

CURRICULUM VITAE

ORIGINAL

N.H.P.U.C. Case No.
Exhibit No. 25-1
Witness
DO NOT REMOVE FROM FILE

**LISA SHAPIRO, Ph.D.**  
Gallagher, Callahan & Gartrell  
214 North Main St.  
Concord, NH 03301  
[shapiro@gcglaw.com](mailto:shapiro@gcglaw.com)  
phone (800) 528-1181  
fax (603) 226-3477

EDUCATION

**Ph.D. in Economics**, June, 1995. Johns Hopkins University, Baltimore, Maryland.  
T. Rowe Price Memorial Fellowship, 1990-1991.

**M.S. in Agricultural and Resource Economics**, August, 1990. University of Maryland, College Park, Maryland. Research Fellowship funded by the Economic Research Service, U.S. Department of Agriculture.

**Bachelor of Arts Degree in Sociology**, cum laude, August, 1985. Cornell University, Ithaca, New York, (transferred from the University of New Hampshire, Durham, New Hampshire, 1983).

PROFESSIONAL EXPERIENCE

**Chief Economist**, Gallagher, Callahan & Gartrell, P.C., Concord, New Hampshire, October 1994 – present. Analyze economic and industry trends of interest to the firm's clients, regulators and others with whom the firm interacts. Work on complex economic and financial projects in public and private settings. Issues include energy and communications markets, healthcare policies, taxation, infrastructure development, environmental economics, labor markets and the financial services industry. Work with businesses and nonprofit organizations on strategic economic issues, legislative and regulatory matters.

**Economist**, Tellus Institute, Boston, Massachusetts, January 1993 – September 1994. Researched and wrote reports, worked with clients, supervised researchers, wrote proposals. Topics included electricity pricing, and electric utility planning.

**Research Director**, Arnesen for Governor Campaign, New Hampshire, April – November, 1992.

**Consultant**, LandCare Associates, Dover, New Hampshire, September 1991 – March 1992. Created computerized billing and accounting systems. Prepared financial statements.

**Researcher**, University of Maryland, College Park, Maryland, Dr. Kenneth McConnell, August 1987 – August 1988. Managed ongoing database of fishing quality in the Chesapeake Bay and prepared statistical analysis.

**Research Fellow**, Energy Conservation Coalition, Washington D.C., March – September 1987.

BOARDS, COMMISSIONS & MEMBERSHIPS

**Governor Hassan's Cost Containment Commission for Retiree Health Plans.** (September - December 2013).

**Chairman of the Board of Trustees of the New Hampshire Retirement System** (February 2008 – July 2013).

**Commission to Make Recommendations to Ensure the Long-term Viability of the New Hampshire Retirement System, Chair of Benefits Subcommittee,** (August – December 2007).

**Federal Reserve Bank of Boston's New England Public Policy Center Advisory Board** (March 2007 to September 2011).

**Josiah Bartlett Center for Public Policy,** Board member. (1999 – 2005).

**Governor Shaheen's New Hampshire Commission on Education Funding.** (2000).

**Governor Shaheen's Business Commission on Child Care and Early Education.** Staff. Prepared and presented economic analysis report. (1999)

**Leader of the Economic Perspectives Technical Work Group of the New Hampshire Comparative Risk Project.** (1998)

**President, Board of Directors, Concord Cooperative Market,** Concord, New Hampshire, October 1992 – October 1994 (Board Member, October 1991 – 1996. Member of the Finance Committee, October 1996 to 2000).

**Campaign for Ratepayer's Rights (CRR),** September 1993 – September 1994. Board Member.

**New Hampshire Community Reinvestment Association,** Member. September 1993 – September 1994.

**Agricultural and Resource Economics Graduate Students Association,** President. University of Maryland, College Park, Maryland, June 1988 – May 1989.

**Member of the American Economic Association, the National Association for Business Economics, and the National Tax Association.**

**Above & Beyond Award from the Business & Industry Association of New Hampshire,** May 2002

TESTIMONY & EXPERT WITNESS APPEARANCES

Testified on numerous energy bills to the New Hampshire State Legislature over the past 15 years including RPS, RGGI, electric industry restructuring, equipment & utility taxes, and renewable energy and planning policies.

Testified on other business and tax issues, healthcare, housing policy, taxation, and land use planning policy on behalf of industry groups, business clients, and not-for-profits.

Prepared testimony and testified as an Expert Witness on the economic impacts of the Power Purchase Agreement between Public Service of New Hampshire and Laidlaw Berlin Biopower, LLC. New Hampshire Public Utilities Commission DE-10-195.

Expert witness in private arbitration renewable energy case.

## REPORTS

**Proposed Northern Pass Transmission Project, Economic Impact Update, Estimated New Hampshire Jobs During 3 Year Construction Phase**, prepared for Northern Pass Transmission LLC with Heidi Kroll, April 2011.

**Preliminary Economic and Fiscal Impacts of the Proposed Northern Pass Transmission Project**, prepared for Northern Pass Transmission LLC with Heidi Kroll, October 2010.

**Preliminary Economic and Fiscal Impacts of the Proposed Northern Pass Transmission Project, Franklin Converter Station and Line Work**, prepared for Northern Pass Transmission LLC with Heidi Kroll, October 2010.

**The Economic Impacts of Constructing a Scrubber at Merrimack Station**, prepared for Public Service Company of New Hampshire with Heidi Kroll, March 13, 2009.

**The Economic Impacts of Greater Investments in New Hampshire's Transportation Infrastructure Funded by an Increase in the Gas Tax**, prepared for the Aggregate Manufacturers of New Hampshire with Heidi Kroll, February 17, 2009.

**Estimated Economic Impacts of Childhood Lead Poisoning in New Hampshire**, prepared for Child Health Services with Heidi Kroll, October 3, 2008.

**Land Use Regulations in New Hampshire**, prepared for the New Hampshire Public Policy Alliance for Housing, the Home Builders & Remodelers Assoc. of New Hampshire, and the New Hampshire Housing Finance Authority with Heidi Kroll, January 2007.

**Housing New Hampshire's Workforce**, prepared for the New Hampshire Workforce Housing Council with Heidi Kroll, March, 2005.

**Public Opinion Poll Results in the Study of Select Economic Values of New Hampshire Lakes, Rivers, Streams and Ponds-Phase III Report**, prepared for the New Hampshire Lakes Association with Heidi Kroll, December 2004.

**Estimates of Select Economic Values of New Hampshire Lakes, Rivers, Streams and Ponds-Phase II Report**, prepared for the New Hampshire Lakes Association with Heidi Kroll, June, 2003.

**The New Hampshire Forum On Higher Education—Recommended Strategy Going Forward**, prepared for The New Hampshire Forum On Higher Education with Heidi Kroll, October 30, 2002.

**Transmission Transition: Toward an Efficient Electricity Grid**, Energy User News, October, 2002.

**Budget Deficits and Business Taxes in New Hampshire**, prepared for the New Hampshire Bankers Association, with Charles Connor and Heidi Kroll, May 9, 2002.

**A Study of the Economic Values of the Surface Waters of New Hampshire—Phase I Report - Preliminary Assessment of the Existing Literature, Data, and Methodological Approaches to Estimating the Economic Value of Surface Water**, prepared for the New Hampshire Lakes Association with Heidi Kroll, August 1, 2001.

**2001 NH Local Impact Assessment Project - Economic Statistics on LIAP Forestry and Water Issues**, prepared for the Society for the Protection of New Hampshire Forests with Heidi Kroll, May, 2001.

**Energy Issues and the Economy**, A presentation to the N.H. Electric Utility Oversight Committee, February 20, 2001, and to the N.H. Senate Ways and Means Committee, February 14, 2001.

**Making Economic Sense of Electricity Price Spikes**, Energy User News, December, 2001.

**Workforce Opportunity Council (WOC) Information and Data Gathering Initiative**, prepared for the Demand Committee of the Workforce Opportunity Council, October, 2000.

**The Economic Impacts of the New Hampshire Housing Finance Authority Tax Exempt Bond Programs**, with Richard England, prepared for The New Hampshire Housing Finance Authority, August, 2000.

**New Choices Mean New Rules for the Electricity Market**, June, 2000.

**Access to Capital in a Changing Economy**, INTERFACE TECH NEWS, May 2000, p. 33.

**Short-term Economic and Fiscal Impact Analysis of Senate Bill 401 – The Establishment of the Land and Community Heritage Investment Program – Testimony before the House Finance Committee on Senate Bill 401**, prepared for the Society for the Protection of New Hampshire Forests, May, 2000.

**Vermont’s Digital Economy and Government Regulation of Access – Comments on House Bill 817**, prepared for AT&T, April, 2000.

**Local Fiscal Impact Study for the Proposed Mall at Long Wharf, City of New Haven, Connecticut**, prepared for the Connecticut Economic Resource Center, Inc., January, 2000.

**New Hampshire’s Digital Economy and Government Regulation of Access – Testimony before the NH House Science, Technology and Energy Committee on House Bill 1372**, January 25, 2000.

**The Economic and Fiscal Impacts of a Uniform Statewide Property Tax**, with Charles Connor, Richard England and Daphne Kenyon, National Tax Association Proceedings - 1999, 92<sup>nd</sup> Annual Conference on Taxation, Atlanta, Georgia, October 24-26, 1999.

**The Economic Impacts of the New Hampshire Housing Finance Authority Mortgage Revenue Bond Programs – Preliminary Assessment Report**, with Richard England, prepared for The New Hampshire Housing Finance Authority, August, 1999.

**Closing the Education Funding Structural Deficit Through an Increase in the Statewide Property Tax**, October, 1999 with Charles Connor.

**The Economic and Fiscal Impacts of a Uniform Statewide Property Tax**, January, 1999. Co-author and Project Coordinator. Co-authors: Dr. Richard England, Whittemore School of Business and Economics, University of New Hampshire; Dr. Daphne Kenyon, Simmons College; and Mr. Charles Connor, former Director of the Office of the Legislative Budget and the Governor's Budget Director. Also published in State Tax Notes, (June 14, 1999) Vol. 16, No. 24.

**The New Hampshire Economy and Child Care Markets**, May, 1998. Report submitted to Governor Shaheen's Business Commission on Child Care and Early Education.

**The Economic Impacts of Community Development Finance Authority Programs**, January, 1998. Co-authors: Dr. Richard England, Whittemore School of Business and Economics, University of New Hampshire, and Mr. Benjamin Ellis, Research Assistant. Report submitted to the NH Community Development Finance Authority and to the New Hampshire Legislature.

**Creating a Comparative Advantage in New Hampshire Capital Markets**, The New Hampshire Business Development Corporation's Financial Forum, Fourth Edition, August, 1997. Guest Commentary.

**Agriculture and Nitrate Concentrations in Maryland Community Water Systems**, The Journal of Environmental Quality, Volume 26, Number 1, January-February, 1997. Co-author Dr. Erik Lichtenberg.

**Economic Perspectives on Environmental Risks in New Hampshire**, November, 1996. Report submitted to the Public Advisory Group of the New Hampshire Comparative Risk Project.

**Portland Natural Gas Transmission System: Select Fiscal and Economic Impacts**, Update Study, October, 1996. Original Study, November, 1995. Co-author Dr. Richard England, Whittemore School of Business and Economics, University of New Hampshire.

**Banking on Small Business in New Hampshire**, May, 1995. Report on economic trends in small businesses in the Granite State. Prepared for the New Hampshire Delegation to The White House Conference on Small Business.

**Tax Policy and Voting Behavior in Statewide Elections**, June, 1995. Unpublished Ph.D. Dissertation, John Hopkins University, Baltimore, Maryland.

**Comments Submitted to the Delaware Public Utilities Commission on Ratemaking Standards**, August, 1993. By joint authors at the Tellus Institute, Boston, Massachusetts, on behalf of the Staff of the Delaware Public Utilities Commission.

**The State of Integrated Resource Planning in North America**, May, 1993. By joint authors at the Tellus Institute, Boston, Massachusetts, on behalf of Hydro-Quebec and a Consortium of Intervenors.

**A Brighter Future: State Actions in Least-Cost Electrical Planning**, 1987. Joint authors, Paul Markowitz and Nancy Hirsh. Published by the Energy Conservation Coalition, Washington, D.C.

#### TEACHING EXPERIENCE

**Adjunct Faculty**, Introduction to Microeconomics, University of New Hampshire, Manchester, Fall Semester, 1998.

**Adjunct Faculty**, Graduate Introduction to Public Policy, University of New Hampshire, Whittemore School of Business and Economics, Fall Semester, 1997.

**Instructor**, Introductory Statistics, Technical College at Berlin, New Hampshire, August – December, 1992.

**Teaching Assistant**, Graduate Macroeconomics, Johns Hopkins University, January – May 1991.

**Instructor**, Introductory Microeconomics, Johns Hopkins University, September – December 1990.

#### PRESENTATIONS

Presentation before the **New Hampshire House Ways & Means Committee's "Revenue Structure Informational Session,"** October 21, 2009

*"Adjusting to a Challenging Economy,"* **Greater Somersworth Chamber of Commerce - Tri-Chambers Breakfast Forum**, Somersworth, New Hampshire, September 10, 2008.

*"The Cost of Opting in to RGGI"* **Greater Manchester Chamber of Commerce Breakfast Forum**, Manchester, New Hampshire, May 21, 2008.

*"A Survey of Land-use Regulations in New Hampshire,"* **Mortgage Bankers Association**, Bedford, New Hampshire, January 18, 2007.

*"Energy Cost Outlook: Impact on New Hampshire,"* **New Hampshire House and Senate Joint Finance and Ways & Means Committees' Global, National and Regional Economic Briefing**, Concord, New Hampshire, December 14, 2005.

*"Housing New Hampshire's Workforce,"* **Eastern Lakes Regional Housing Coalition**, Wolfeboro, New Hampshire, October 18, 2005.

*"Housing New Hampshire's Workforce,"* **Strafford Regional Planning Commission**, Rochester, New Hampshire, May 26, 2005.

*"Housing New Hampshire's Workforce,"* **Upper Valley Housing Coalition**, West Lebanon, New Hampshire, April 29, 2005.

*"Housing New Hampshire's Workforce,"* **Public Policy Alliance for Housing: State of Housing in New Hampshire Conference**, Manchester, New Hampshire, May 17, 2005.

*"Notes on Electric Restructuring in New Hampshire and Beyond,"* **New Hampshire House Science, Technology and Energy Committee**, Concord, New Hampshire, February 8, 2005

*"New Hampshire Seacoast Region Wastewater Management Study,"* **Gulf of Maine Council on the Marine Environment**, Portsmouth, New Hampshire, December 9, 2004.

"Testimony on behalf of Merrill's Marine Terminal Services, Inc. in their support of Maine Legislative bill LD 1647", **Maine Appropriations and Financial Affairs Committee**, Augusta, Maine, February 18, 2004.

*"State and Local Tax Incentives for Business,"* Respondent, **National Tax Association 96<sup>th</sup> Annual Conference on Taxation**, The Drake Hotel, Chicago, Ill., November 13-15, 2003.

*"School Costs and Affordable Housing,"* Moderator, **New England Housing Network Overcoming the Obstacles - Creating and Preserving Affordable Housing**, Nashua, NH, September 9, 2003.

*"Connecting Businesses with Education, Government, and Money,"* **Sullivan County Business Information Expo** Tax Panelist with David Alukonis, Chair, N.H. House Ways & Means Committee, Stanley Arnold, Commissioner, NH Department of Revenue Administration, David Juvet, VP, Business and Industry Association. NH Community Technical College, Claremont, NH, May 22, 2002.

*"Budget Deficits and Business Taxes in New Hampshire,"* **New Hampshire Bankers Association Spring CEO Meeting**, The Inn at Mill Falls, Meredith, NH, May 9, 2002.

"A Citizens Summit - Beyond September 11<sup>th</sup>: NH Citizens Charting Our Economic Future," Panelist (House Speaker Gene Chandler, Facilitator), **Citizens Resource Foundation**, Manchester, NH, October 17, 2001.

"New Hampshire Tax Options," **New Hampshire Bankers Association Spring CEO Meeting**, Woodstock, VT, May, 2001.

"Energy, Taxes & the NH Economy," **New Hampshire Association of Health Underwriters, The New Hampshire Chapter of The Society of Chartered Property and Casualty Underwriters, Inc.**, April 25, 2001.

*"Tax and Expenditure Options for Closing the State Budget Deficit,"* Moderator, **Options for Closing the State Budget Deficit—What Now?**, Josiah Bartlett Center for Public Policy, April 30, 2001.

*"Electric Restructuring in New Hampshire: Outlook and Options,"* **Dollars & Sense of Electric Competition, Business & Industry Association of New Hampshire**, April 9, 2001.

*"An Open Forum Between Providers and Users to Discuss New Hampshire Specifics,"* Moderator, **Telecommunications in the Year 2000 and Beyond**, New Hampshire Public Utilities Commission, March 17, 2000.

A Presentation of the Study – *“The Economic and Fiscal Impacts of a Uniform Statewide Property Tax,”* **Current Issues in U.S. Property Taxation, National Tax Association 92<sup>nd</sup> Annual Conference on Taxation**, Atlanta, Georgia, October 24-26, 1999.

*“The Economic Impact and Looking to the Future,”* Moderator, **Reading, Writing and Revenues Post Claremont, Josiah Bartlett Center for Public Policy**, Concord, New Hampshire, October 14, 1999.

*“North Country Telecommunications: The Next Steps”* **Berlin Economic Development Council**, Bretton Woods, New Hampshire, September 29, 1999.

*“What is the Future for Electric Rates in New Hampshire?”* **Josiah Bartlett Center for Public Policy**, Concord, New Hampshire, September 15, 1999.

*Keynote Speaker, Annual Conference and Trade Show, New Hampshire Telecommunications Association*, Manchester, New Hampshire, June, 1999.

*“Electric Industry Deregulation – Looking Ahead and Meeting the Challenge,”* **National Manufacturing Week Conference '99**, Chicago, Illinois, March 17, 1999.

*“PUC & FCC Annual Regulatory Seminar”* **New Hampshire Telecommunications Association**, Bedford, New Hampshire, December 17, 1998.

*“The Economics of On-Site Generation Under Regulatory Uncertainty,”* **Producing Your Own Electricity On-Site Conference and Exhibition, Governor’s Energy Office and Others**, West Lebanon, New Hampshire, November 17, 1998.

*“Investment Opportunities,”* **Northern New England Community Reinvestment Conference, Granite State Community Reinvestment Association, Federal Reserve Bank of Boston**, October 6, 1998.

*“The Myths and Reality Behind Energy Resale,”* **Telecom Business Conference**, Jacob Javitz Center, New York, New York, September, 1998.

*“Child Care Markets: Challenges and Opportunities,”* **New England Rural Development Conference, Federal Reserve Bank of Boston**, Sheraton Harborside Hotel, Portsmouth, New Hampshire, June 15, 1998.

*“New Hampshire Economy and Child Care Markets,”* **Governor Shaheen’s Business Commission on Child Care and Early Education**, Concord, New Hampshire, May 26, 1998.

*“Restructuring Electricity Markets: Telecommunications Opportunities,”* **Telecom Reseller Opportunities Conference**, Jacob Javitz Center, New York, New York, September, 1997.

*“Demystifying Electric Industry Restructuring,”* **New Hampshire North Country Council**, Lincoln, New Hampshire, July, 1997.

*“Centralized Versus Decentralized State Fiscal Systems,”* **New Hampshire’s Fiscal Foundation: Granite or Quicksand, Josiah Bartlett Center for Public Policy**, Concord, New Hampshire, April 11, 1997.

ORIGINAL	
N.H.P.U.C. Case No.	
Exhibit No.	25-2
Witness	
DO NOT REMOVE FROM FILE	

---

## THE ECONOMIC IMPACTS OF CONSTRUCTING A SCRUBBER AT MERRIMACK STATION

---

March 13, 2009

Prepared By  
Dr. Lisa Shapiro, Ph.D., Chief Economist  
Heidi Kroll, Market and Policy Analyst  
Gallagher, Callahan and Gartrell, P.C.  
214 North Main Street  
Concord, NH 03301  
[www.gcglaw.com](http://www.gcglaw.com)  
(800) 528-1181

Prepared for  
Public Service Company of New Hampshire

## EXECUTIVE SUMMARY

Merrimack Station is a coal fired power station in Bow, New Hampshire that is undergoing a major construction project to dramatically reduce mercury and sulfur dioxide emissions pursuant to a New Hampshire law passed in 2006. The \$457 million project is halfway completed.

Starting in the summer of 2008, a number of interested parties have called for "pausing" the project in order to revisit the overall public interest of the construction project. A bill has been introduced in the New Hampshire Senate, SB 152, which requires the New Hampshire Public Utilities Commission to consider whether or not the project is in the public interest, and take action accordingly.

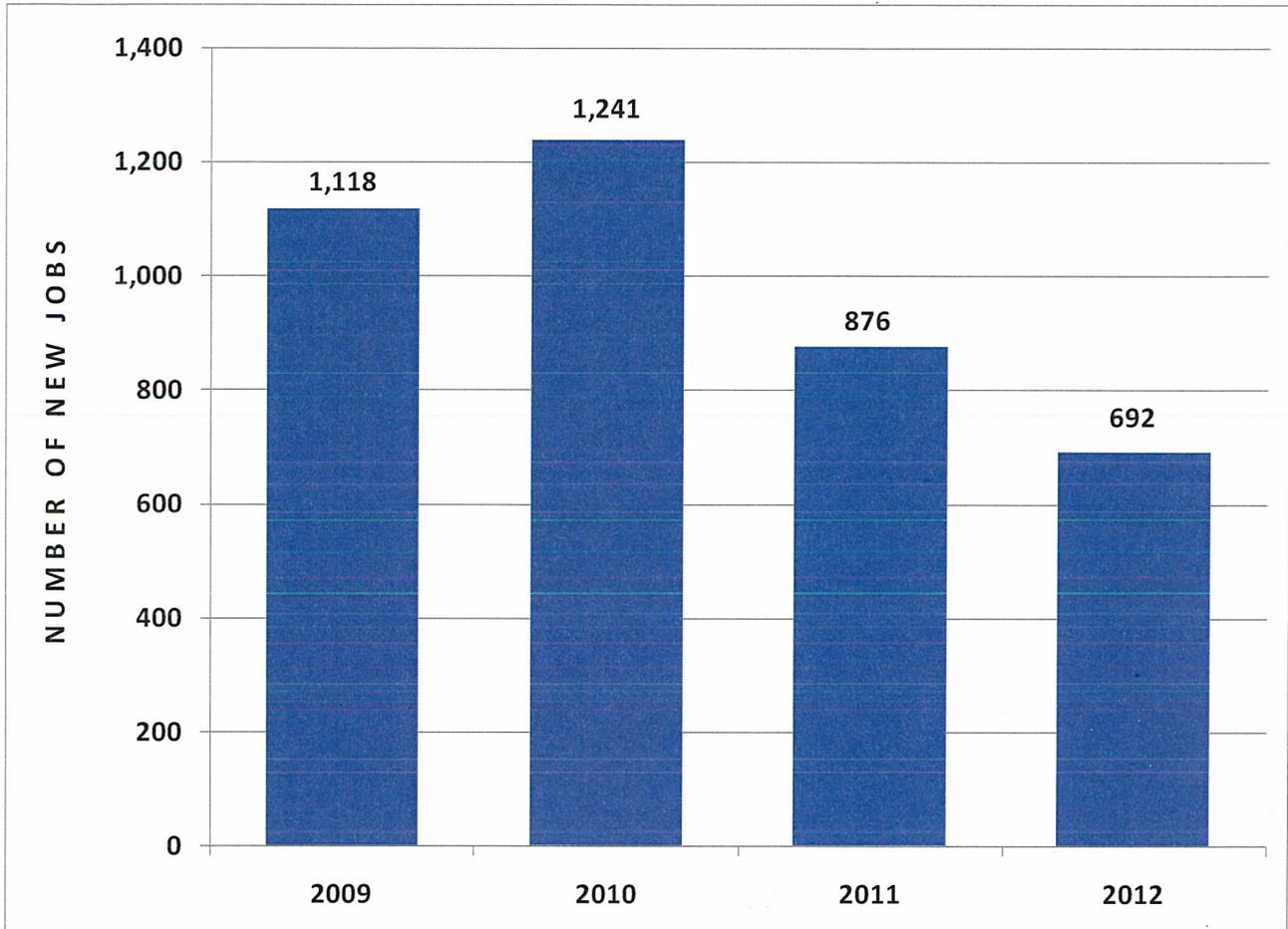
The purpose of this study is to provide an estimate of the economic benefits to New Hampshire – jobs, gross state product, and personal income – from the construction of a wet flue gas desulfurization system, commonly called a scrubber, at Merrimack Station. This report is intended to provide additional information for the legislature on the potential consequences from passing SB 152.

The methodology uses a model of the New Hampshire economy developed by the Regional Economic Model, Inc. (REMI). The REMI model is founded on econometrics – the application of mathematics, statistics, and economic theory to provide an empirical model and quantitative framework to explain and forecast economic impacts. This analysis uses a 23-sector single-region REMI model, widely used by government and private forecasters to simulate the effect on the economy of various private and public initiatives and policy proposals. In New Hampshire, the REMI model was used, for example, by the University of New Hampshire to estimate the economic benefits of enacting legislation to join the Regional Greenhouse Gas Initiative (RGGI), and by New Hampshire Economic and Labor Market Information Bureau (ELMI) to estimate the economic impacts from large mill closures in the North Country.

### *Summary of Economic Impacts*

- There is immediate and significant job creation from the investment in the scrubber project as a result of direct, indirect, and induced economic effects.
- Beginning in 2009 and continuing through 2012, about 1,000 jobs per year will be created (or saved) in New Hampshire from the scrubber construction project.<sup>1</sup>
- The new (or saved) jobs are primarily in construction, retail, and services.
  - A median estimate of 1,118 new (or saved) jobs in 2009.
  - A median estimate of 1,241 new (or saved) jobs in 2010.
  - A median estimate of 876 new (or saved) jobs in 2011.
  - A median estimate of 692 new (or saved) jobs in 2012.

**Chart ES-1: Estimates of New Jobs from the Scrubber Project  
(Median Estimates)**



- The state's Gross State Product (GSP) is estimated at \$224 million higher on a cumulative basis during 2009-2012, and economic output at \$396 million higher on a cumulative basis over the 4 year forecast period of the scrubber project construction.
- Disposable personal income is projected to increase during the 2009-2012 period by an average of about \$35 million per year.

## BACKGROUND

In 2002, New Hampshire passed a first-in-the-nation four-pollutant reduction law, the Clean Power Act, RSA Chapter 125-O. It was the product of a lengthy collaborative effort in which Public Service Company of New Hampshire (“PSNH”), the Governor’s Office, the Office of Energy and Planning, the Department of Environmental Services, and a number of legislators and environmental groups all participated. In 2006, following near-unanimous passage in the House and Senate of House Bill 1673, the Act was amended to reflect updated reduction requirements for mercury emissions.

The Clean Power Act expressly states that “It is in the public interest to achieve significant reductions in mercury emissions at the coal-burning electric power plants in the state as soon as possible” and requires a minimum of an 80% reduction in such emissions. “To accomplish this objective, the best known commercially available technology shall be installed at Merrimack Station no later than July 1, 2013... The department of environmental services has determined that the best known commercially available technology is a wet flue gas desulphurization system, hereafter „scrubber technology“.”

Merrimack Station is a 433 MW base-load plant that generates approximately 3.1 billion kilowatt-hours (kWh) per year. This level of operation is expected to continue after the scrubber is installed. In addition, the Station will have the added benefit of being among the cleanest coal-burning plants in the nation. As recognized in the Clean Power Act, the “[s]crubber technology achieves significant emissions reduction benefits, including but not limited to, cost effective reductions in sulfur dioxide, sulfur trioxide, small particulate matter, and improved visibility (regional haze).” For example, the scrubber will enhance current reductions in SO<sub>2</sub> emissions by an additional 30,000 tons of reductions each year. Such reductions will avoid the cost of emission allowances, and provide public health and environmental benefits.

## SCRUBBER PROJECT TIMELINE – KEY MILESTONES

The installation of the scrubber is a large and complex project that has been underway since 2006 and will be completed on or before July 1, 2013 if there are no delays. PSNH has already completed a number of critical milestones on the scrubber project, including but not limited to the following:

- The program manager has been hired.
- Engineering design work is nearly complete.
- Rigorous competitive bidding processes took place for the seven major pieces of work: the program manager, the site preparation, foundations, scrubber, new chimney, waste-water treatment facility, and material handling.
- Fixed price contracts have been negotiated with winning bidders for these seven key areas.

- Union labor agreements have been signed.
- Contractors have received notices to proceed for procurement of materials, design and engineering.
- All Phase 1 permits have been issued.
- Phase 1 construction is underway.
- Final Temporary Permit for the installation and operation of the scrubber has been issued.
- Phase 2 construction is slated to begin.
- Over \$230 million has been spent or contractually committed.

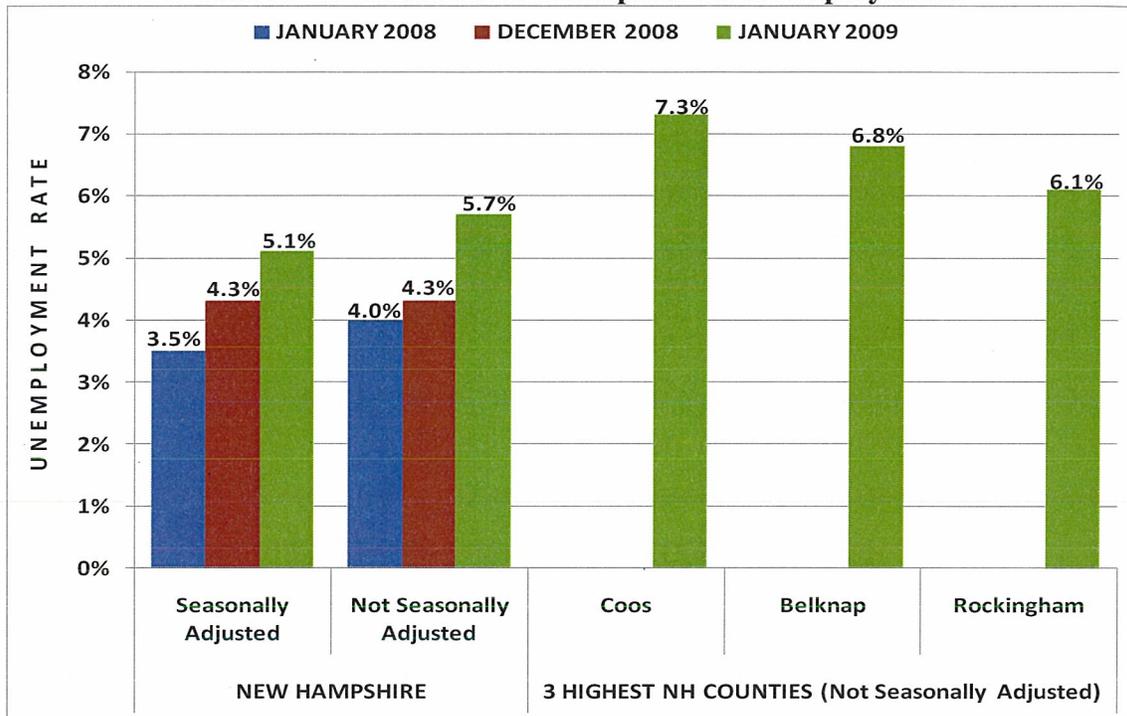
### **ESTIMATED ECONOMIC BENEFITS**

According to filings submitted to the Public Utilities Commission in September 2008 by Public Service Company of New Hampshire, the scrubber project is estimated to cost \$457 million and produce a nominal benefit to customers of \$583 million (a \$132 million benefit on a net present value basis) over the depreciable life of the scrubber.<sup>2</sup> The cost estimate includes the project costs, project management costs, AFUDC,<sup>3</sup> indirect costs, and project contingencies. Phase 1 construction began in 2008, Phase 2 construction is slated to begin imminently, and construction activities will continue through 2012.

As discussed below, this multi-year investment is estimated to have significant economic benefits for New Hampshire during a time when the State is in a recession and facing many economic uncertainties. Households are struggling. A survey released last week by the Mortgage Bankers Association found that 7% of all mortgage loans in New Hampshire were at least 30 days past due in the last quarter of 2008.<sup>4</sup> Furthermore, NH bankruptcy filings are up 32% and the jump is largely attributable to personal, rather than business, filings.<sup>5</sup>

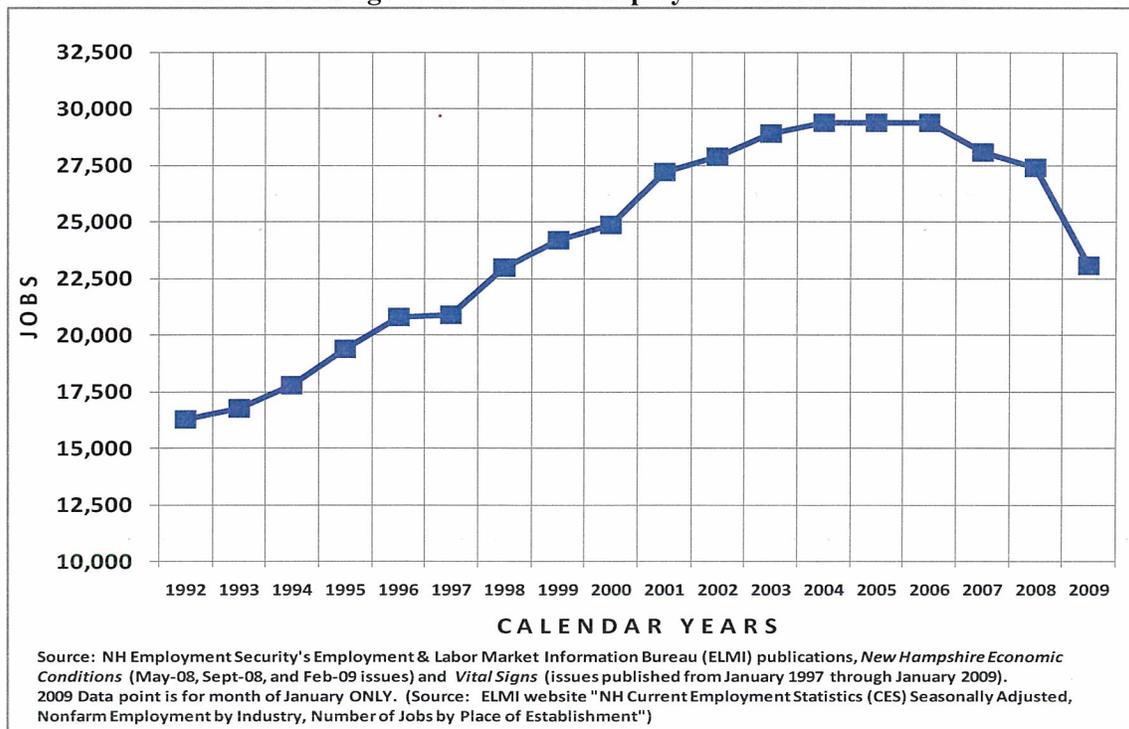
Many businesses are struggling, reducing their spending and cutting jobs. New Hampshire's unemployment rate currently stands at 5.1%, a 15-year high – the number of unemployed residents grew by 6,620 between December 2008 and January 2009, to reach 38,060.<sup>6</sup> In January 2009, 11,890 more New Hampshire residents were unemployed than in January 2008.<sup>7</sup> Before this latest economic news was released, it was forecast that the State would lose at least 16,000 jobs, or 2.5% of employment, with the greatest job losses occurring in the Trade, Finance, and Construction sectors.<sup>8</sup>

**Chart 1: Growth in New Hampshire's Unemployment**



The construction industry is among the hardest hit in New Hampshire. Employment in the construction industry has already declined by as many as 3,700 jobs between January 2008 and January 2009.<sup>9</sup> As discussed below, the scrubber project would put a significant number of construction and other skilled laborers back to work.

**Chart 2: Average Construction Employment in NH 1992-2009**



## *Methodology*

This analysis used primary and secondary approaches to estimate the economic impacts of the scrubber project during its construction. Together these approaches provide the basis for the estimated median impacts on jobs, business activity, and personal income in New Hampshire.

The primary methodology used a model of the New Hampshire economy developed by the Regional Economic Model, Inc. (REMI). The REMI model is founded on econometrics – the application of mathematics, statistics, and economic theory to provide an empirical model and quantitative framework to explain and forecast economic impacts. This analysis used a 23-sector single-region REMI model, widely used by government and private forecasters to simulate the effect on the economy of various private and public initiatives and policy proposals.

In this instance, the model was used to simulate the near-term economic effects of spending \$457 million during 2008 through 2012 (Phase 1 and Phase 2 construction activities) on the scrubber project compared to a control forecast where no such investments are made. Several different variables for modeling expenditures on industrial equipment and construction were used to reflect greater or lesser amounts of the expenditures being retained in-state. Sensitivities were also run to reflect the possibility that the project may come in under \$457 million and to reflect the fact that AFUDC and indirect corporate costs are not expected to have the same impact on the New Hampshire economy as other expenditures. The lowest case scenario simulates a 15% reduction in investment to reflect a conservative outlook, namely higher levels of leakage and lower levels of investment. The results from these various REMI scenarios were compared against estimates made using New Hampshire-specific multipliers from the federal government’s Regional Input-Output Modeling System, or RIMS II.<sup>10</sup> RIMS II multipliers are used to estimate static, present-day economic impacts resulting from a given amount of final demand in an industry or a given number of new jobs specific to a project. These multipliers reflect the federal government’s analyses of inter-industry relationships.

## *Summary of Economic Impacts*

Based on the results from the REMI modeling, the economic impacts in New Hampshire of investing in the scrubber project are forecasted to be positive. The estimated impacts are summarized in Table 1 and described in more detail below.

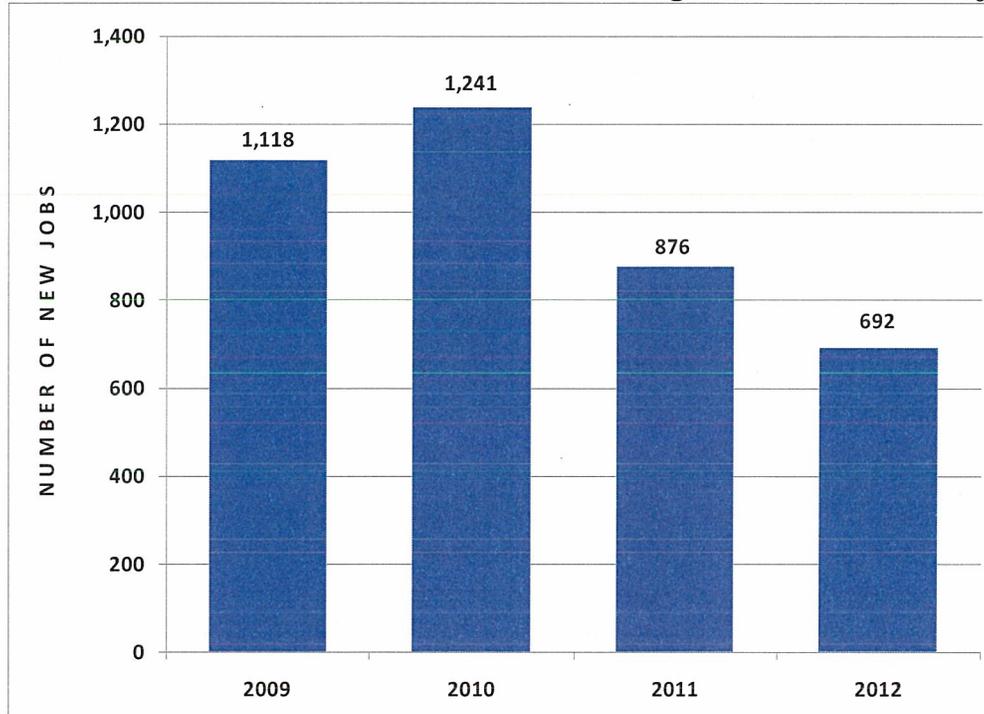
**Table 1: Median Estimates of Annual Economic Impacts of Investing in the Scrubber Project  
 Increase in Jobs, Gross State Product, Sales and Personal Income  
 2009-2012**

<b>Economic Indicator</b>	<b>Average Per Year</b>
Employment	982 Jobs
Gross State Product (2009\$)	\$56 Million
Economic Output / Sales (2009\$)	\$99 Million
Disposable Personal Income (2009\$)	\$35 Million

## Employment

There is immediate and significant job creation from the investment in the scrubber project. The median estimate for new jobs is 982 on average during the period 2009 through 2012.<sup>11</sup> The estimated number of new jobs will peak in 2010, at a median estimate of 1,241 jobs, when activity on the project is expected to crest. The majority of these jobs are expected to occur in three sectors: construction, services, and retail trade.

**Chart 3 Median Estimates of Jobs from Investing in the Scrubber Project**



The estimated job creation is a result of three economic effects: direct, indirect, and induced economic impacts. Direct jobs refers to those jobs that are directly related to work on the scrubber project. PSNH estimates conservatively that there would be more than 300 skilled workers on site for the project during the peak period in 2010. The New Hampshire Building Trades Council estimates the number to be closer to 500 jobs because certain trades such as sheet metal workers, insulators, and painters are not included in PSNH's 300 estimate, and experience has shown that projects of this magnitude tend to require around 500 workers.<sup>12</sup> PSNH has reached a written agreement to use union labor to ensure the availability of critical skilled workers and prioritize safety on the job. In addition to these skilled laborers, the project will also support many engineering and management related positions. For example, in the fall of 2008, the program manager for the scrubber project, URS Washington Division ("URS"), had approximately 30 engineers working on the project in areas such as electrical, civil, and structural engineering; controls; fire protection; and draftsmen.

Beyond the direct jobs described above that are associated with the project, indirect jobs will also be created as a result of meeting the project's demand for materials, supplies, and indirect services, and induced jobs will be created when direct and indirect workers spend their

income on local goods and services. The RIMS II multiplier for construction jobs is approximately 2, which suggests that the job estimates produced by the REMI model are reasonable.

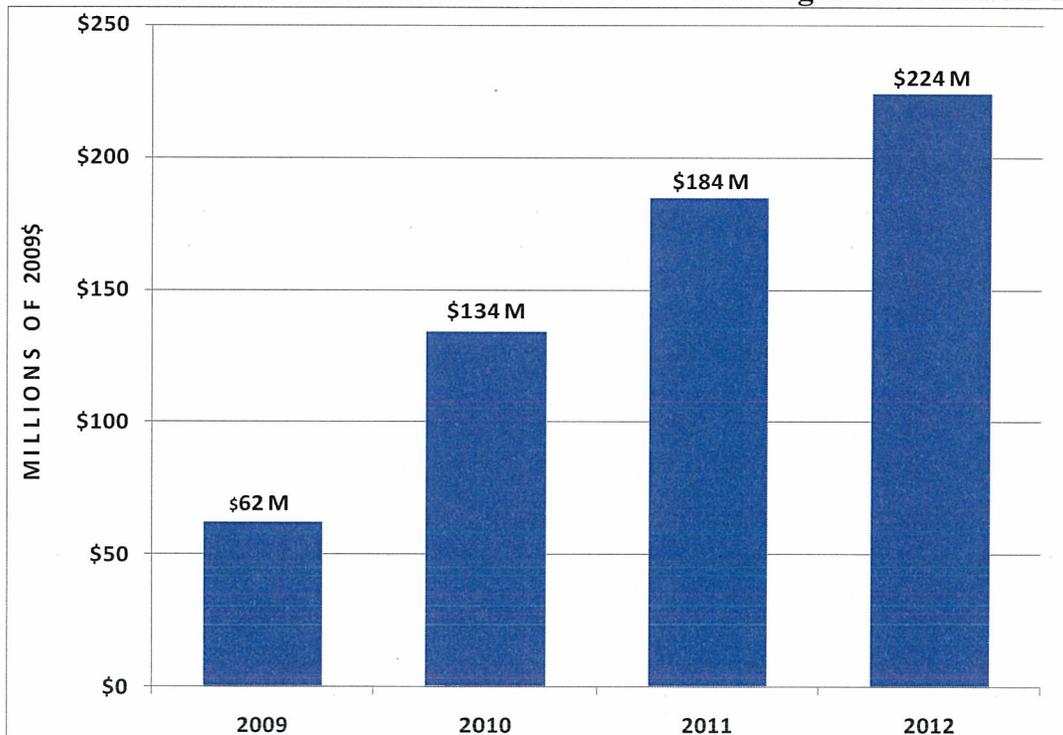
The median estimates for new jobs shown in Chart 3 are based on the scenarios described earlier. Several different variables for modeling expenditures on industrial equipment and construction were used to reflect greater or lesser amounts of the expenditures being retained in-state. Sensitivities were run to reflect the possibility that the project may come in under \$457 million, and to reflect lower in-state impacts from AFUDC and corporate cost. The ranges of job creation reflecting these scenarios for each year are as follows:

- Between 826 and 1,411 jobs created in 2009
- Between 936 and 1,546 jobs created in 2010
- Between 647 and 1,106 jobs created in 2011
- Between 496 and 888 jobs created in 2012

### ***Gross State Product***

Gross State Product (GSP) is the value added to the economy through the net output of goods and services. The median estimate for the increase in New Hampshire's annual GSP between 2009 and 2012 is \$56 million. Based on the median estimated increases in GSP each year during this period, the state's GSP is estimated to be \$224 million higher on a cumulative basis than it would be in the absence of the scrubber project.

**Chart 4: Cumulative Median Estimates of GSP from Investing in the Scrubber Project**



The median estimates for GSP underlying the data in Chart 4 are based on a range of scenarios and estimates. Several different variables for modeling expenditures were used to reflect greater or lesser amounts of the expenditures being retained in-state, and sensitivities were run to reflect costs coming in under \$457 million and higher leakage rates. The ranges for each year are as follows:

- Between \$51 million and \$74 million more in GSP in 2009
- Between \$61 million and \$83 million more in GSP in 2010
- Between \$43 million and \$58 million more in GSP in 2011
- Between \$34 million and \$46 million more in GSP in 2012

### ***Economic Output / Sales***

Economic output, or sales, captures all of the intermediate goods purchased as well as all of the final goods and services that are captured in GSP. Based on the modeling for this analysis, New Hampshire's annual sales are estimated to increase on average by \$99 million. Based on REMI's estimated increases in economic output each year during the period 2009-2012, the state's output could be an estimated \$396 million higher on a cumulative basis than they would be in the absence of investment in the scrubber project.

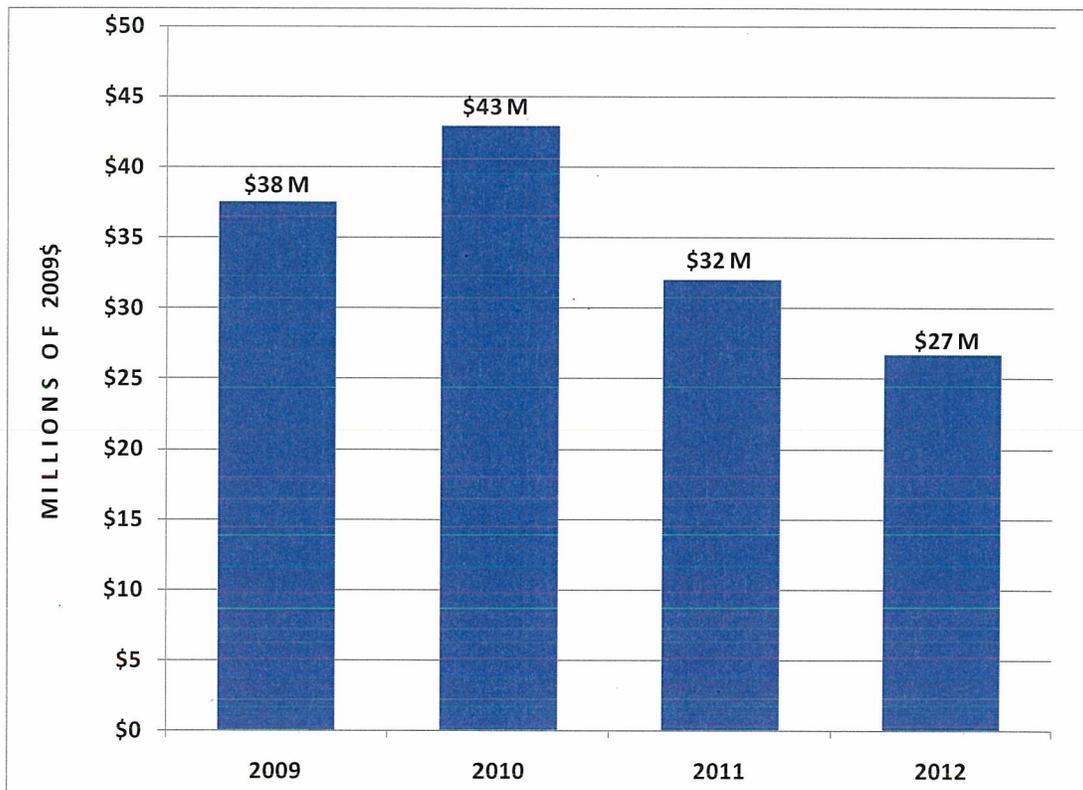
The median estimates for economic output are based on the range of scenarios described earlier in this report. The ranges for each year are as follows:

- Between \$89 million and \$135 million more in economic output in 2009
- Between \$106 million and \$151 million more in economic output in 2010
- Between \$73 million and \$103 million more in economic output in 2011
- Between \$58 million and \$79 million more in economic output in 2012

### ***Disposable Personal Income***

Disposable personal income is projected to increase during the 2009-2012 period by an average of about \$35 million per year, and during the peak year of activity, disposable personal income could increase by a median estimate of \$43 million. Disposable personal income in the REMI model reflects the income received by New Hampshire residents from wages and salaries (and supplements thereto), proprietors' income, rental income, interest and dividends, and transfer receipts (e.g., retirement and disability insurance benefits, Medicare, etc.), less taxes and contributions for government social insurance.

**Chart 5:**  
**Median Estimates of Disposable Personal Income from Investing in the Scrubber Project**



The median estimates for personal disposable income shown in Chart 5 are based on the range of scenarios described earlier in this report. The ranges for each year are as follows:

- Between \$26 million and \$49 million more in personal disposable income in 2009
- Between \$31 million and \$55 million more in personal disposable income in 2010
- Between \$23 million and \$41 million more in personal disposable income in 2011
- Between \$19 million and \$35 million more in personal disposable income in 2012

<sup>1</sup> Jobs include full-time and part-time jobs.

<sup>2</sup> PSNH's September 2, 2008 filing to the Public Utilities Commission responding to a Request for Information on the Merrimack Station Scrubber Project, Docket No. 08-103.

<sup>3</sup> AFUDC stands for Allowance for Funds Used During Construction and is an imputed interest rate on the funds used to construct large utility plant and equipment.

<sup>4</sup> "Foreclosed Homes Snatched Up In NH Auction," Associated Press, March 8, 2009. Available at: [www.Seacoastonline.com](http://www.Seacoastonline.com)

<sup>5</sup> "NH Bankruptcy Filings Up 32 Percent," Associated Press, January 11, 2009. Available at: [www.Seacoastonline.com](http://www.Seacoastonline.com)

<sup>6</sup> "Unemployment News Release," New Hampshire Economic and Labor Market Information Bureau, February 26, 2009.

<sup>7</sup> "Unemployment News Release," New Hampshire Economic and Labor Market Information Bureau, February 26, 2009.

<sup>8</sup> Gittel, Ross, "New Hampshire and New England Economic Outlook," New England Economic Partnership, February 2009.

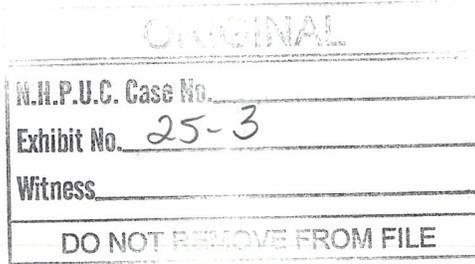
---

<sup>9</sup> “NH Current Employment Statistics (CES) Seasonally Adjusted, Nonfarm Employment by Industry, Number of Jobs by Place of Establishment,” New Hampshire Economic and Labor Market Information Bureau, <http://www.nh.gov/nhes/elmi/nonfarmcessa.htm>.

<sup>10</sup> Additional information about the US Department of Commerce’s Bureau of Economic Analysis’ RIMS II multipliers can be found at <http://www.bea.gov/regional/rims/index.cfm>.

<sup>11</sup> Jobs include full-time and part-time jobs.

<sup>12</sup> Testimony of the New Hampshire Building Trades Council before the House Science, Technology & Energy Committee on HB 496, March 5, 2009.



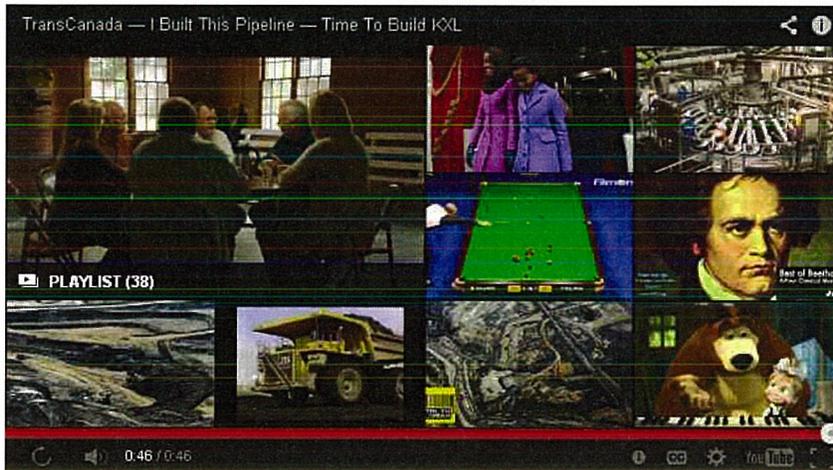
Keystone XL Pipeline

- About
- Benefits**
- Facts
- Community Engagement
- Blog
- Environment
- Safety
- Time To Build
- Contact Us
- Su

## Jobs & Economic Benefits

### Keystone XL means jobs

*economic benefits, jobs*



Nine Thousand Shovel-Ready Jobs

Keystone XL is the definition of shovel-ready infrastructure project. **Almost overnight, Keystone XL could put 9,000 hard-working American men and women directly to work.** The U.S. State Department's Final Supplemental Environmental Impact Statement (PDF, 4 MB) found that **the project would support more than 42,000 direct and indirect jobs** nationwide.

#### Supporting North American Labor

TransCanada has entered into comprehensive **Project Labor Agreements** with North America's largest building trades unions, the Laborers International Union of North America, the International Brotherhood of Teamsters, the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada, AFL-CIO, the International Union of Operating Engineers and the Pipeline Contractors Association.

The agreement guarantees TransCanada will have access to the most capable, well-trained and ready workforce in the U.S. to construct Keystone XL.

#### Millions of Work Hours

**During construction, the project is expected to create over seven million hours of labor and over 13,000 new jobs for American workers.** Danny Hendrix, a business manager for Pipeliners Local 798 in Tulsa, Okla., **recently told media** what these jobs mean to his members and their families: "They've got healthcare for another year, [and] they've got a pension credit for when they retire. It means that those families have got healthcare, dental care — so it means a lot. It means they can make a house payment, it means they can send their kids to college."

#### Support Keystone XL

### Explore

- Time To Build KXL
- About The Project – Keystone XL Pipeline
- Jobs & Economic Benefits
- Environmental Responsibility
- Energy Security

### Route Maps

- Keystone XL Pipeline — Overall route map  
Nov 29, 2012
- Keystone XL Pipeline - Nebraska route map  
Nov 29, 2012
- Keystone XL Pipeline - Montana route map  
Nov 29, 2012
- Keystone XL Pipeline - South Dakota route map  
Nov 29, 2012

Make your voice heard and visit <http://keystone-xl.com/timetobuildkxl/> to send a message to the StateDepartment in support of good jobs for American labor and in support of the Keystone XL Pipeline.

### Make your voice heard! Support Keystone XL today!

*economic benefits, jobs*

**Time To Show Your Support**

**Keystone XL Pipeline will create 42,100 jobs.**

**Visit TimeToBuildKXL.com now**

Building Keystone XL will connect the United States Gulf Coast refineries with safe and reliable access to abundant continental crude and decrease the United States' dependence on oil from places such as the Middle East, Russia and Venezuela. Keystone XL will create jobs — **the Gulf Coast Pipeline created more than 4,800 good jobs for hard-working men and women in Texas and Oklahoma. Keystone XL will create 9,000 more.**

Across the United States, labor and business groups are calling for the approval of Keystone XL. From Michigan to Texas, Montana to Pennsylvania, construction workers, pipefitters and heavy equipment operators are looking forward to the opportunity to build the safest pipeline in United States history. Visit [www.timetobuildkxl.com](http://www.timetobuildkxl.com) now to learn more.

### Putting skilled Americans to work

*economic benefits, jobs*



Our People, Our Culture

The \$5.3-billion Keystone XL Pipeline Project is the largest infrastructure project currently proposed in the United States. Construction of the 1,179-mile pipeline will require 9,000 skilled American workers. The project will provide jobs for welders, mechanics, electricians, pipefitters, laborers, safety coordinators, heavy equipment operators and other workers who rely on large construction projects for their livelihoods.

In addition to construction jobs, an estimated 7,000 U.S. jobs are being supported in manufacturing the steel pipe and the thousands of fittings, valves, pumps and control devices required for a major oil pipeline.

TransCanada has contracts with more than 50 suppliers across the U.S., including companies in Texas, Missouri, Pennsylvania, Michigan, Oklahoma, South Carolina, Indiana, Georgia, Maryland, New York, Louisiana, Oklahoma, Minnesota, Ohio, Arkansas, Kansas, California and Pennsylvania.

TransCanada employed 4,844 Americans in Oklahoma and Texas on construction of the \$2.3-billion Gulf Coast Pipeline Project, which is expected to be complete by the end of this year.

Construction and development of the Keystone XL and Gulf Coast Pipeline Projects is anticipated to generate \$20 billion in economic impact in the United States, including \$99 million in local government revenues and \$486 million in state government revenues during construction.

The pipelines will also generate an estimated \$5 billion in additional property taxes during their operational life.

The Canadian Energy Research Institute predicts that Keystone XL will add \$172 billion to America's gross domestic product by 2035 and will create an additional 1.8 million person-years of employment in the United States over the next 22 years.

Read more about the Keystone XL and jobs on our blog:

- Gulf Coast Pipeline: 4,844 thank yous
- Houston Lateral: More oil for U.S. refineries and more jobs for Americans
- Labor and business leaders call for Keystone XL approval
- 165+ CEOs and business executives urge President Obama to approve Keystone XL

### Economic benefits of the Keystone XL Pipeline Project



Keystone XL Pipeline Project will provide good-paying jobs for U.S. families in addition to millions of dollars in annual tax revenue for local governments.

- The majority of jobs will be created during pipeline construction
- Jobs will likely include positions for equipment operators, welders, mechanics, truck drivers and laborers
- Business and contracting opportunities — Pipeline construction will create demand for local goods and services, including clearing, gravel supply, construction equipment supply and maintenance, lodging and accommodation
- Annual tax revenue — Once the pipeline is in operation, property taxes will flow to communities across the United States to support school and hospital districts, emergency services and other local programs

- **Investment in local communities** — The operation of the pipeline will also support the economies of communities surrounding our operations, which means increased revenues

Read more about Keystone XL and economic benefits on [our blog](#):

- [Pipelines creating jobs and opportunities](#)
- [One cool customer](#)
- [Quality Mat provides a firm foundation](#)

### About Keystone XL Pipeline

The Keystone XL Pipeline is a proposed 1,179-mile (1,897 km), 36-inch-diameter crude oil pipeline beginning in Hardisty, Alberta, and extending south to Steele City, Neb. This pipeline is a critical infrastructure project for the energy security of the United States and for strengthening the American economy.

Along with transporting crude oil from Canada, the Keystone XL Pipeline will also support the significant growth of crude oil production in the United States by allowing American oil producers more access to the large refining markets found in the American Midwest and along the U.S. Gulf Coast.

### Recent Posts



Majority of Americans agree it's time to build Keystone XL

Mar 05, 2014



Tribal monitors preserving cultural heritage

Feb 26, 2014



What does a judge's ruling in Nebraska mean for Keystone XL?

Feb 25, 2014

### Recent Tweets

.@LIUNA GP Terry O'Sullivan submits #KXL letter of support "on behalf of 500,000 members" <http://t.co/raqJvZpuCL> <http://t.co/F3uEKKkBFJ>

Since 2011, 16 opinion polls, 10 different agencies, 64% support for #KeystoneXL. It's #TimetoBuild. <http://t.co/BPflq5FDJ3>

Support for #KXL is everywhere, including @Hampton Inn at Stillwater, Okla. <http://t.co/YZEUIQIXfB> #KeystoneXL <http://t.co/TBBJXRkSp1>

Follow TransCanada on Twitter

### Contact Us

**General Enquiries**  
(toll-free in U.S. and Canada)  
1.866.717.7473

**Investor & Analyst Enquiries**  
1.800.361.6522

**Landowner Enquiries (U.S.)**  
1.866.585.7063

**Landowner Enquiries (Canada)**  
1.866.412.5263

**Keystone Project E-mail**  
[keystone@transcanada.com](mailto:keystone@transcanada.com)

Mailing Address

**Shipper Application and Accounting**  
Visit the Keystone Shipper Information page on [TransCanada.com](http://TransCanada.com)

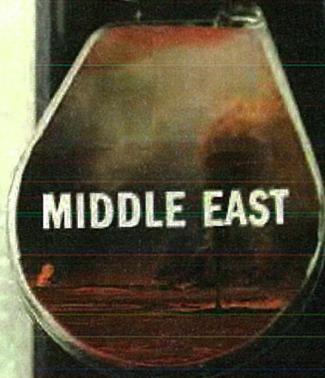
ORIGINAL

N.H.P.U.C. Case No.

Exhibit No.

25-4

DO NOT REMOVE FROM FILE



**The U.S. has a choice: More oil from unfriendly foreign sources  
or energy from a safe, reliable neighbor.**

## Where would you rather the U.S. get our energy?

Unrest halfway around the globe affects the United States because America imports millions of barrels of oil from the Middle East every week.

### **But there is another option: The TransCanada Keystone XL Pipeline.**

Along with increased domestic production, Keystone XL could eliminate America's reliance on unstable and often unfriendly foreign energy in 10 to 20 years.

**And the pipeline will bring more than just oil. Construction will support the creation of more than 40,000 American jobs.**

Keystone XL would be equipped with the latest environmental safeguards: 21,000 sensors that send data to the Oil Control Center every five seconds, 24/7 monitoring and automatic valves inside the pipeline that can be closed remotely within minutes.

**Let's build the TransCanada Keystone XL Pipeline.**

Learn more at [www.Keystone-XL.com](http://www.Keystone-XL.com)

