



## STEPHEN GROVER

*President*

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### PROFILE

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**Dr. Stephen Grover**, President of Evergreen Economics, is a Ph.D. economist with 20 years of experience in researching energy issues through impact, process and market evaluations. Dr. Grover's expertise is in discrete choice modeling and estimating models of consumer behavior using revealed and stated preference techniques. He has utilized these skills in a wide range of applications, most recently to estimate energy savings for audit and peer benchmarking programs. Dr. Grover has also applied these techniques to research environmental and non-market valuation issues and to estimate consumer willingness to pay for energy efficiency. He has managed and worked on projects for the U.S. Department of Energy, U.S. Environmental Protection Agency, and the National Renewable Energy Lab, as well as for some of the largest electric utilities in the country.

In addition to his research at Evergreen Economics, Dr. Grover has worked as an adjunct professor at Portland State University, where he has taught courses in econometric forecasting and energy economics. In 2006, he served on the Oregon Governor's Carbon Allocation Task Force, which developed a plan for a cap-and-trade carbon allocation system to reduce greenhouse gas emissions in Oregon. In 2010, Dr. Grover was also chosen as one of twelve people to serve on the Oregon Governor's Energy Planning Council.

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### EDUCATION

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Ph.D., Economics, University of Wisconsin-Madison

M.S., Economics, University of Wisconsin-Madison

B.A., Economics, Pacific Lutheran University, Tacoma, WA

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### INDUSTRY EXPERIENCE

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- **Southern California Edison AMI Billing Analysis Study** - Conducting a research study to determine the potential benefits of using 15-minute AMI consumption data in a billing regression model to estimate HVAC program impacts.
- **Ameren Missouri Low Income Weatherization Assistance Program Evaluation** - Managed an impact and process evaluation of the Low Income Weatherization Program (LIWAP), including a fixed effects billing regression model to estimate realized energy savings, and a customer survey conducted to obtain feedback on the participation process and identify any additional non-energy benefits.
- **California Statewide Finance Pilot Program Evaluations** - As the Master Contract Administrator (MCA) for SoCalGas, managing all of the process evaluations of the Statewide California Finance Pilot programs.

- **Public Utilities Commission of Ohio** - Managed the Independent Evaluator team for the Public Utilities Commission of Ohio, which involves reviewing and verifying the annual energy efficiency program evaluations and savings claims submitted by Ohio utilities.
- **Opower Impact Evaluation** - In separate evaluations in Hawaii and Massachusetts, used a fixed effects regression model to estimate impacts from an Opower home report program.
- **FortisBC Portfolio Evaluation** - Conducting multi-year evaluations of efficiency program portfolio, including impact and process evaluations of residential and commercial lighting programs, residential heat pumps and residential appliances.
- **Bonneville Power Administration Performance Tested Comfort System Program Evaluation** - Evaluated the PTCS Program using a fixed effects model to estimate impacts from duct testing and heat pumps installed through the program.
- **Vermont Independent Audit of Energy Efficiency Programs** - For the Vermont Public Service Board, conducted an independent audit of the 2011-2013 energy efficiency program savings claims made by Efficiency Vermont and the Burlington Electric Department.
- **Union Gas Independent DSM Audit** - Conducted an independent verification audit of utility savings claims for 2013 and 2014.
- **Northwest Energy Efficiency Alliance ENERGY STAR Residential Lighting** - Conducted an evaluation of the market transformation effects of an ENERGY STAR residential lighting program for the Northwest Energy Efficiency Alliance.
- **Energy Trust of Oregon Process Evaluations for Residential and Commercial New Construction** - Conducted process evaluations of its residential and commercial new construction programs and assessing market areas that new programs should target.
- **Energy Trust of Oregon Economic Impacts of Energy Efficiency and Renewable Energy Programs** - Estimated economic impacts of program spending and energy savings attributed to its energy efficiency and renewable energy programs.
- **California Low Income Program Impact Evaluation** - For the California PUC, managed the 2009 and 2011 impact evaluations of the low income Energy Savings Assistance (ESA) program.
- **US DOE Better Buildings Program Evaluation** - Assisted with an impact evaluation of the ARRA-funded Better Buildings efficiency programs covering over 40 grantees nationwide.
- **Hawaii Energy Efficiency Programs** - Managed the impact, process and market evaluations of the Hawaii Energy Efficiency Programs.
- **ACEEE Economic Impacts of Energy Efficiency** - Estimated the economic impacts for proposed energy efficiency programs in Louisiana and Mississippi.
- **Economic Impacts of Wind Energy** - Estimated the economic benefits to the local economy for a large-scale wind farm located in Sherman County, Oregon.
- **Pacific Gas and Electric Local Government Partnership** - Conducted evaluation of seven local government energy conservation programs operating in partnership with local governments.
- **Consumers Energy** - Conducting impact evaluation of the Consumers Energy commercial and industrial programs.

- **California's Small Commercial Energy Efficiency Programs** - Developed discrete choice nested logic model for net impact analysis of California's Small Commercial Energy Efficiency Programs.
- **California Public Utilities Commission (CPUC)** - Conducted impact evaluation to estimate embedded energy savings from water conservation pilot programs in California.
- **California Statewide Express Energy Efficiency and Non-residential Audit Program** - Developed discrete choice model for net impact analysis of California's Express Efficiency and Non-residential Audit programs.
- **San Diego Gas & Electric and Southern California Gas Residential Efficiency Programs** - Completed a process evaluation of all SDG&E and SoCalGas residential efficiency programs (20+ programs total).
- **San Diego Gas & Electric and Southern California Gas Non-residential Efficiency Programs** - Conducted process evaluations of all SDG&E and SoCalGas non-residential efficiency programs (subcontractor to KEMA).
- **Energy Trust of Oregon Home Energy Services Program** - Conducted an impact and process evaluation of the Home Energy Services Program utilizing both a billing regression and discrete choice model to estimate impacts.
- **California Public Utilities Commission (CPUC) Impact Evaluation Small Commercial Efficiency Programs** - Assisted with the impact evaluation and discrete choice modeling for the 2006-2008 small commercial efficiency programs.
- **California Public Utilities Commission (CPUC) Local Government Partnership Efficiency Programs** - Assisted with the impact evaluation of the 2006-2008 local government partnership efficiency programs.
- **Southern California Edison Home Energy Efficiency Survey** - Conducted an evaluation of the Home Energy Efficiency Survey (HEES).
- **Pacific Gas and Electric Home Energy Efficiency Survey** - Conducted a process and impact evaluation of the Home Energy Efficiency Survey (HEES) program. The impact evaluation involved regression modeling to determine how much of the observed savings could be attributed to efficiency tips received from the HEES.
- **Northwest Energy Efficiency Alliance ENERGY STAR Homes Northwest Program** - Completed an evaluation of the ENERGY STAR Homes Northwest program.
- **Southern California Edison Statewide Emerging Technologies Program** - Conducted a process evaluation of the Statewide Emerging Technologies Program.
- **Oregon Department of Energy Economic Impact Evaluation of Energy Tax Credit** - Estimated the economic impacts of its business and residential energy tax credits (BETC/RETC).
- **Bonneville Power Administration Residential Loan Program** - Conducted a process evaluation of BPA's Residential Loan Program offered for energy efficiency equipment investments.
- **Sempra Utilities Commercial Conservation Programs** - Completed impact and process evaluations for two commercial conservation programs.

- **Southern California Edison Non-residential Impact Evaluation** - Performed an impact evaluation to determine energy savings resulting from a non-residential financial incentives program.
- **State of Washington Small Wind Projects Guidebook** - Developed a guidebook to help rural counties estimate the potential economic impacts of small wind projects.
- **Vestas Wind Economic Benefits of Wind Power Plant** - Estimated the economic benefits to Oregon of having a wind power manufacturing plant located within the state.
- **Northwest Energy Efficiency Alliance Energy Management Guidebook for Hospitals** - Developed guidelines and a financing guidebook for hospitals considering outsourcing energy management for their facilities.
- **National Renewable Energy Laboratory (NREL) and Department of Energy (DOE)** - Wrote report documenting the effects of Federal R&D in energy efficient technologies in the buildings sector over the last 25 years.
- **National Renewable Energy Laboratory (NREL)** - Assessed status of solar energy research and provided recommendations for future R&D for several solar technologies.
- **National Renewable Energy Laboratory (NREL) Solar Energy Market Assessment** - Completed a market assessment for commercial solar energy technologies.
- **New York State Energy Research and Development Authority (NYSERDA) Energy Programs** - Developed logic models and program theory for the 41 energy efficiency and renewable energy programs included in the New York Energy Smart program portfolio.
- **Enbridge Consumer Gas DSM Program Evaluations Audit** - For Enbridge Consumer Gas in Toronto, completed an audit of its 2002 and 2003 DSM program evaluations and provided recommendations on evaluation and reporting procedures.
- **Kittitas County, Washington Wind Energy Farm Economic Evaluation** - For a local economic development group, analyzed the potential economic benefits and effects on property values of a large wind energy farm in Kittitas County, WA.
- **Portland General Electric** - For a private client, analyzed potential costs associated with public-private ownership of Portland General Electric.
- **California Public Utilities Commission DSM Verification Analysis** - Verification analysis of DSM program savings estimates for California utilities for the California PUC Office of Ratepayer Advocates.

## **SELECTED PUBLICATIONS AND PRESENTATIONS**

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- Grover, S., J. Fraser, 2015, "Who Dunit? Determining Savings Attribution When Both Rebates and Financing Are Available", *Proceedings of the 2015 International Energy Program Evaluation Conference*, Long Beach, CA.
- Grover, S., J. Cornwell, J. Yaillen, C.A. Dickerson, J. Flanagan, & M. Sakuda, 2013, "Opower Where Art Thou? Savings Estimates from a Pilot Program", *Proceedings of the 2013 International Energy Program Evaluation Conference*, Chicago, IL.

- Grover, S., J. Yailen, & T. Helvoigt, 2011, "Free to Choose? A Comparison of a Nested Logit Model with a Billing Regression Model and Self-Report Analysis in a Commercial Impact Evaluation", *Proceedings of the 2011 International Energy Program Evaluation Conference*, Boston, MA.
- Grover, S., 2009, "Economic Impacts of Energy Efficiency Within a Cap-and-Trade System", *Proceedings of the 2009 International Energy Program Evaluation Conference*, Portland, OR,
- Grover, S., March 2009, "2004-05 California Statewide Emerging Technologies Program", *ACEEE Symposium on Market Transformation*, Washington, DC.
- Grover, S., May 2008, "Overview of Market-Based Approaches for Reducing Green House Gas Emissions", Presentation to the *Oregon House Interim Revenue Committee and House Committee on Energy and Environment*.
- Grover, S., August 2007, "Evaluating Emerging Technologies Programs: Accelerating the Future", *Proceedings of the 2007 International Energy Program Evaluation Conference*, Chicago, IL.
- Grover, S., November 2007, "Broad Economic Market Perspective on Climate Change in the Columbia River Basin", Presentation at *The Mighty Columbia Seminar*, Seattle, WA.
- Grover, S., Grave, P., & Rubin, R., August 2005, "Hard to Reach? Hard to Tell Lessons Learned From California", *Proceedings of the 2005 International Energy Program Evaluation Conference*, New York, NY.
- Grover, S., Dickerson, C.A., Richardson, V., Krieg, B., & Tyler, C., August 2005, "Local Government Partnerships: Working Together for Efficiency A Theoretical Portfolio Analysis Method", *Proceedings of the 2005 International Energy Program Evaluation Conference*, New York, NY.
- Grover, S., & Margolis, R., September 2004, "Private-Sector Commercial Customers and Market Drivers to Early Solar Adoptions", *Proceedings of the World Renewable Energy Congress VIII*, Denver, CO.
- Grover, S., Josephson, A., Bronfman, B., & Gordon, F., 2004, "Reaping the Wind: The Economic Impacts of Spending on Renewable Energy and Energy Efficiency Programs", *Proceedings of the ACEEE 2004 Summer Study on Energy Efficiency in Buildings*, Washington DC.
- Grover, S., Graven, P., & French, E., 2004, "Consumer Preferences for CFLs Over Time: Where Are We Going?", *Proceedings of the ACEEE 2004 Summer Study on Energy Efficiency in Buildings*, Washington DC.
- Grover, S., & Margolis, R., 2004, "Commercial Customers and Market Drivers to Early Solar Adoptions", *Proceedings of 33<sup>rd</sup> ASES Annual Conference*, Boulder, CO.
- Grover, S., & Flaherty, C., 2003, "A Comparison of Rebates and Non-Rebate Promotions in a Residential Lighting Program", *Proceedings of the 2003 IEPE Conference*, IEPE, Oregon, WI.
- Grover, S. (2002). The Economic Impacts of a Proposed Wind Power Plant in Kittitas County, Washington State, USA. *Wind Energy Engineering*, Volume 26, No. 5.
- Grover, S., Cohen, D., & Ton, M., 2002, "Saturation, Penetration, Transformation: How Do You Know When a Market Has Changed?", *Proceedings of the ACEEE 2002 Summer Study on Energy Efficiency in Buildings*, Washington DC.

- Grover, S., & Cohan, D., 2001, "Shedding Light on Energy Star Markets: Evaluation Lessons Learned from a Retail Lighting Market Transformation Program", *Proceedings of the 2001 IEPE Conference*, IEPE, Oregon, WI.
- Grover, S., & Babiuch, B., 2000, "Pay Now, Save Later: Using Conjoint Analysis to Estimate Consumers' Willingness to Pay for Energy Efficiency", *Proceedings of the ACEEE 2000 Summer Study on Energy Efficiency in Buildings*, Washington DC.
- Grover, S., Torok, C., & Babiuch, B., 1999, "High Efficiency Clothes Washers: Whiter Whites, Less Energy?", *Proceedings of the 1999 International Energy Program Evaluation Conference*, Denver, CO.
- Grover, S., & Ikenze-Bates, I., 1998, "Market Penetration: How to Predict the Future," *Proceedings of the ACEEE 1998 Summer Study on Energy Efficiency in Buildings*, Washington DC, ACEEE.