\$235	\$110,581	874	\$628	\$718,079
7 New York	2,309	\$252	\$120,227	932	\$713	\$764,791
8 Ohio	2,113	\$217	\$112,424	843	\$614	\$727,772
9 Pennsylvania	1,954	\$208	\$116,466	807	\$589	\$729,774
10 New Jersey	1,391	\$134	\$107,217	560	\$409	\$730,028

Upward trend in New York State energy-related SBIR/STTR awards.

From only six energy-related SBIR/STTR awards valued at \$990,000 in 2002, NYS experienced a steady increase in the number and value of these awards, which peaked at 26 awards worth \$7.2 million in 2010. This growth was due in part to federal stimulus funding. In 2011, those numbers returned to pre-stimulus levels, falling to 11 energy-related SBIR/STTR awards valued at \$4.2 million.

NYS Energy-Related SBIR/STTR Awards (DOD/DOE/NSF/NASA), 2002-2011

Source: Small Business Administration (2012)





Business Environment

Cleantech companies span several industry sectors. The same business environment fundamentals that are critical to technology companies broadly are critical to cleantech companies as well: access to capital, availability of skilled and professional workers, transparency and ease of compliance with government regulations, access to customers/markets, and overall cost of doing business (e.g., tax rates, indirect labor costs, energy prices).

The Business Environment Category benchmarks how attractive the NYS business environment is for new and expanding technology companies. It tracks NYS trends in: venture capital (VC) activity; small business loan activity; science, technology, engineering, and mathematics (STEM) graduates and workforce availability; regional average wages; tax competitiveness; and cost of energy.

Key Findings:

Venture Capital

- NYS ranks 3rd nationally in total VC investment, up from 5th in 2007.
- Between 2007 and 2011, VC investment in NYS grew by nearly 80%.
- NYS' share of total VC deals also increased during this period, with NYS companies accounting for 8.6% of U.S. VC deals in 2011.
- NYS cleantech companies attracted \$43 million in cleantech VC in 2012.
- NYS ranks 12th nationally in cleantech VC investment over the 2007-2012 period.

Workforce

- NYS consistently awards an above-average number of STEM degrees per capita, ranking 19th nationally.
- The State ranks 2nd in total STEM degrees awarded by institutes of higher education each year.
- NYS ranks 3rd nationally for total high-tech employment.
- NYS ranks 4th nationally in green goods and services employment.

Cost of Doing Business

- Average annual wages in Upstate New York are below the national average.
- State and local taxation on new investment in NYS is slightly below the U.S. average, with NYS ranking 23rd (weighted by capital).
- NYS electricity prices are higher than the national average, creating a market opportunity for renewable energy and energy efficiency products and services in the country's 3rd largest state economy.
- NYS' low-cost hydropower incentives for expanding manufacturing and technology companies balances the relatively high electricity prices.

The Business Environment Category includes the following indicator groups and their underlying metrics.

Venture Capital Indicators

Venture Capital Investments

- Total annual value of investments and NYS share of U.S. total
- Total annual value of investments by state
- NYS VC deals: total annual number and share of U.S. total

Cleantech Venture Capital Investments

- Total annual value of investments and NYS share of U.S. total
- Total annual number of deals and share of U.S. total
- Deals by round
- Investment by sector
- Total annual value of investments by state

Cleantech IPOs and M&As

- NYS cleantech exits

Workforce Indicators

Science, Technology, Engineering and Mathematics (STEM) Degrees Awarded

- Per capita number of STEM degrees awarded (associate's, bachelor's, master's, and doctoral) by NYS institutes of higher education, compared to U.S. overall
- Total number of STEM degrees awarded by state

Managerial, Professional and Technical Jobs

- Number of individuals in managerial, professional and technical jobs in NYS
- Concentration of managerial, professional and technical jobs in NYS, compared to U.S. overall

STEM Jobs

- Number of individuals in Science, Technology, Engineering and Mathematics jobs in NYS
- Percentage of Science, Technology, Engineering and Mathematics jobs in NYS, compared to U.S. overall

High-Technology Jobs

- Number of individuals in high-technology jobs by state

Green Goods and Services Jobs

- Private sector GGS employment by state
- NYS breakdown of private sector GGS employment by industry

Cost of Doing Business Indicators

Cost of Labor

- Average annual pay by NYS region

Tax Competitiveness

- Total Effective Business Tax Rate: State & Local Business Taxes as % of Private GSP, by state
- State and Local Business Tax Competitiveness Index: Taxes on New Investment by Selected Industries, by state

Cost of Energy

- Average residential electricity price and monthly bill in NYS, compared to U.S. overall
- Average retail industrial electricity price and monthly bill in NYS, compared to U.S. overall
- Average annual commercial electricity price and monthly bill in NYS, compared to U.S. overall

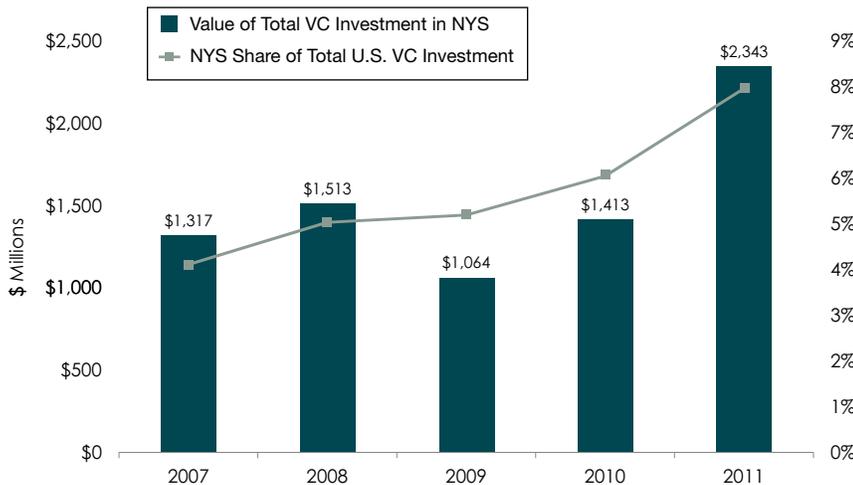
Venture capital investment in New York State companies has grown by nearly 80% since 2007.

NYS' share of U.S. venture capital deals is increasing, accounting for 8.6% in 2011.

Over the past four years, NYS has significantly outpaced the national average growth rate in the number of VC deals. NYS experienced net growth of 119 deals from 2007 to 2011, while the U.S. overall experienced a decline in the number of deals. As a result, NYS' share of U.S. VC deals has risen substantially, from 5.2% in 2007 to 8.6% in 2011.

NYS Venture Capital Investment, All Industries, 2007-2011

Source: Pricewaterhouse Coopers, National Venture Capital Association (2012)



NYS ranks 3rd nationally in total venture capital investment, up from 5th in 2007.

VC is an important indicator of the vitality of NYS's overall innovation system, since it indicates the availability of risk capital for new technology-based ventures. Not included in the above numbers: Angel investing, corporate strategic investing and impact investing which may play an increasing role in NYS.

NYS ranks 3rd nationally in total venture capital investment, up from 5th in 2007.

Total Value of Venture Capital Investment for Top Ten States, 2007 and 2011 (\$ Millions)

2011

1 California	\$15,135
2 Massachusetts	\$3,071
3 New York	\$2,343
4 Texas	\$1,595
5 Illinois	\$770
6 Virginia	\$617
7 Colorado	\$611
8 Washington	\$551
9 Pennsylvania	\$508
10 New Jersey	\$485

2007

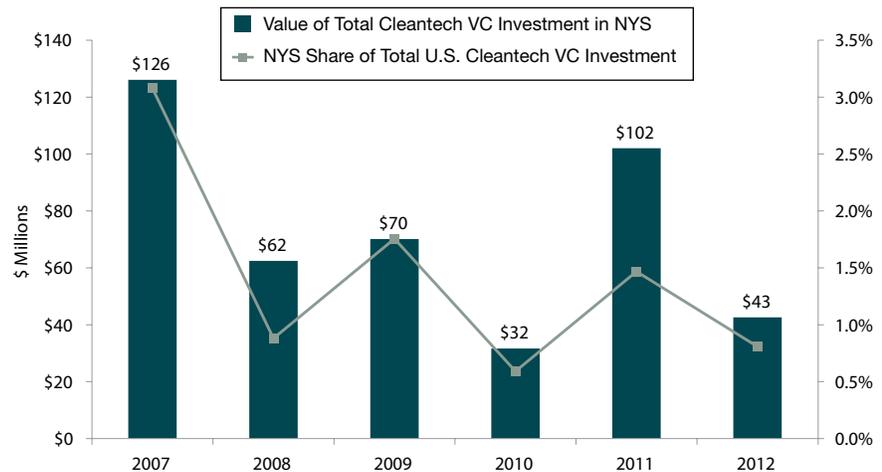
1 California	\$15,517
2 Massachusetts	\$3,744
3 Texas	\$1,571
4 Washington	\$1,359
5 New York	\$1,317
6 Pennsylvania	\$967
7 Maryland	\$727
8 Colorado	\$686
9 New Jersey	\$630
10 Virginia	\$622

New York State cleantech companies attracted \$43 million in venture capital investment in 2012.

Over the 2007-2012 period, NYS accounted for 1.3% of U.S. VC investment. During the same period, NYS has experienced significant year-to-year variation in both the level of cleantech VC investment and NYS' share of the U.S. total.

NYS Cleantech Venture Capital Investment

Source: Cleantech Group (2013)

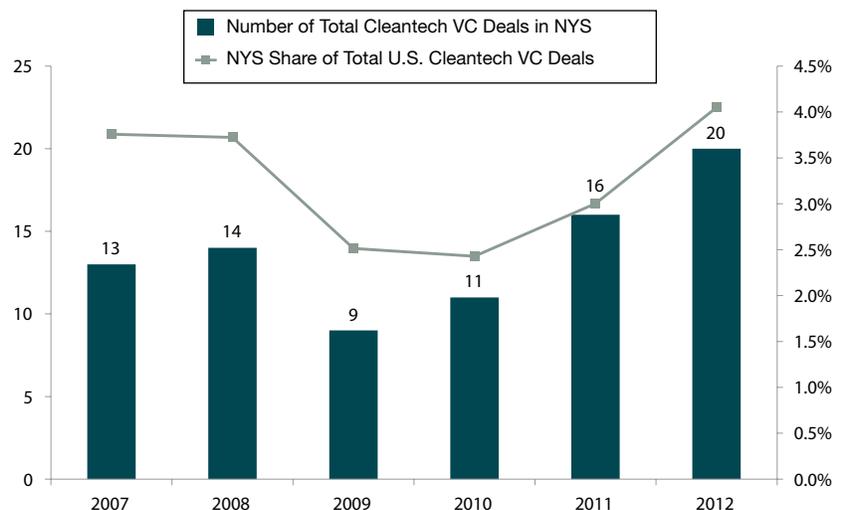


The number of cleantech venture capital deals in NYS is on the rise.

The number of cleantech VC deals in NYS increased from 13 deals in 2007 to 20 deals in 2012. The state's share of total U.S. cleantech venture capital deals has varied between a low of 2.4% (2010) and a high of 4.0% (2012) during the 2007-2012 period.

NYS Cleantech Venture Capital Deals

Source: Cleantech Group (2013)



New York State ranks 12th nationally in cleantech venture capital investment for the 2007-2012 period.

With \$435 million in VC investment over the 2007-2012 period, NYS ranks 12th among U.S. states. California is the strong leader, accounting for more than half of all U.S. cleantech VC investment from 2007 to 2012, followed by Massachusetts and Texas.

A number of NYS cleantech startups made successful exits during the 2008-2012 period.

Start-up companies typically exit through an initial public offering (IPO) or a strategic merger or acquisition (M&A). Over the past five years, several NYS cleantech start-ups have exited via M&A. Acquired companies represent a variety of cleantech sectors, including energy efficiency, advanced materials, solar, smart-grid, and water/wastewater. Cleantech exits are an important indicator of success for venture capital investors.

Exiting Company	Acquiring Company	Year
Efficiency 2.0 <i>Details: Development Partners: Greenlet Technologies & Recyclebank</i>	C3	2012
Crystal IS <i>Details: Venture Investment by: 3i Group, ARCH Venture Partners, Credit Suisse, Harris & Harris Group, Lux Capital, Asahi Kasei</i>	Asahi Kasei Chemicals	2012
CPower <i>Details: Venture Investment by: Intel Capital, Aster Capital, Bessemer Venture Partners, Consensus Business Group, Expansion Capital Partners, Mayfield Fund, NYC Investment Fund, Schneider Electric Ventures</i>	Constellation Energy	2010
Advanced Energy Conversion <i>Details: Founded based on research at Rensselaer Polytechnic Institute</i>	Ioxus	2010
G3i Technology Innovations	BigSky Technologies	2009
Aquus Energy	Reverse merger with Mercury Solar Systems	2008
Connected Energy Corp <i>Details: Venture Investment by: Oppenheimer & Co. Inc.</i>	BPL Global	2008
Ecovation <i>Details: Venture Investment by: Cordova Ventures, Element Partners, Sterling Partners, Cayuga Venture Fund, Roser Ventures</i>	Ecolab	2008
The GreenLife Organization <i>Details: Venture Investment by: RNK Capital</i>	CarbonNeutral Company	2008

Source: Cleantech Group (2013)

Total Value of Cleantech Venture Capital Investment for Top 15 States, 2007-2012 *Total Value (\$ Millions)*

1 California	\$17,636
2 Massachusetts	\$3,170
3 Texas	\$1,873
4 Colorado	\$1,484
5 Illinois	\$722
6 Pennsylvania	\$700
7 Washington	\$622
8 Oregon	\$519
9 Virginia	\$512
10 Georgia	\$506
11 Arizona	\$506
12 New York	\$435
13 New Jersey	\$426
14 Minnesota	\$375
15 Utah	\$372

Source: Cleantech Group (2013)

NOTE: The NYS Cleantech Company Exits metric relates to both the Business Environment and Industry Development Categories and appears in both sections for the reader's convenience.

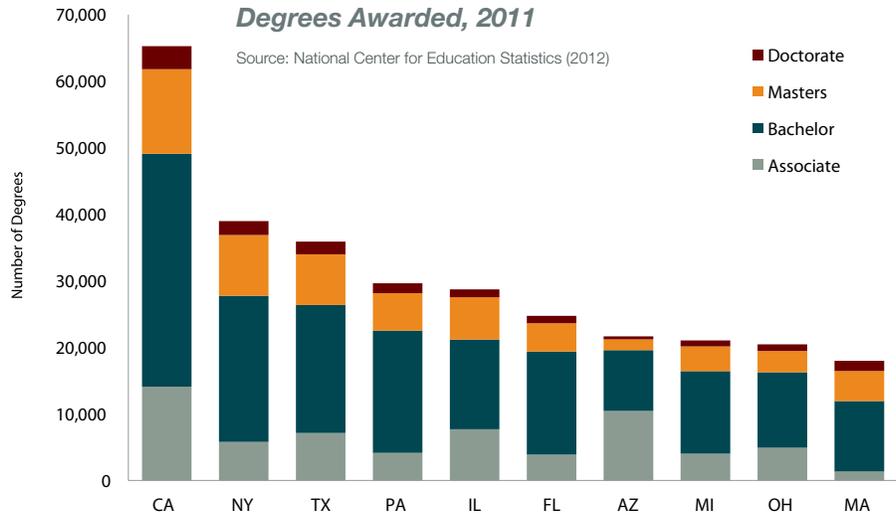
NYS consistently awards an above-average number of STEM degrees per capita.

NYS institutes of higher education awarded nearly 200 Science, Technology, Engineering, and Mathematics (STEM) degrees per 100,000 population in 2011, well above the national average of 180 degrees. NYS has awarded an increasing number of STEM degrees per capita, with an average growth rate of 3.0% per year from 2000 to 2011. These figures include associate, bachelor, masters, and doctoral-level degrees.

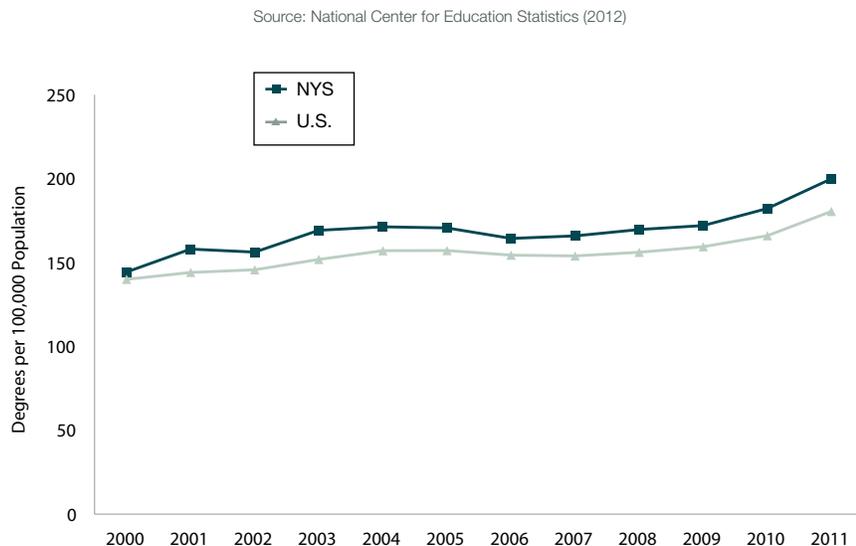
New York State ranks 2nd in total Science, Technology, Engineering and Mathematics (STEM) degrees awarded.

NYS awarded nearly 39,000 STEM degrees in 2011, accounting for nearly 7.0% of STEM degrees nationally. NYS ranks 19th in STEM degrees awarded per capita.

Top Ten States for STEM Degrees Awarded, 2011



STEM Degrees per Capita in NYS and US, 2000-2011



New York State ranks 3rd nationally in total high-tech employment.

In 2010, NYS ranked 3rd with 294,700 high-tech workers across 20,700 high-tech establishments. NYS also ranked 3rd nationally in R&D and testing labs employment (with 41,900 jobs), electronic components manufacturing jobs (13,900 jobs), and space and defense systems manufacturing workers (10,900 jobs), while NYS ranked 5th in photonics manufacturing employment (with 1,400 jobs). Source: TechAmerica Foundation (2011).

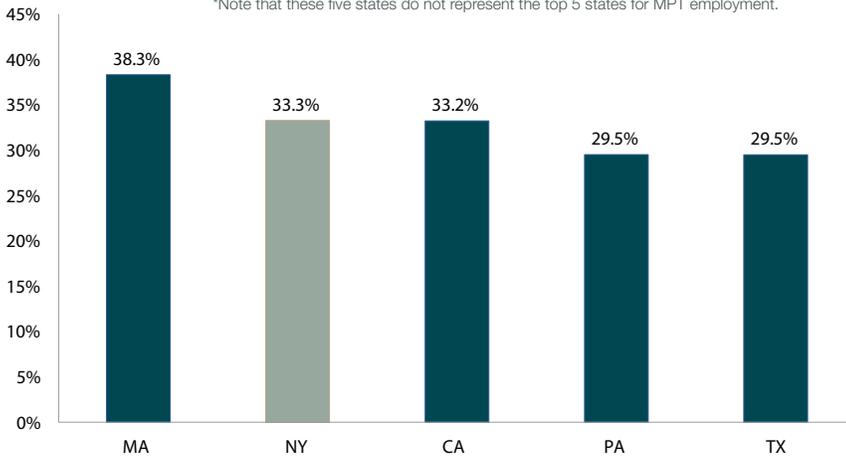
NYS has a high concentration of workers in managerial, professional, and technical jobs relative to the national average and other cleantech states.

The size, skill level, and composition of the workforce are important factors in a state or region's ability to attract and support technology companies; in the cleantech sector, a strong scientific, technical and managerial workforce is critical.

Managerial, Professional & Technical Jobs as a Share of Total Employment, by Selected States*, 2011

Source: Bureau of Labor Statistics (2011)

*Note that these five states do not represent the top 5 states for MPT employment.



NYS Employment, 2011: Managerial, Professional, and Technical (MPT) jobs

2,804,520

% of NYS Employment
33.3%

% of U.S. Employment
31.0%

NYS Employment, 2011: Science, Technology, Engineering, and Mathematics (STEM) jobs

975,980

% of NYS Employment
11.6%

% of U.S. Employment
12.6%

Source: U.S. Bureau of Labor Statistics (2007 and 2011)

Over half of GGS employment in NYS is concentrated in the following industries:

- transportation and warehousing
- construction
- professional and scientific services.

Administrative and waste services, and manufacturing also account for a significant portion of GGS jobs.

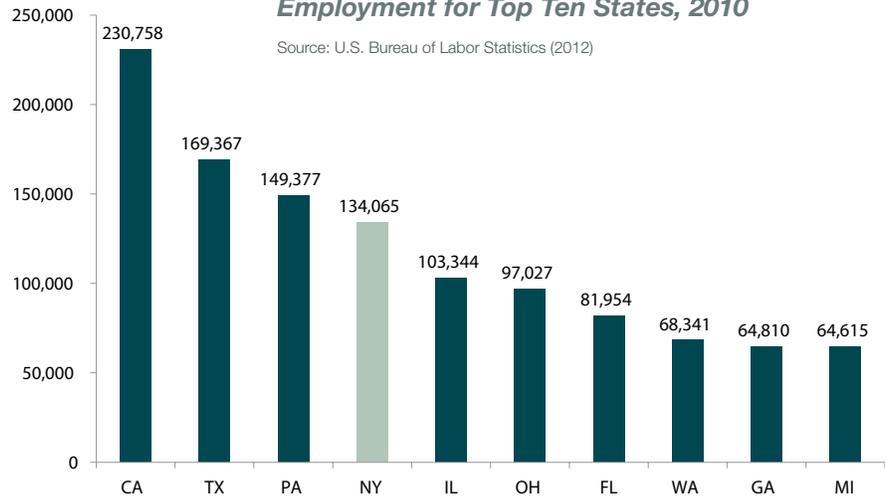
NYS ranks 4th nationally in green goods and services employment.

With over 134,000 employed in industries that produce goods or services that benefit the environment in 2010, NYS ranks 4th behind California, Texas, and Pennsylvania. Green goods and services (GGS) employment serves as a metric for the size of the green economy in NYS.

This employment data is based on the U.S. Bureau of Labor Statistics' GGS Survey – an annual survey developed to address the need for data on the size and scope of the U.S. green economy.

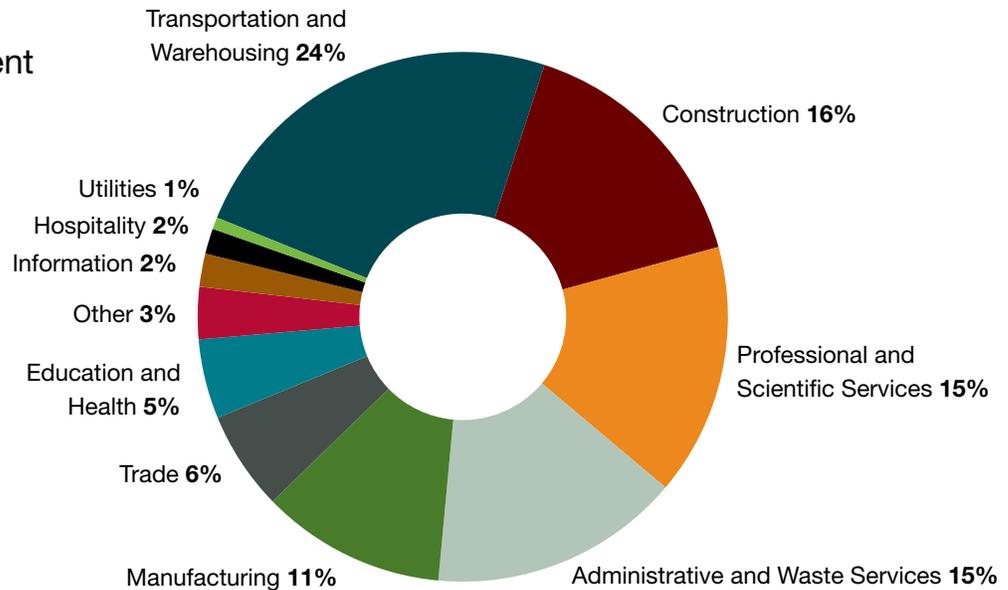
Green Goods and Services Private Sector Employment for Top Ten States, 2010

Source: U.S. Bureau of Labor Statistics (2012)



NYS Green Goods and Services Employment by Industry, 2010

Source: U.S. Bureau of Labor Statistics (2012)



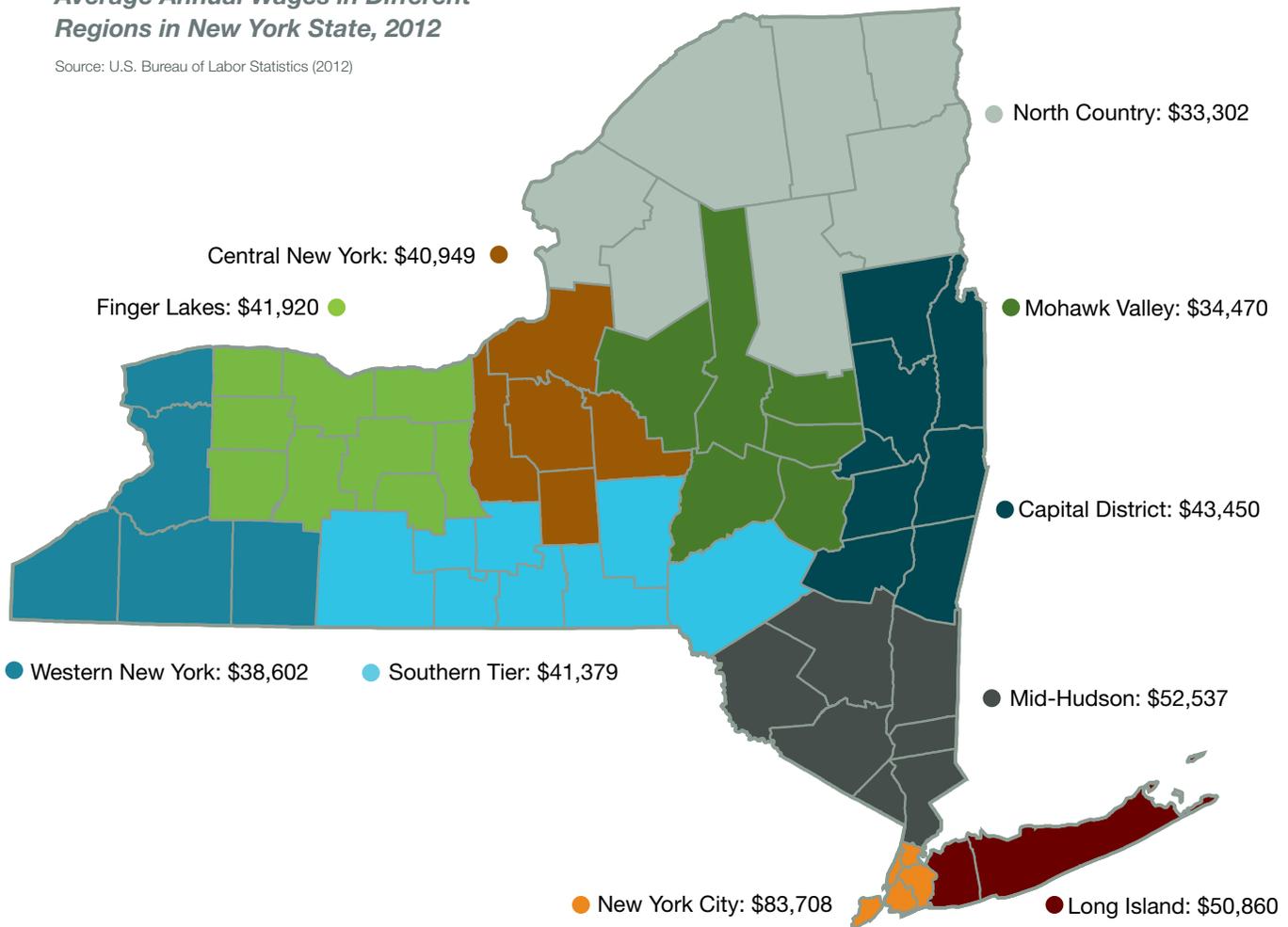
Average annual wages in Upstate New York are below the national average.

Average annual wages are a rough indicator of the cost of labor, and by extension the cost of doing business in a region. In 2011, average regional wages in Upstate New York ranged from \$33,302 per year (in the North Country) to \$43,450 per year (in the Capital District), well below the national average wage of \$47,815. Wages in the New York City metropolitan area (including Long Island and the Mid-Hudson region) are above the national average.

The U.S. average annual wage is \$47,815

Average Annual Wages in Different Regions in New York State, 2012

Source: U.S. Bureau of Labor Statistics (2012)



Business Environment

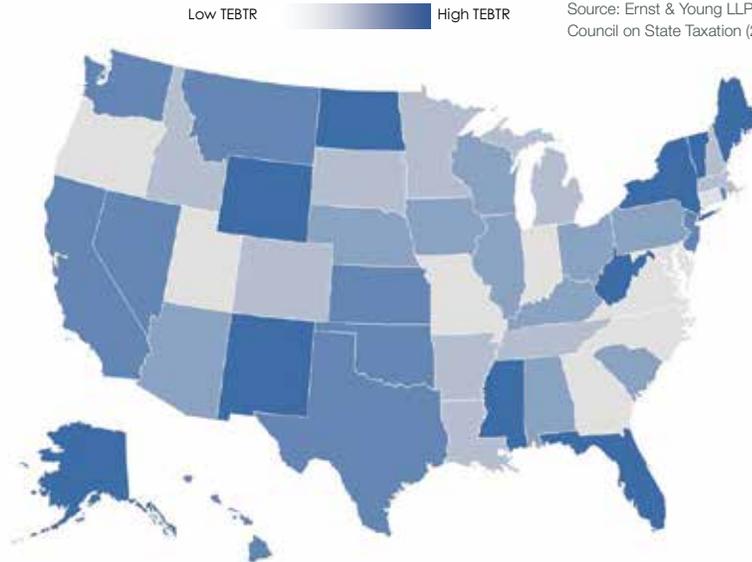
Cost of Doing Business

The NYS Total Effective Business Tax Rate (TEBTR) exceeds the national average.

State and local business taxes as a percent of gross state product (GSP) is an indicator of the average effective tax burden on existing businesses. However, there is substantial variation in state and local tax structures and across business types and sectors, and the TEBTR is not effective as a measure of the taxation of investment in new or expanded facilities. NYS performs better in this metric, as illustrated to the right.

Total Effective Business Tax Rate (TEBTR): State & Local Business Taxes as % of Private GSP

Source: Ernst & Young LLP and the Council on State Taxation (2012)



State and local taxation on new investment in NYS is slightly below the national average.

Ernst & Young's State and Local Business Tax Competitiveness Index measures taxation of investment in new and expanded facilities by selected industries. NYS performs roughly on par with the U.S. average according to this index, with an effective tax rate (ETR) that ranks 23rd or 27th amongst U.S. states, depending on whether the effective tax rate is weighted for different sectors according to capital or by jobs.

State and Local Business Tax Competitiveness Index: Taxes on New Investment by Selected Industries

	Weighted by Capital		Weighted by Jobs	
	ETR	Rank	ETR	Rank
U.S. mean	7.90%		9.10%	
U.S. median	7.30%		8.70%	
Oregon	3.80%	2	4.40%	2
Georgia	6.60%	16	7.90%	16
Colorado	6.80%	18	7.70%	14
Texas	6.90%	20	8.20%	19
New York	7.10%	23	8.90%	27
Pennsylvania	7.10%	21	8.30%	20
New Jersey	7.50%	28	9.20%	31
California	7.70%	29	10.00%	35
Massachusetts	8.20%	32	9.70%	34
Connecticut	8.90%	38	9.40%	32
Washington	9.40%	40	12.40%	47

Source: Small Business Administration (2011)

New York State electricity prices are considerably higher than the national average, creating a market opportunity for renewable energy and energy efficiency products and services.

NYS residential, commercial, and industrial electricity prices exceed the national average. From 1991 to 2011, the rate of increase in residential and industrial electricity prices grew faster than the national average rate, while the rate of increase in commercial electricity prices grew more slowly than the national average rate.

Electricity Prices and Average Monthly Bills
for NYS and the U.S. Overall, 1991 and 2011

		Price (Cents per kWh) 1991	Price (Cents per kWh) 2011	Change in Price 1991-2011
Residential	NYS	11.97	18.26	53%
	U.S. Overall	8.04	11.72	46%
Commercial	NYS	10.85	15.81	46%
	U.S. Overall	7.53	10.23	36%
Industrial	NYS	6.16	7.83	27%
	U.S. Overall	4.83	\$.82	41%

Source: U.S. Energy Information Administration (2011, 2012)

***NYPA: Low-Cost
Hydropower Incentives for
Expanding Companies***

The New York Power Authority (NYPA) sets aside significant blocks of low-cost hydropower under NYS law as incentives for job-creating companies that are considering new facilities or expansions of existing facilities in western New York. The power allocations are granted for a specified number of kilowatts or megawatts and for a particular term date, e.g., seven years. NYPA is the largest state public power organization in the U.S., and 80% of the electricity it produces is renewable hydropower.



Industry Development

Long term, the increasing global demand for energy (as marked by a projected 53% increase in global energy consumption by 2035, according to the U.S. Energy Information Administration) as well as increasing environmental concerns are anticipated to create a large and growing market for renewable energy and energy efficient goods and services. Already, these factors are presenting commercial opportunities that innovative cleantech companies in NYS are leveraging.

The Industry Development Category tracks the development of the NYS' cleantech industry base in terms of the number of cleantech companies, employment, startup activity, investment, and the state's competitiveness in related, enabling economic sectors, such as manufacturing and IT/software.

Key Findings:

Clean Tech Economy and Green Goods and Services

- NYS ranks 4th nationally in the number of cleantech companies.
- Energy efficiency, solar, and advanced materials are among NYS' top five cleantech sectors.
- NYS ranks 4th nationally in green goods and services employment (2010).

Technology Business Creation and Growth

- NYS ranks 3rd nationally in number of Tech Fast 500 (Deloitte) companies (2010 to 2012 average).
- Since 2009, the NYSERDA incubators have assisted 94 client companies: these clients commercialized 48 new products, attracted \$74.1 million in private investment, and \$19.9 million in federal funding.
- Total cumulative investment in NYSERDA incubator client companies more than doubled in the past year, from \$46.3 million (as of Q2 2011) to \$94.0 million (as of Q2 2012). This represents cumulative growth of over 103% from Q2 2011 to Q2 2012, compared to 40% growth in the cumulative number of client companies.

NYS Economy by the Numbers:

- 3rd largest economy (Gross State Product (GSP) of \$1.16 trillion)
- 6th highest real per capita GSP (\$52,214; U.S. average is \$42,070)
- High manufacturing workforce concentration in:
 - Rochester Metropolitan Statistical Area (MSA) (14.8%)
 - Buffalo-Niagara Falls MSA (11.8%)
 - Syracuse MSA (10.9%)
 - U.S. average (10.8%)

The Industry Development Category includes the following indicator groups and their underlying metrics.

Clean Tech Economy and Green Goods and Services Indicators

State Economy

- NYS gross state product
- NYS per capita real gross state product
- NYS regions with a higher concentration of manufacturing employment, compared to U.S. average

Cleantech Companies

- Total number of cleantech companies by state
- Number of cleantech companies by sector for NYS

Green Goods and Services (GGS) Jobs

- Private sector GGS employment by state: total and by industry
- NYS breakdown of private sector GGS employment by industry

Technology Business Creation and Growth Indicators

Technology Fast 500 Companies

- Average annual number of Tech Fast 500 companies by state

NYSERDA Incubators

- Total number of client companies, Q2 2011 and Q2 2012
- Total amount of investment attracted by client companies by funding source (total, private, public non-NYS, etc.), Q2 2011 and Q2 2012

Cleantech IPOs and M&As

- Number of cleantech IPOs for NYS: total and by sector
- Number of cleantech mergers & acquisitions for NYS: total and by sector

Green Goods and Services:

Green jobs are jobs in businesses that produce goods and provide services that benefit the environment or conserve natural resources.

1. Energy from renewable sources.
2. Energy efficiency.
3. Pollution reduction and removal, greenhouse gas reduction, and recycling and reuse.
4. Natural resources conservation.
5. Environmental compliance, education and training, and public awareness.

Source: <http://www.bls.gov/ggs/ggsoverview.htm#definition>

New York State ranks 4th nationally in number of cleantech companies.

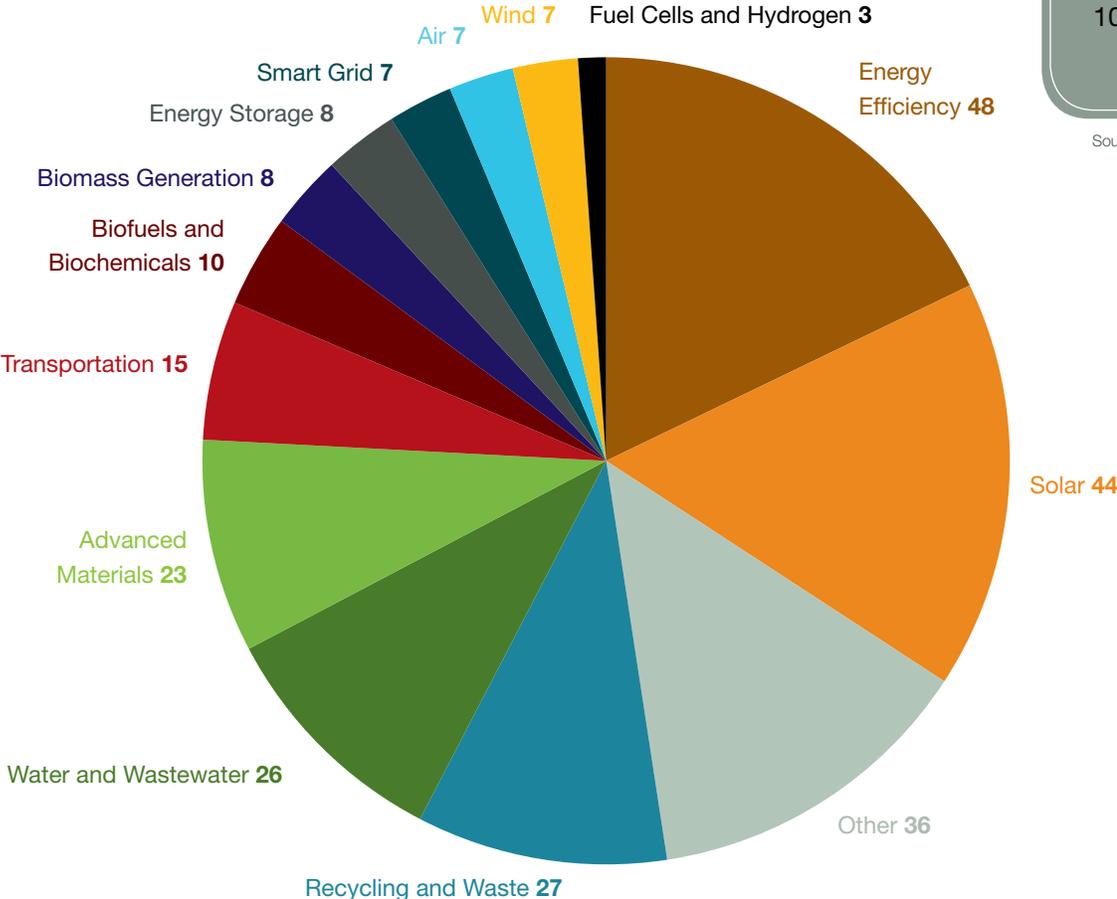
NYS has the 4th largest number (270) of cleantech companies, according to the Cleantech Group. While California is the clear frontrunner with 1,235 companies, NYS is close behind Texas and Massachusetts, which rank 2nd and 3rd, respectively.

Energy efficiency, solar, and advanced materials are among NYS' top five cleantech sectors.

Companies are categorized by the cleantech sectors defined by the Cleantech Group.

Number of NYS Cleantech Companies by Sector

Source: Cleantech Group (2013)



Source: Cleantech Group (2013)

Total Number of Cleantech Companies for Top Ten States

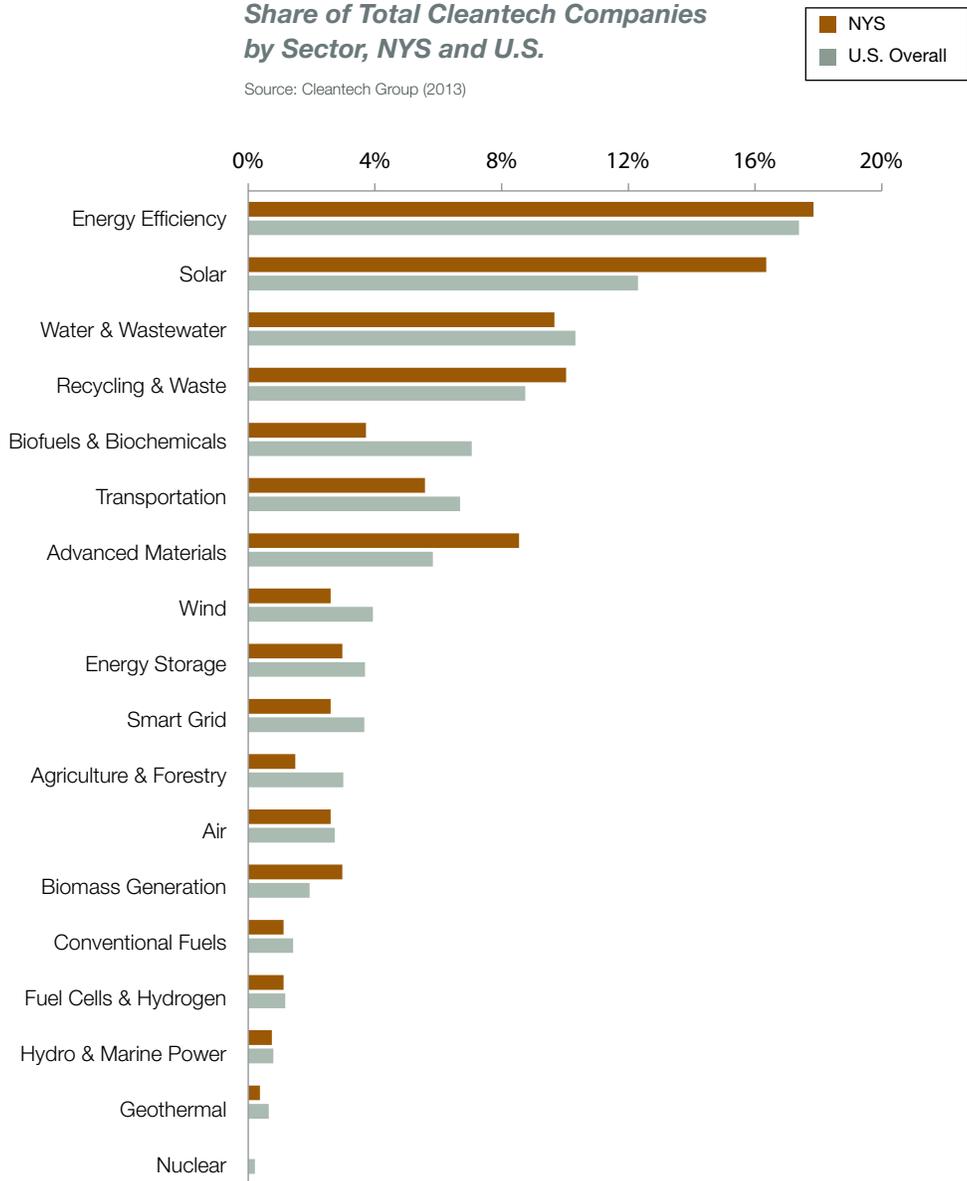
1 California	1,235
2 Texas	310
3 Massachusetts	308
4 New York	270
5 Florida	200
6 Colorado	169
7 Pennsylvania	168
8 Illinois	139
9 New Jersey	134
10 Ohio	128

New York State has a high concentration of solar and advanced materials companies.

NYS has significantly higher shares of companies in the solar and advanced materials sectors than the U.S. overall, but lags the nation in several sectors including biofuels and biochemicals, transportation, wind, energy storage, smart grid, and agriculture and forestry.

Share of Total Cleantech Companies by Sector, NYS and U.S.

Source: Cleantech Group (2013)



New York State ranks 4th nationally in green goods and services employment.

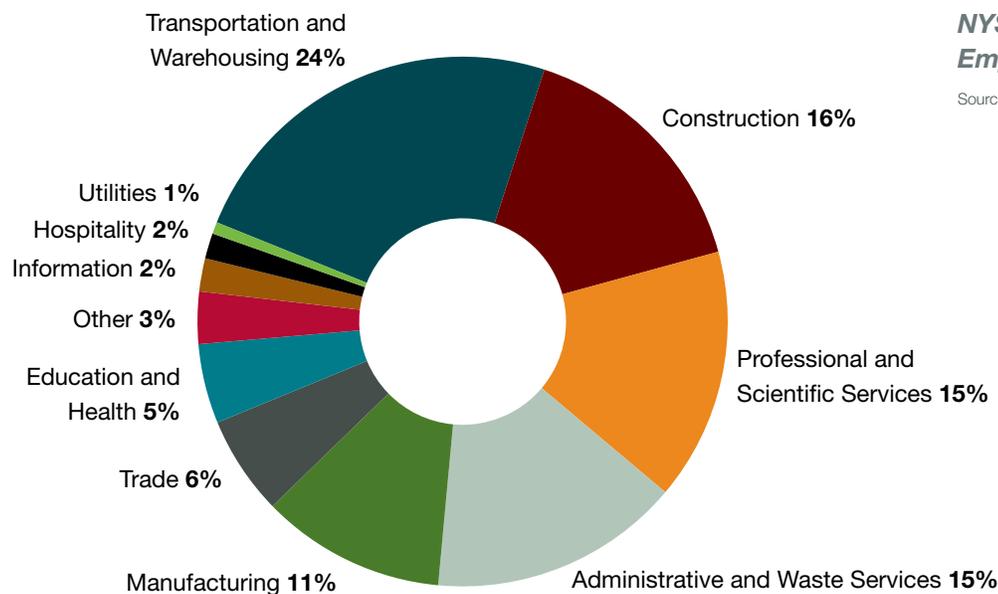
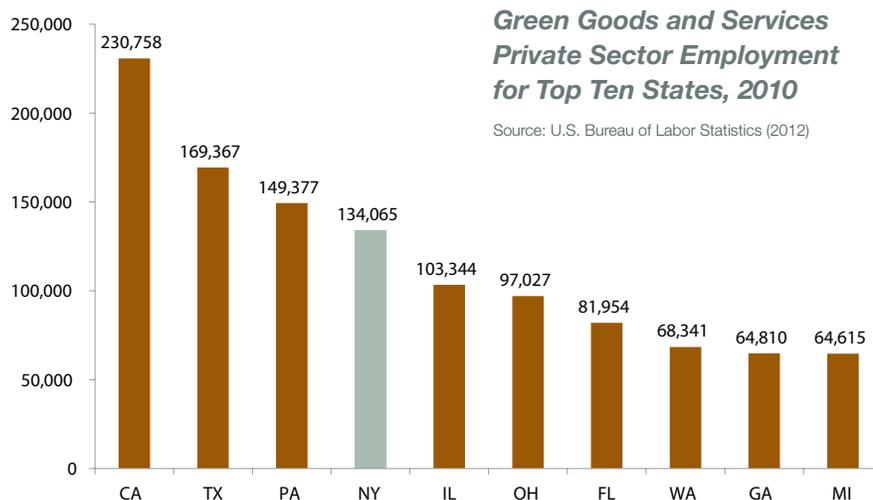
With over 134,000 employed in industries that produce goods or services that benefit the environment in 2010, NYS ranks 4th behind California, Texas, and Pennsylvania. Green goods and services (GGS) employment serves as a metric for the size of the green economy in NYS.

This employment data is based on the U.S. Bureau of Labor Statistics' GGS Survey – an annual survey developed to address the need for data on the size and scope of the U.S. green economy.

Over half of GGS employment in NYS is concentrated in the following industries:

- Transportation and warehousing
- Construction
- Professional and scientific services.

Administrative and waste services, and manufacturing also account for a significant portion of GGS jobs.



General Electric (GE) Selects Upstate New York for New Battery Manufacturing Plant

Building on new battery technology developed at its Global Research Center in Niskayuna, NY, GE opened a new battery manufacturing plant in Schenectady in 2012. The \$100 million plant will employ 450 people at full capacity, and ship globally.

Why New York?

- **Co-location of manufacturing and R&D:** battery technology developed at GE's Global Research Center in nearby Niskayuna, NY
- **Workforce talent:** availability of wide range of skilled workers, from community college training and certifications to advanced degrees
- **Attractive state incentives:** NYS provides a range of incentives for manufacturing expansion



Photo courtesy of General Electric

*GE Battery's new facility
in Schenectady, NY*



Interior of GE Battery's new facility

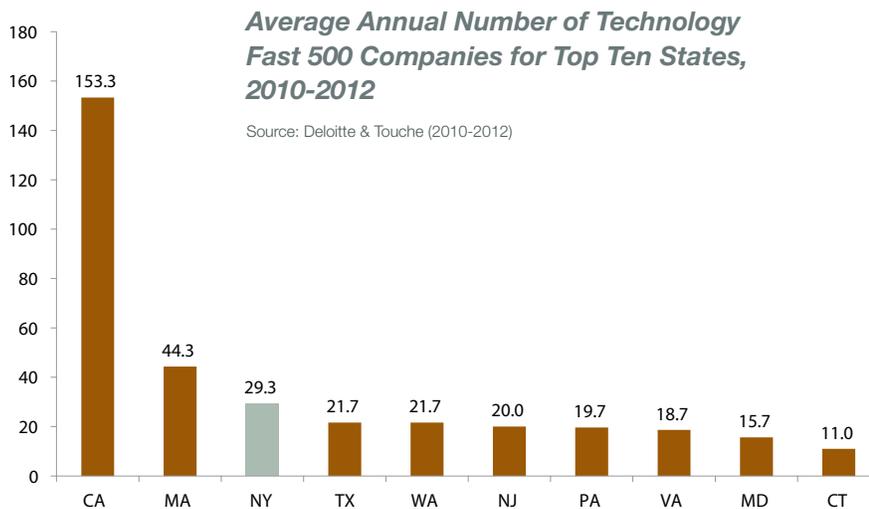
“GE Energy Storage was born in New York’s Capital Region from an idea that we turned into an advanced manufacturing plant. We really think there is a new spirit in New York today.”

– Jeffrey Immelt, GE Chairman and CEO

New York State ranks 3rd nationally in number of Technology Fast 500 companies.

NYS had the highest average annual number (29) of Technology Fast 500 award-winning companies from 2010 to 2012, after California (153) and Massachusetts (44). NYS cleantech companies in the Technology Fast 500 include Cemtrex, Inc. in Farmingdale (2012) and Ener1, Inc. in New York City (2010).

Deloitte's Technology Fast 500, a technology awards program, ranks the fastest-growing technology, media, telecommunications, life sciences, and cleantech companies in North America, based on revenue growth, and serves as an indicator of how well NYS' business environment fosters the rapid scale-up and growth of technology companies.



Cemtrex, Inc. ***2012 Technology Fast 500*** ***Cleantech Winner***

Founded in 1998, Cemtrex designs and manufactures monitoring equipment and instruments to measure mercury, sulfur oxides, hydrocarbons, nitrogen oxides, and other greenhouse gases in flue gases discharged by a number of industries. Cemtrex's monitoring instruments help clients comply with emissions regulations and facilitate carbon trading on international markets. Based in Farmingdale, NY, the company's primary customers globally are in the chemical, power, and petrochemical industries.

Cemtrex's revenues grew 135% from FY2007 to FY2011, placing it among Deloitte's 2012 Technology Fast 500 winners. Cemtrex has partnered with and acquired other NYS cleantech companies as it has grown, including a joint venture with Ducon Technologies (also based in Farmingdale) to produce an expanded line of emissions monitors and the acquisition of Syracuse-based Griffin Filters in 2007.

NYSERDA's six cleantech incubators are accelerating the development of early-stage cleantech companies.

Since 2009, NYSERDA-supported incubators have assisted 94 client companies across NYS. These clients have produced 48 new products, and have attracted \$74.1 million in private investment and \$19.9 million in public, non-NYS funding.

Investment in NYSERDA incubator client companies more than doubled in the past year.

NYSERDA incubator client companies attracted \$47.7 million in investment in just one year (Q2 2011 to Q2 2012), more than the total investment attracted in the previous two years, \$46.3 million (Q2 2009 to Q2 2011). This represents cumulative growth of over 103% from Q2 2011 to Q2 2012, compared to 40% growth in the cumulative number of client companies.

Private capital accounts for almost 80% of total cumulative investment, and is growing more quickly than public, non-NYS funding.

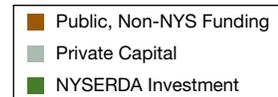
NYSERDA-Supported Cleantech Incubator Client Metrics

	Q2 2011	Q2 2012
Total number of client companies (cumulative)	67	94
Total investment (cumulative) (\$)	\$46,265,000	\$93,956,798
Total private capital (cumulative) (\$)	\$35,699,000	\$74,062,400
Total public, non-NYS funding (cumulative) (\$)	\$10,566,000	\$19,894,398
Number of new products commercialized (cumulative)	30	48

Source: NYSERDA (2012)

Investment Attracted by NYSERDA Incubator Companies, 2011 and 2012

Source: NYSERDA (2012)



Location of NYSERDA-Funded Clean Clean Energy Business Incubators and Client Companies

NYSERDA-supported incubators have provided support to nearly 100 cleantech startups since 2010. Concentrations of these companies are found in and around Buffalo, Rochester, Syracuse, Albany, New York City, and Long Island. They represent a variety of cleantech segments including energy efficiency, solar, wind, energy storage, smart grid, and materials.

White dots represent companies aided by the Clean Energy Business incubators.

Source: NYSERDA (2013)



A number of New York State cleantech startups made successful exits during the 2008-2012 period.

Start-up companies typically exit through an initial public offering (IPO) or a strategic merger or acquisition (M&A). Over the past five years, several NYS cleantech start-ups have exited via M&A. Acquired companies represent a variety of cleantech sectors, including energy efficiency, advanced materials, solar, smart-grid, and water/wastewater. Cleantech exits are an important indicator of success for venture capital investors.

Exiting Company	Acquiring Company	Year
Efficiency 2.0 <i>Details: Development Partners: Greenlet Technologies & Recyclebank</i>	C3	2012
Crystal IS <i>Details: Venture Investment by: 3i Group, ARCH Venture Partners, Credit Suisse, Harris & Harris Group, Lux Capital, Asahi Kasei</i>	Asahi Kasei Chemicals	2012
CPower <i>Details: Venture Investment by: Intel Capital, Aster Capital, Bessemer Venture Partners, Consensus Business Group, Expansion Capital Partners, Mayfield Fund, NYC Investment Fund, Schneider Electric Ventures</i>	Constellation Energy	2010
Advanced Energy Conversion <i>Details: Founded based on research at Rensselaer Polytechnic Institute</i>	Ioxus	2010
G3i Technology Innovations	BigSky Technologies	2009
Aquus Energy	Reverse merger with Mercury Solar Systems	2008
Connected Energy Corp <i>Details: Venture Investment by: Oppenheimer & Co. Inc.</i>	BPL Global	2008
Ecovation <i>Details: Venture Investment by: Cordova Ventures, Element Partners, Sterling Partners, Cayuga Venture Fund, Roser Ventures</i>	Ecolab	2008
The GreenLife Organization <i>Details: Venture Investment by: RNK Capital</i>	CarbonNeutral Company	2008

NOTE: The NYS Cleantech Company Exits metric relates to both the Business Environment and Industry Development Categories, and appears in both sections for the reader's convenience.

Source: Cleantech Group (2013)



Clean Energy Market

Clean Energy Market

Key Findings

NYS is the 3rd largest economy and 8th largest consumer of energy in the U.S. Over the past ten years, NYS has enacted progressive renewable portfolio standards (RPS) and energy efficiency mandates. These mandates, coupled with relatively high electricity rates, create a sizable market and test bed for companies specializing in renewable energy and energy efficiency products and services.

The Clean Energy Market Category benchmarks the size of the current and potential market for renewable energy and energy efficiency products and services in NYS and the larger Northeast Region. It includes metrics and trends in total energy consumption, renewable energy consumption and generation, electricity prices, funding for energy efficiency programs, as well as indicators that suggest “early adopter” consumer behavior with regard to clean energy products and services.

Key Findings:

Energy Consumption

- NYS is the 3rd largest state economy, and the 8th largest consumer of energy. NYS has the 2nd lowest per capita energy consumption among Northeast states.
- NYS leads the East Coast in renewable energy consumption. Hydro-electric, biomass, and wind are the leading sources of renewable energy in NYS.

Energy Prices

- Energy prices in NYS tend to be higher than the U.S. average.

Energy Production

- The generation of energy from renewable sources is growing in NYS, and hydro-electric remains the primary renewable electricity source in NYS.

Consumer Market and Behavior

- NYS ranks 18th nationally in net metering customers per capita.
- While NYS ranks 2nd among all U.S. states in total LEED-certified square footage, NYS drops to 10th in per capita terms.
- NYS ranks 5th among all states in the number of alternative fuel vehicles registered in 2010, but ranks 28th as a share of total registered vehicles.

Energy Policy

- NYS ranks 3rd overall in state energy efficiency policies.
- NYS, through NYSERDA, is making long-term investments in programs to incentivize the generation of energy from renewable sources and the adoption of energy efficiency products and services.
- NYS ranks 2nd for the size of its electric and gas efficiency program budget.

The Clean Energy Market Category includes the following indicator groups and their underlying metrics.

Energy Consumption Indicators

Energy Consumption

- Total energy consumption by state and for Northeast Region
- Energy consumption per capita for NYS and for Northeast Region

Renewable Energy Consumption

- Total renewable energy consumption by state and for Northeast Region
- Renewable energy consumption as share of total energy consumption for NYS and Northeast Region
- Total renewable energy consumption by source for NYS

Energy Prices Indicators

Electricity Prices

- Average annual retail residential, industrial, and commercial electricity prices for NYS, compared to U.S. overall

Natural Gas Prices

- Average annual retail residential, industrial, and commercial liquid natural gas prices for NYS, compared to U.S. overall

Energy Production Indicator

Electricity Generation from Renewable Sources

- Total renewable electricity net generation for NYS
- Renewable electricity net generation as a share of total electricity generation for NYS
- Total renewable electricity net generation by source for NYS

Consumer Market and Behavior Indicators

Net Metering

- Total number of net metering customers by state
- Total number of net metering customers per capita by state

LEED Certified Square Feet

- Total amount of LEED-certified square feet by state
- Total amount of LEED-certified square feet per capita by state

Alternative Fueled Vehicle Use

- Number of alternative fuel vehicles (electric, natural gas, hybrid) by state
- Alternative fuel vehicles (electric, natural gas, hybrid) as a share of total registered vehicles, by state

ENERGY STAR® Appliances

- ENERGY STAR qualified appliance retail sales as a share of total appliance retail sales

Energy Policy Indicators

State Energy Efficiency Ranking

- Utility and Public Benefits Funds Program and Policies Efficiencies
- Transportation Efficiency
- Building Energy Efficiency
- Combined Heat and Power Efficiency Standards
- State Government Initiatives Promoting Energy Efficiency

Renewable Portfolio Standard

- Funding for implementation of the NYS Renewable Portfolio Standard over time (NYSERDA budget)

Energy Efficiency Program Budgets

- Total electric and gas efficiency program budget by state

Clean Energy Market

Renewable Energy Consumption

From FY2013 to FY2015, NYSERDA will invest more than \$2.6 billion in energy efficiency and renewable energy programs.

These programs enable demonstration projects and incentivize residential consumer and business purchases of energy efficiency products and services.

NYS has the 2nd lowest per capita energy consumption among Northeast states.

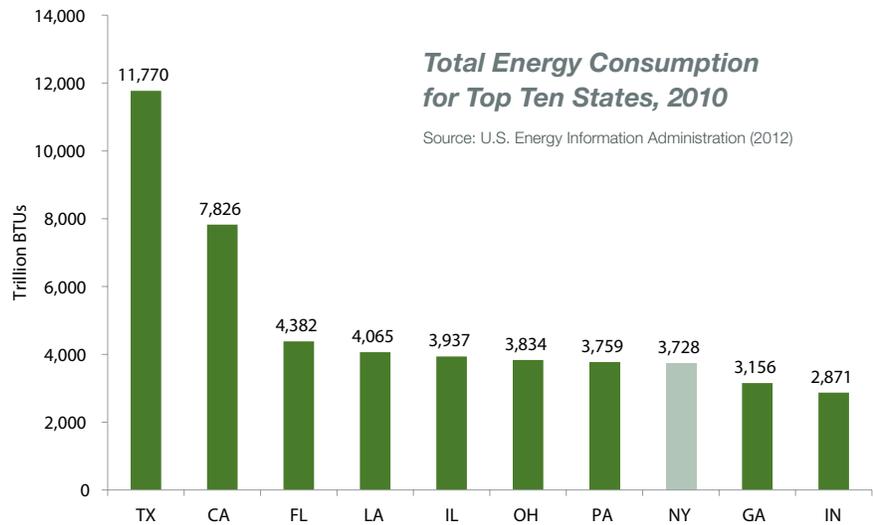
Per capita energy consumption in NYS is the lowest of all other Northeast states following Rhode Island.

NY-Sun Initiative

With the introduction of Governor Cuomo's NY-Sun Initiative, the State is expanding investment in solar technology as part of a balanced renewable energy portfolio. NY-Sun stimulates the marketplace for photovoltaic installations through financial incentives and reduces costs through a balance-of-system program. This solar program, started in 2012, has \$800 million in funding through 2015.

New York State is the 3rd largest state economy but the 8th largest consumer of energy.

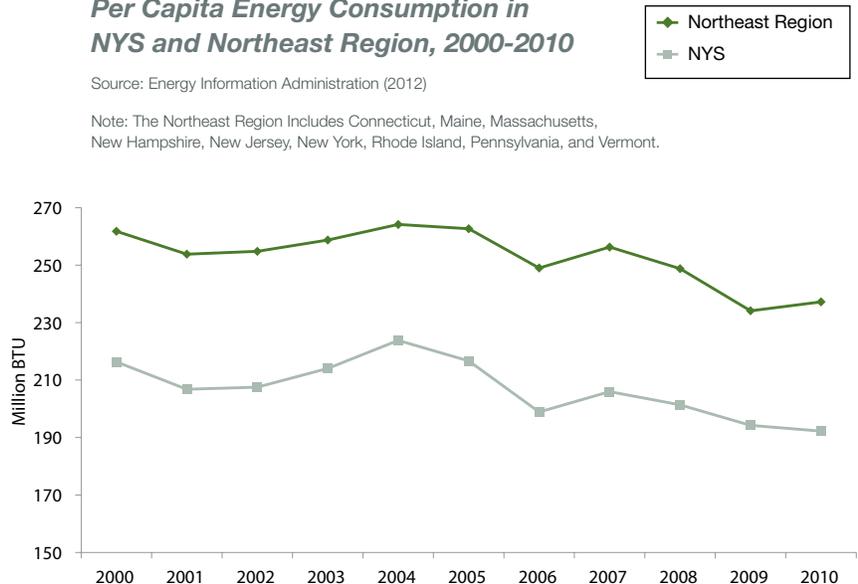
As a significant state economy, NYS consumed over 3,700 trillion BTUs of energy in 2010. However, energy consumption declined by -5.5% from 2001 (3,947 trillion BTUs) to 2010 (3,728 trillion BTUs).



Per Capita Energy Consumption in NYS and Northeast Region, 2000-2010

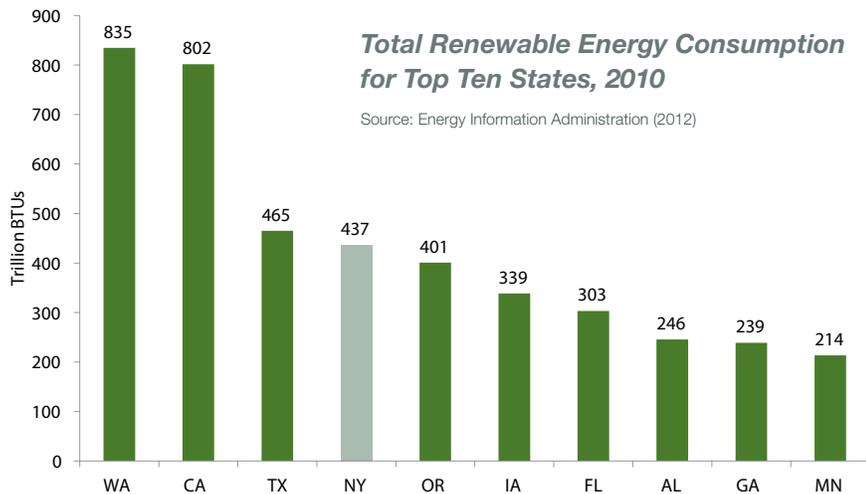
Source: Energy Information Administration (2012)

Note: The Northeast Region Includes Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Pennsylvania, and Vermont.



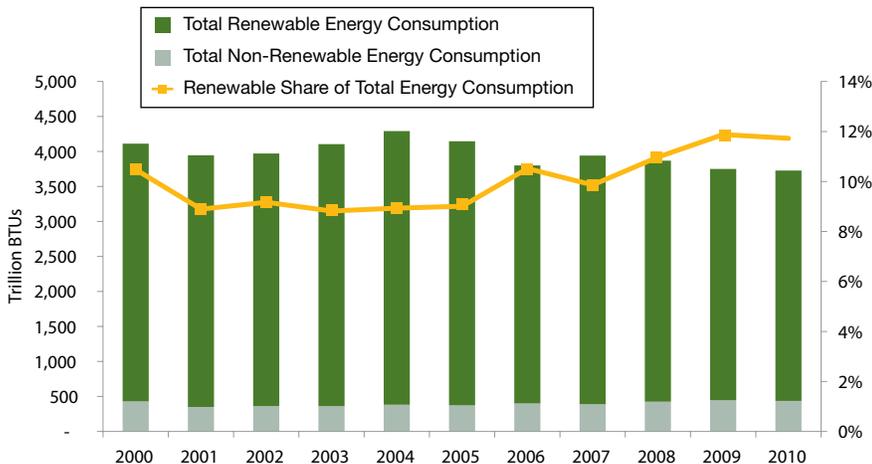
New York State leads the East Coast in renewable energy consumption.

Only Washington, California, and Texas consumed more renewable energy than NYS in 2010. The 437 trillion BTUs of renewable energy consumed in NYS in 2010 comprise more than 11% of total energy consumption, one of the highest ratios in the country.



Breakdown of NYS Total Energy Consumption by Renewable/Non-Renewable, 2000-2010

Source: Energy Information Administration (2012)



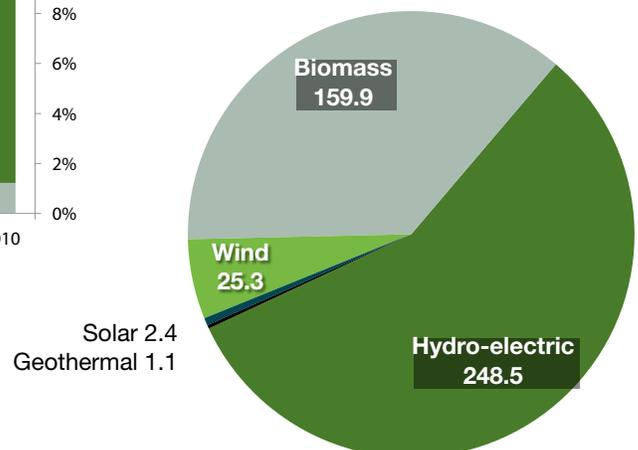
Hydro-electric, biomass, and wind are the leading sources of renewable energy in NYS.

Solar and geothermal energy accounted for a combined 3.5 trillion BTUs in 2010, just 0.8% of total renewable energy consumption.

Total renewable energy consumption in NYS grew slightly from 431 trillion BTUs in 2000 to 437 trillion BTUs in 2010. During the same period, overall energy consumption in NYS declined from 4,111 trillion BTUs in 2000 to 3,728 trillion BTUs in 2010, with the renewable share of total energy consumption growing from 10 to 12%.

NYS Total Renewable Energy Consumption by Source, 2010 (Trillion BTUs)

Source: Energy Information Administration (2012)



Electricity and natural gas prices in New York State exceed the U.S. average, creating a market opportunity for renewable energy and energy efficiency products and services.

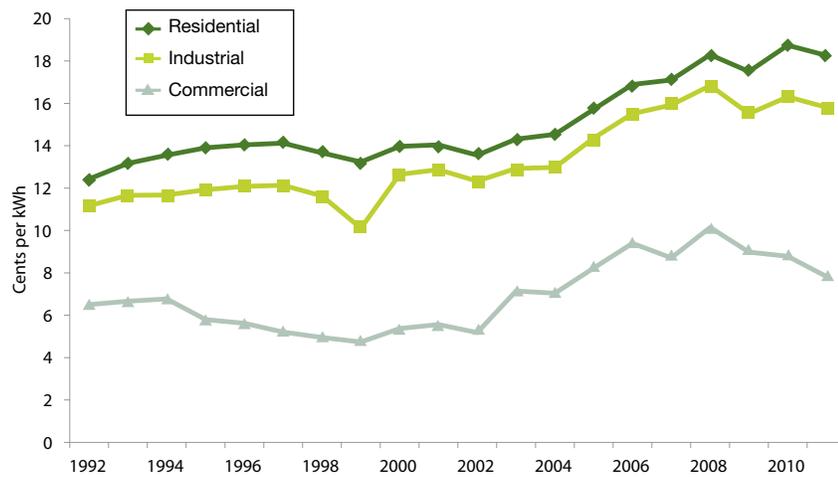
Higher electricity prices spur greater demand for renewable energy and energy efficiency products and services. On the other hand, energy prices are a cost-competitiveness issue for companies. For this reason, the New York Power Authority (NYPA) allocates low-cost hydropower for job-creating companies in the state.

In 2011, NYS residential and industrial electricity prices (18.3 and 15.8 cents per kWh respectively) exceeded the U.S. average prices (11.7 and 6.8 cents per kWh, respectively). However, commercial electricity (7.8 cents per kWh) was notably lower than the U.S. average (10.2 cents per kWh).

In 2011, liquid natural gas (LNG) was more expensive in NYS than the U.S. average. Residential, commercial, and industrial LNG prices in NYS were 13.7, 9.3, and 8.1 cents per kWh, respectively, while U.S. average prices were 11.0, 8.9, and 5.1 cents per kWh, respectively.

Average Annual Retail Electricity Prices for NYS, 1992-2011

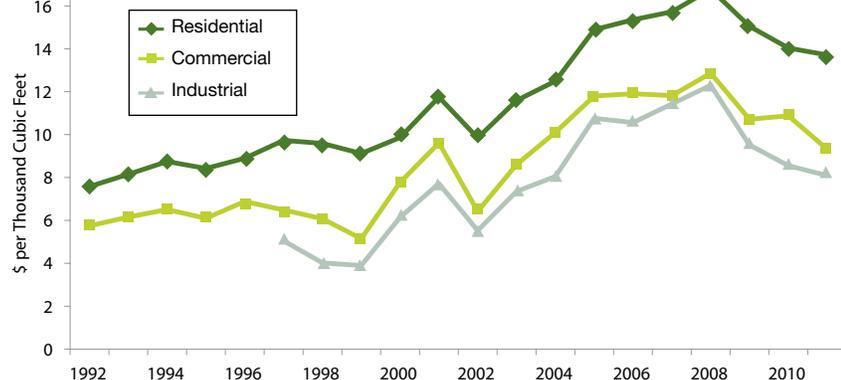
Source: Energy Information Administration (2012)



Average Annual Liquid Natural Gas Prices in NYS, 1992-2011

Source: Energy Information Administration (2013)

Note: Data not available for the Industrial Sector prior to 1997

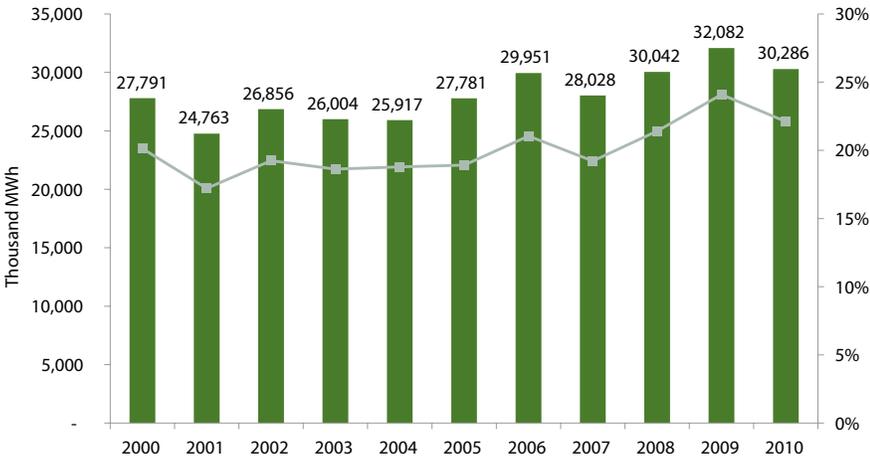
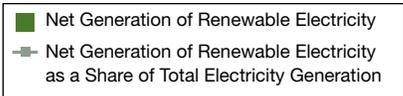


The generation of energy from renewable sources is growing in New York State.

From 2000 to 2010, net generation of renewable electricity grew from 27,791 to 30,286 million MWh. However, this increase represents an annual growth rate of less than 1%. Over the past ten years, renewable's share of total electricity generation in NYS ranged from 17% to 24%.

NYS Net Generation of Renewable Energy, 2000-2010

Source: Energy Information Administration (2012)

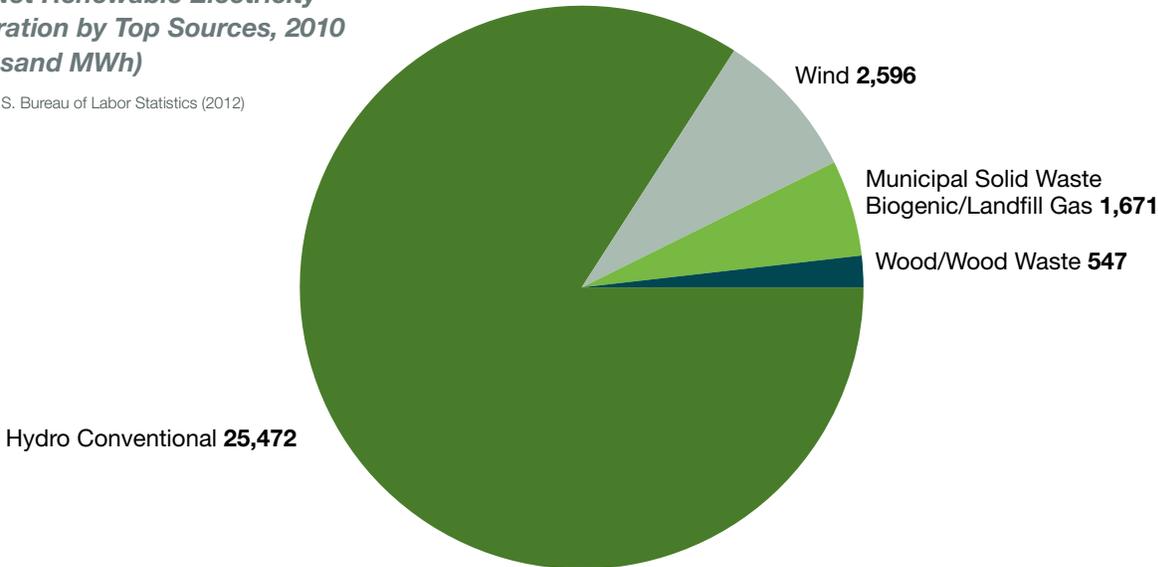


Hydro-electric remains the primary renewable electricity source in NYS.

Hydro-electric accounted for over 84% of NYS' renewable electricity generation in 2010, followed by wind (9%), municipal solid waste/landfill gas (6%), and wood waste (2%). Solar generation figures were too small for inclusion.

NYS Net Renewable Electricity Generation by Top Sources, 2010 (Thousand MWh)

Source: U.S. Bureau of Labor Statistics (2012)



Net metering is a system in which renewable energy generators are connected to a utility power grid and surplus power is transferred on to the grid, allowing customers to offset the cost of power drawn from the utility.

Net Metering Customers Per Million Population for Top Ten States and NYS, 2010

1 Hawaii	3,180
2 California	2,316
3 Colorado	1,936
4 Vermont	1,476
5 Arizona	1,334
6 Delaware	900
7 New Mexico	879
8 New Jersey	855
9 Oregon	829
10 Montana	789
18 New York	291

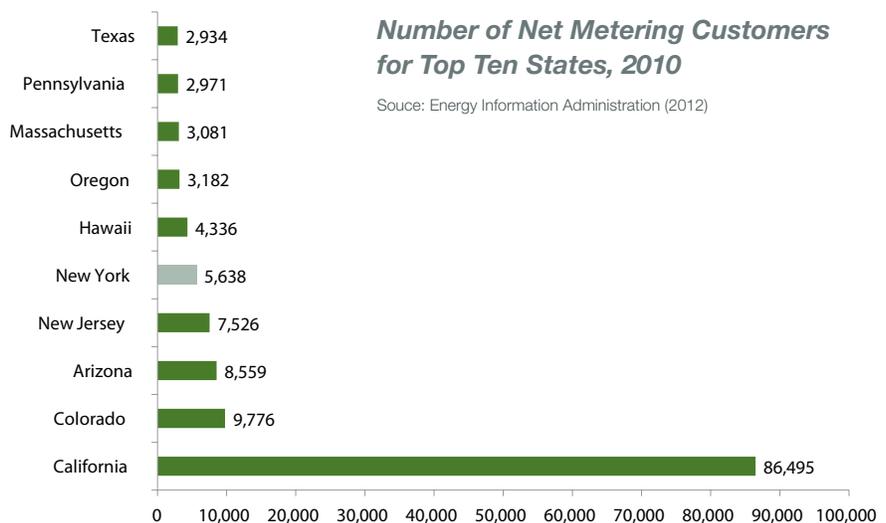
Source: Energy Information Agency (2012)

New York State ranks 5th nationally in the number of net metering customers.

In this indicator, NYS ranks 5th nationally, with over 5,600 net metering customers in 2010. California is the clear forerunner with over 86,000 net metering customers.

NYS ranks 18th nationally in net metering customers per capita.

NYS had 291 net metering customers per million people in 2010, ranking 18th among all U.S. states.



NYS legislation supports net metering.

In 2008, NYS laws were amended and non-residential solar & wind installations were made eligible for net metering tariffs. Legislative amendments have gradually expanded the acceptable scale of net metering installations, allowing increasingly higher-output facilities to qualify for a tariff. Current non-residential system limitations for eligibility range from 1.5 MW for fuel cell systems to 2 MW for solar, wind, and micro-hydroelectric installations.

Although New York State ranks 2nd among all U.S. states in total LEED®-certified square footage, it ranks 10th in per capita terms.

The U.S. Green Building Council's LEED® (Leadership in Energy and Environmental Design) program provides third-party verification of building factors such as water efficiency, energy efficiency, and indoor environmental quality.

In total LEED-certified square feet, only California (1,310.1 million sq. ft. in 2009) claims more LEED-certified square footage than NYS (548.2 million sq. ft.).

However, in per capita terms, with 28.4 LEED-certified square feet per person in 2009, NYS ranks 10th, while California ranks 5th.

Per Capita LEED®-Certified Square Footage
for Top Ten States, 2009

State	Square Feet Per Capita
1 Nevada	86.6
2 Virginia	41.8
3 Hawaii	39.0
4 Maryland	38.8
5 California	35.4
6 Massachusetts	33.9
7 Colorado	33.9
8 Illinois	32.4
9 Washington	32.2
10 New York	28.4

Source: U.S. Green Building Council (2012)

Note: District of Columbia (375 LEED-certified square feet per capita) was omitted to improve comparability of state rankings.

LEED®-Certified Square
Footage for Top Ten
States, 2009

Millions of square feet

1 California	1,310.1
2 New York	548.2
3 Texas	547.7
4 Illinois	415.3
5 Florida	411.6
6 Virginia	331.5
7 Pennsylvania	243.2
8 Nevada	232.4
9 Maryland	222.2
10 Massachusetts	220.7

Source: U.S. Green Building Council (2012)

Note: District of Columbia (226 million LEED-certified square feet) was omitted to improve comparability of state rankings.

Alternative fuel vehicles (AFVs) include all vehicles designed to operate on an alternative fuel, such as compressed natural gas, propane, or electricity. AFVs do not include gasoline and diesel-electric hybrids (as their primary fuel is gasoline/diesel).

New York State ranks 5th in the number of alternative fuel vehicles registered in 2010, but ranks lower as a share of total registered vehicles.

The total market for alternative fuel vehicles in NYS is large—over 34,000 vehicles in 2010. However, as a share of total registered vehicles, NYS ranks 28th among U.S. states in alternative fuel vehicle use. This may be attributable to NYS’ population concentration in New York City, where car ownership is generally lower.

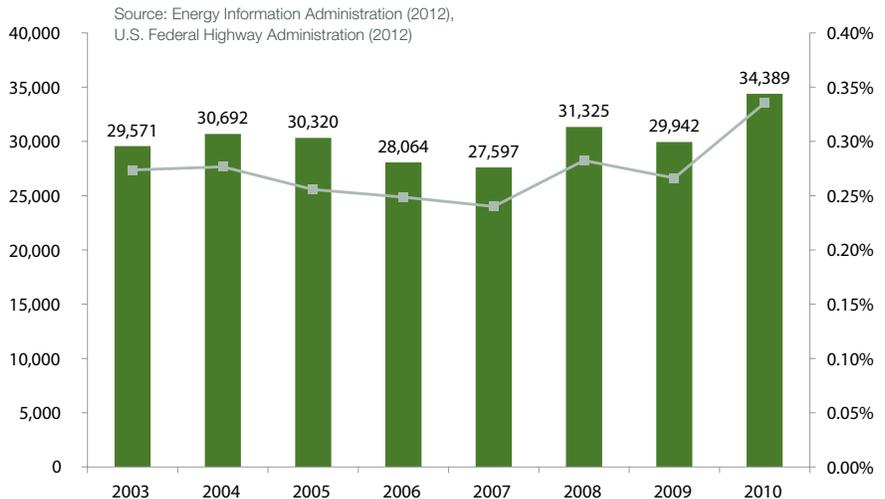
The number of alternative fuel vehicles in use in NYS grew 2.2% per year from 2003 to 2010. It remains a small share of total registered vehicles in NYS, just below 0.35% in 2010.

Number of Alternative Fuel Vehicles in Top Ten States, 2010

1 California	144,569
2 Texas	115,374
3 Arizona	39,343
4 North Carolina	35,417
5 New York	34,389
6 Florida	33,693
7 Illinois	32,438
8 Virginia	27,999
9 Georgia	26,451
10 Michigan	24,408

Source: U.S. Federal Highway Administration (2012)

Alternative Fuel Vehicles in NYS, 2003-2010



Source: Energy Information Administration (2012), U.S. Federal Highway Administration (2012)

Alternative Fuel Vehicles as a Share of Total Registered Vehicles in Top Ten States and NYS, 2010

1 New Mexico	1.11%	7 North Carolina	0.62%
2 Arizona	0.91%	8 Mississippi	0.54%
3 Nevada	0.82%	9 North Dakota	0.53%
4 South Dakota	0.68%	10 South Carolina	0.48%
5 Texas	0.67%	28 New York	0.34%
6 Hawaii	0.66%		

Source: U.S. Federal Highway Administration (2012)

Note: District of Columbia (5.69% market share) was omitted to improve comparability of state rankings.

A significant share of new appliances sold in New York State are ENERGY STAR® qualified.

New York State beats the national average for sales of ENERGY STAR appliances in 5 categories.

ENERGY STAR Qualified Appliance Retail Sales, 2009

Appliance	Share of NYS New Sales	Share of U.S. New Sales
Air Conditioner	43%	36%
Clothes Washer	51%	48%
Dishwasher	75%	68%
Refrigerators and Freezers	34%	35%
Water Heaters	3%	2%

Source: ENERGY STAR Retail Sales Data (2010)

Note: The most recent data available is from 2009.

Cleaner, Greener Communities

Cleaner, Greener Communities will invest \$100 million in community-driven sustainability initiatives to reduce our carbon footprint.

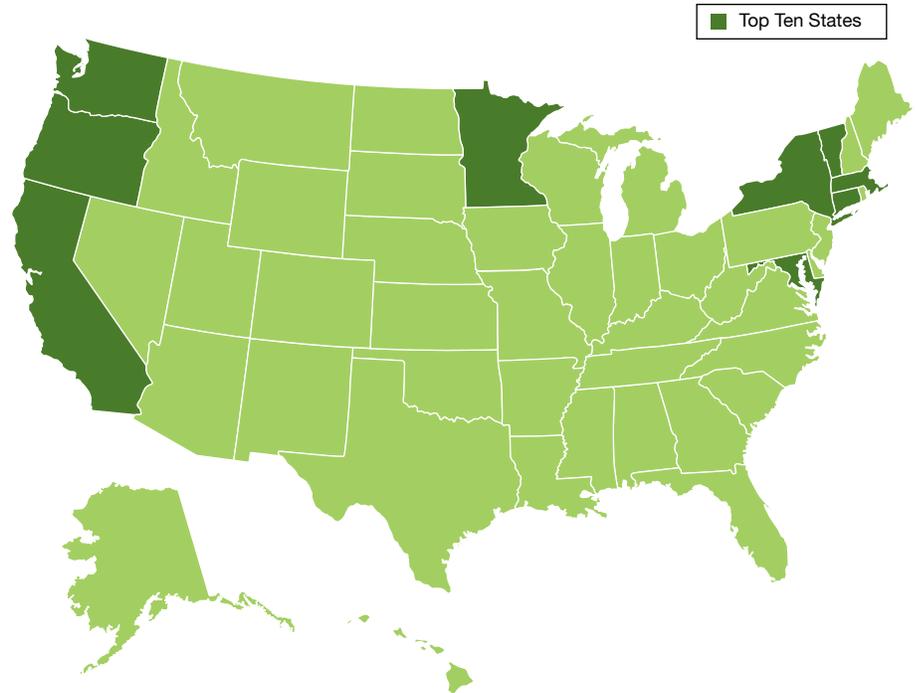
During Phase One, New York State's 10 economic development regions received support from NYSERDA to create comprehensive sustainability plans.

During Phase Two, NYSERDA will provide funding to the regions on a competitive basis for the implementation of innovative, community-based projects that reduce current greenhouse gas emissions; create more resilient, sustainable communities; and position New York State for a cleaner future.

New York State ranks 3rd overall in state energy efficiency policies.

The American Council for an Energy-Efficient Economy's State Energy Efficiency Scorecard ranks states on their energy efficiency policy and program efforts, examining six primary policy areas: utility and "public benefits" programs and policies, transportation policies, building energy codes, combined heat and power policies, state government-led initiatives around energy efficiency, and appliance and equipment standards. According to the scorecard, NYS is a leader in state energy efficiency policies, with strong rankings in the areas of transportation policies, state government initiatives, and utility and public benefit programs and policies.

State Energy Efficiency Policy Rankings, 2012



State Energy Efficiency Policy Rankings and Scores for Top Ten States, 2012

State	Utility and Public Benefits Programs & Policies (20 pts.)	Transportation Policies (9 pts.)	Building Energy Codes (7 pts.)	Combined Heat & Power (5 pts.)	State Government Initiatives (7 pts.)	Appliance Efficiency Standards (2 pts.)	Total Score (50 pts.)	Change in rank from 2011
1 Massachusetts	19.5	6.5	6	4.5	7	0	43.5	0
2 California	17.5	7.5	6	2	5.5	2	40.5	0
3 New York	17.5	7.5	5	2.5	6.5	0	39	0
4 Oregon	16	6	6	2.5	6.5	0.5	37.5	0
5 Vermont	19	4.5	5	2.5	4.5	0	35.5	0
6 Connecticut	15	5.5	4.5	3	5.5	1	34.5	3
7 Rhode Island	18.5	5.5	4	2.5	2	0.5	33	-2
8 Washington	14.5	6	6	2.5	2.5	0.5	32	-3
9 Maryland	12	6	5.5	1	5	0.5	30	1
10 Minnesota	19	2.5	3	1	4.5	0	30	-1

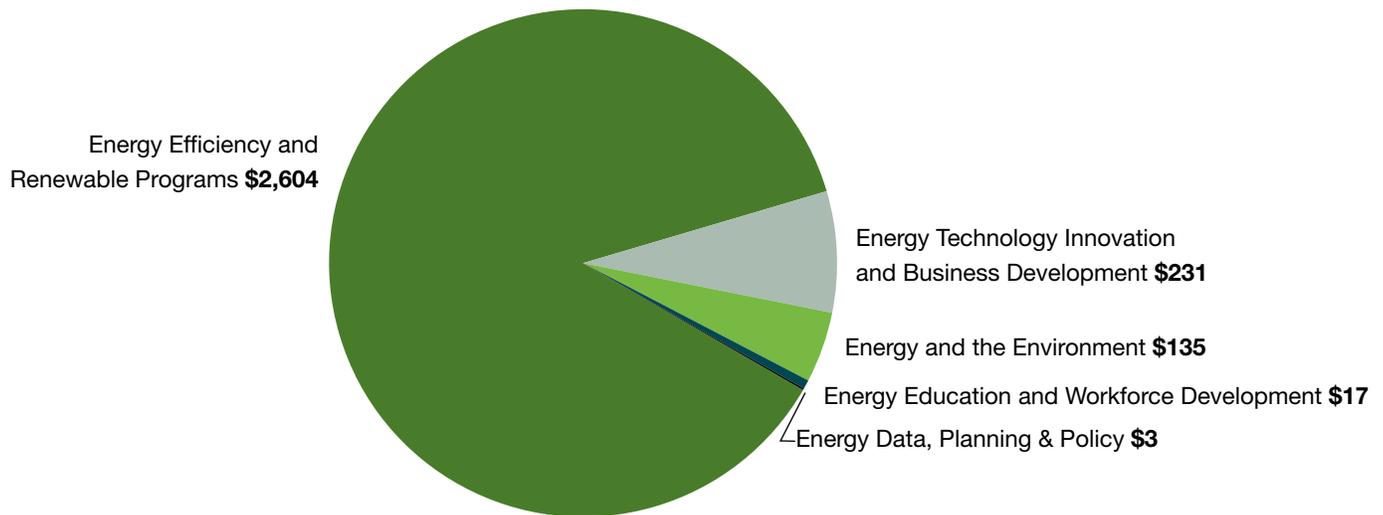
Source: American Council for an Energy-Efficient Economy (2012)

New York State, through NYSERDA, is making long-term investments in programs to spur the generation of energy from renewable sources and the adoption of energy efficiency products and services.

Over the three-year period from FY2013 to FY2015, NYSERDA will invest more than \$2.6 billion in energy efficiency and renewable energy programs. Another \$231 million will be invested in NYS companies and research institutions for clean technology development and commercialization.

NYSERDA's Three-Year Budget by Program Portfolio, FY2013-2015 (\$ Millions)

Source: New York State Energy Research and Development Authority (2012)



Regional Greenhouse Gas Initiative (RGGI)

RGGI is the first market-based mandatory cap-and-trade program in the U.S. designed to reduce greenhouse gas emissions. New York State participates along with eight other Northeast and Mid-Atlantic States. Revenues from the sales of emission allowances are invested in energy efficiency, renewable and carbon abatement programs.

New York Green Bank

Governor Cuomo announced the formation of a green bank in New York, a \$1 billion initiative used to facilitate financing for clean energy projects. The NY Green Bank will accelerate the deployment of energy efficiency improvements and renewable energy systems by offering mechanisms to address market barriers for private sector financing.

In 2011, only California allocated a larger budget to its electric and gas efficiency programs.

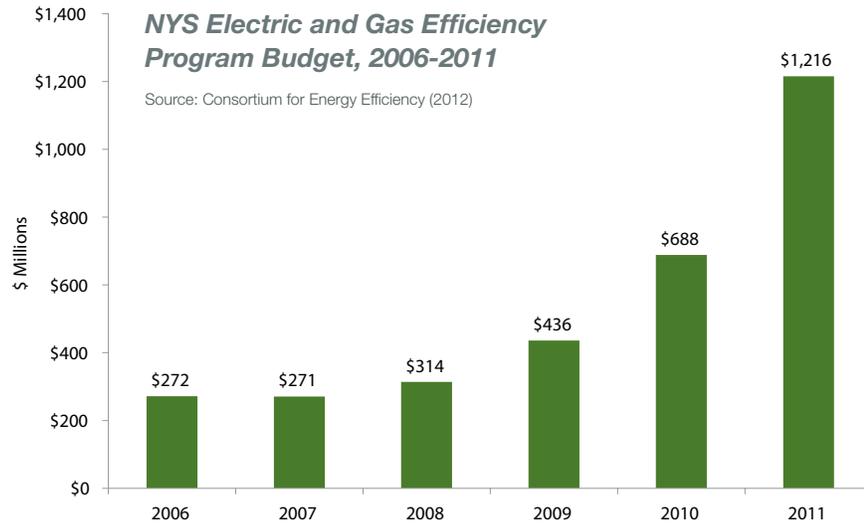
New York State ranks 2nd for the size of its electric and gas efficiency program budget.

NYS' electric and gas efficiency program budget is expanding rapidly, more than tripling from \$272 million in 2006 to \$1.2 billion in 2011.

Electric and Gas Efficiency Program Budgets for Top Ten States, 2011 (\$ Millions)

1 California	\$1,805
2 New York	\$1,216
3 Massachusetts	\$507
4 New Jersey	\$499
5 Florida	\$367
6 Pennsylvania	\$292
7 Maryland	\$216
8 Michigan	\$185
9 Ohio	\$184
10 Washington	\$181

Source: Consortium for Energy Efficiency (2012)



Many cities, states, and utilities operate energy efficiency programs that encourage consumers to become more energy efficient. A number of these organizations are members of the Consortium for Energy Efficiency (CEE). The CEE surveys efficiency program administrators and produces the state efficiency program budget data. Several energy efficiency programs in NYS are operated by Central Hudson Gas & Electric Corporation, Con Edison, Enbridge St. Lawrence Gas, Long Island Power Authority, National Fuel Gas Distribution Corporation (National Fuel Gas Company), National Grid, New York Power Authority, NYSEERDA, and Orange and Rockland Utilities, Inc. (Con Edison).



Appendix

Background and Approach

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Research and Innovation

Competitive R&D Awards Indicators

DOE R&D Funding

Total value of federal R&D obligations from DOE by state	14
Share of federal R&D obligations from DOE for top five states vs. rest of states/other	14

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Total annual value of contracts from DOE by state	15
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Business Environment

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Cleantech Venture Capital Investments

Total annual value of investments and NYS share of U.S. total	34
Total annual number of deals and share of U.S. total	34
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Number of individuals in Science, Technology, Engineering and Mathematics jobs in NYS.	37
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Energy Efficiency Program Budgets

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Appendix

Acronym List

ACEEE – American Council for an Energy-Efficient Economy

ARPA-E – Advanced Research Projects Agency-Energy – a division of the U.S. DOE

BTU – British Thermal Unit – a measure of heat energy

Clean Tech – Commonly consists of 4 areas (also referred to as Clean Energy): renewable energy generation, energy storage, efficiency (energy and building), transportation, plus 4 excluded from this report: air and environment (emissions, recycling and waste), clean industry (design, materials, production), water, and agriculture.

CUNY – The City University of New York

DARPA – Defense Advanced Research Projects Agency

DOD – U.S. Department of Defense

DOE – U.S. Department of Energy

EIA – U.S. Energy Information Administration

ETR – Effective Tax rate

GGS – Green Goods and Services

GSP – Gross State Product
(state equivalent to GDP for USA)

KW – Kilowatt – a measure of electrical power

kWH or kWh – kilowatt-hour – a measure of electrical energy

IP – Intellectual Property

IPO – Initial Public Offering (typically of stock)

LEED – Leadership in Energy and Environmental Design – a voluntary, consensus-based, market-driven program that provides third-party verification of green buildings

M&A – Mergers and Acquisition

MW – Megawatt = 1000 Kilowatts – a measure of electrical power

MWH or MWhr – Megawatt-hour = 1000 Kilowatt-hours – a measure of electrical energy

NYPA – New York Power Authority

NYS – New York State

NYSERDA – New York State Energy Research and Development Authority

PV – Photovoltaic (panels to generate electricity from the sun)

Qx yyyy – Quarter – one of 4 quarters in a year

R&D – Research and Development

RPS – Renewable Portfolio Standards

SBIR – Small Business Innovation Research

STEM – Science, Technology, Engineering, and Mathematics

STTR – Small Business Technology Transfer

TEBTR – Total Effective Business Tax Rate

Tech Fast 500 – Technology awards program in United States and Canada run by Deloitte
<http://www.deloitte.com/us/fast500/>

VC – Venture Capital – a type of business investment

About SRI International

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Founded in 1946 as Stanford Research Institute, SRI employs 2,500 people worldwide, including scientists, engineers, technologists, policy researchers, and corporate staff, spanning a wide range of disciplines and areas of expertise including biosciences, education, engineering research and development, information and computing sciences, physical sciences, and innovation and economic development policy.

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise and funding to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce their reliance on fossil fuels. NYSERDA professionals work to protect our environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York since 1975.

To learn more about NYSERDA programs and funding opportunities, visit nyserda.ny.gov.

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