Economic Development RESEARCH GROUP

TO: Navigant Consulting
Efficiency Nova Scotia Corporation

FROM: Glen Weisbrod and Lisa Petraglia, EDR Group

DATE: April 27, 2012

RE: Independent Assessment Report - Navigant's Energy Efficiency Resource Assessment Model (RAM Tool)

EDR Group

Economic Development Research Group (EDR Group) is a research and consulting firm that works across North America, applying state-of-the-art tools and techniques for evaluating public investments and policies. The hallmark of EDR Group is a solid focus on the development, refinement and application of spreadsheet, database and web-based modeling tools. Applications include: (1) energy efficiency programs, (2) renewable energy, (3) energy production, transmission and distribution facilities, (4) air quality programs, and (5) pricing programs. This experience is summarized in the attached Statement of Qualifications.

EDR Group is an independent corporation, owned by its chief officers. It has absolutely no ownership, financial or ongoing business relationship with either Navigant Consulting or Efficiency Nova Scotia Corporation (ENSC).

Purpose

At the request of ENSC, Economic Development Research Group was retained by Navigant to conduct an Independent Assessment of Navigant's Energy Efficiency Resource Assessment Model (RAM Tool). This report is intended to provide ENSC and Navigant with EDR Group's assessment and verification of the functionality of the RAM Tool. It summarizes findings from EDR Group's assessment of:

1) Navigant's correction of the Net-To-Gross (NTG) duplication error within the RAM Tool;

2) The algorithms and structure of the RAM Tool for other systemic errors; and

3) Navigant's Quality Control practices in maintaining and modifying the RAM Tool.

Process

EDR Group conducted the following activities:

- Initial familiarization with model structure/function/concepts – through a Navigant-led webinar on April 18th, and a review of Navigant's model documentation, quality control policies, and memo on detected (corrected) errors related to ENSC proposed 2013-2015 DSM plan.
- Review of specific fixes related to Navigant's memo of April 18, 2012 (attached), as confirmation that the model was properly applying the net-to-gross ratio and reflecting an application of the TRC test consistent with the model previously used for ENSC's TRC calculations.
- A comparison of two versions of RAM (pre- and post-error detection(correction) – for a comprehensive scanning of the model, a software application was leveraged to compare a single pair of sheets (for all relevant sheets) from the two Excel files and reported instances (location and nature of the difference). The report was shared with Navigant on April 20, 2012 to elicit their feedback on the basis for detected differences. Feedback was provided on April 23, 2012.
- A second webinar review of select sheets – was requested by EDR Group to (a) prioritize staff review of key sheets related to calculation of technical potential, economic potential and market potential, (b) get a better sense of the model's sheet sequence, and (c) clarify which sheets were vestigial, which were serving an implicit quality control function, and which sheets were for summarizing/reporting key results calculated in other parts of the application. This review was held Friday April 20, 2012.

Outside of the webinar events, review-based questions were directed to Navigant via e-mail and responses were received.

Findings

1) <u>Review of Navigant's Correction of the NTG Duplication Error within the RAM Tool</u>

   EDR Group applied a third party software tool, "Excel Compare" to identify all changes in formulas and data between the old and new versions of the spreadsheet pertaining to the calculation and use of "net to gross" ratios. EDR Group then examined the applicable formulas and confirmed that all errors have been appropriately corrected. In addition, EDR Group applied example numbers and verified that the calculations are now yielding expected results.

   - *EDR Group confirms that the NTG duplication error has been appropriately corrected in the current version of RAM Tool.*

2) Review of the Algorithms and Structure of the RAM Tool for other Systemic Errors

Navigant clarified which sheets in the RAM Tool were "not in use for this client" and those sheets were not reviewed (D*iffusion, Impact Change Non-Code, Units and Summary Report for NSPI, RES and C&I*). EDR Group reviewed the spreadsheet workbook, focusing on fifteen tabs (spreadsheet tables) that were identified by Navigant as applicable for this client. EDR Group traced the calculations contained in those spreadsheets to test for correctness of links, algorithms and conditional statements. It was found that formulas in those spreadsheets also referenced data in yet other workbook tabs, which were also traced. In addition, the comparison with a previous version of the workbook was completed for the fifteen relevant tabs.

EDR Group conducted testing of key formulas in key sheets, and received clarifications from Navigant on formula interpretation (correctness), and tested for consistency with Navigant's documentation. The trace process did find four instances of cell reference issues in algorithms; however, all were in vestigial tables (spreadsheet tabs) that are not used in the current RAM reports. Among the algorithms that are in use, all were confirmed to be calculating correctly. The comparison process also found other formula differences between old and new versions of the RAM Tool, but in each case they were fully attributable to changes in the TRC calculation or addition of nominal $ concepts. Figure 1, shown on the next page, identifies the specific sheets examined by EDR Group.

Figure 1 - Inventory of RAM Tool Checks conducted by EDR Group

Sheet	*Inquiry*	**Outcome**
Mea-In (EE Measure Inputs)	column AC, calibration targets derivation	correct
Mea-Avoid (Avoided Costs)	cells E40…AE1174	correct
Calibrate	column G, market factors derivation	correct
Units	cumulative saturation only	correct
Stocks	cells G40..AE1175	correct
Net Savings	cells H40.BP1175	correct
Econ	column G, market potential derivation	correct
Cost - Benefits-Res	columns E, AK, BP, and CU	correct
Cost-Benefits -C/I	columns G, AL, BQ, and CV	correct
Financial Tests –Res	cells G40…P499 (yr1)	correct
Financial Tests -C/I	cells G40…P704 (yr1)	correct
Tech Cost (Cost of EE Measures)	cells I40…AI 1165	correct
Tech (Technical potentials)	cells H40…BM1175	correct
Re-Partic	cells H40…AH1175	correct
TRC	cells G40..BI1175	correct

With regard to the review of Navigant's RAM Tool documentation, EDR Group provided comments and suggested edits (corrections related to typos, or the need for more complete definitions) to Navigant and all edits were accommodated.

- *EDR Group attests that the current version of the RAM Tool is functioning correctly.*

3) Review of Navigant's Quality Control Practices in maintaining & modifying the RAM Tool

EDR Group reviewed Navigant's process for tracking model changes and tracing calculation impacts when changes are made. It was noted that, to further buttress Navigant's staff review of model changes (done independently across multiple office locations), the RAM Tool now has embedded additional charts/graphs (in the Scenario Switches sheet) to visually alert the analyst whether there is a calculation issue elsewhere in the model. Also, several of the DSM Tech tables (those showing Program results by Measure) have cross-checks built in.

The April 13, 2012 Navigant RAM Tool Report describes (in Section 6.2) additional Navigant steps that will be taken as a result of this experience.

- *EDR Group finds that the changes that have been done, and which will be done, appear to be adequate to address previously-found problems and minimize the likelihood of similar problems occurring in the future.*

- *EDR Group recommends that, if the RAM Tool is to undergo further updates of a significant nature in the future, additional improvements should be made to:*

    1) *Eliminate vestigial algorithms and tables that are not needed for the client,*

    2) *Enhance labeling regarding units of measurement, and*

    3) *Reorder the sequencing of sheets and cell references to follow the updated logic that is now in place.*

Statement of Qualifications: Energy, Evaluation and Software Tools

Economic Development Research Group, Inc.
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April 2012

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1 THE FIRM

Economic Development Research Group, Inc. (EDR Group) is a consulting firm focusing specifically on applying state-of-the-art tools and techniques for evaluating public investments and policies. The firm was started in 1996 by a core group of economists and planners who are specialists in evaluating impacts of energy, environment, transportation and economic development programs and policies. From its headquarters in Boston, the firm provides advisory services and full-scale research projects to agencies around the US and overseas, focusing on three issues:

- Impact Analysis – *How can I measure program impacts? …How can I best target my efforts?*
- Market / Strategy Analysis -- *How will I be affected by changes in markets and the economy? …What should I do to respond to them?*
- Benefit / Cost Analysis -- *What will be the economic benefits & costs of my project / program? …What should I do to maximize net value?*

The hallmark of EDR Group is a solid focus on state-of-the-art analysis, building on an array of spreadsheet, database and web-based modeling tools to evaluate the benefits and opportunities associated with public policies and private sector investments..

Senior staff at EDR Group have supported energy and environmental policy decision making through economic impact analyses studies for local, state and regional agencies across the US. These include studies of the impacts of: (1) energy efficiency programs, (2) renewable energy, (3) energy production, distribution and conservation policies, (4) air quality and safety programs, and (5) utility pricing and customer response.

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2 SAMPLE PROJECTS & TOOLS

Energy and Infrastructure Analysis Tools

REEM: Renewables & Energy Efficiency Impact Model. REEM is a spreadsheet-based framework for conducting economic impact and benefit-cost analysis for renewable energy and energy efficiency programs. It calculates the impacts on jobs, income, GDP (value-added) and output. It handles several types of energy investment including:(a) new or modified generation facilities,(b) energy efficiency programs and (c) improvements in transmission and distribution. The REEM framework has been used for evaluation of energy programs in Connecticut, Iowa, Massachusetts, New York, Texas, Wisconsin, Vermont, Rhode Island, New Hampshire and Maine.

Infrastructure Planning Spreadsheet. For the US Dept. of Defense, EDR Group developed a spreadsheet model for investment growth in cities around the world that have been affected by infrastructure loss. The spreadsheet model assesses needs for electric energy generation and distribution, telecommunications, water, sewer and transportation infrastructure by zone, based on current and expected future land use.

Economic Analysis Tools

Army Base Fiscal Impact Spreadsheet. For the Development Authority of the North Country, EDR Group developed the "Fort Drum Fiscal Impact Estimator Spreadsheet" to evaluate the economic (job, income) and fiscal (tax revenue) impacts of expansion and change in an army base located in upstate New York. The model assessed how changes in hiring, housing, contracting and tax policies lead to changes in costs and revenues for individual counties surrounding the base.

Appalachian ARC-LEAP Spreadsheet. The Appalachian Regional Commission initially hired EDRG to develop a spreadsheet tool that could be used by local economic development agencies for evaluating their regional program and policy needs and opportunities for achieving greater economic development. That was subsequently replaced by an enhanced tool that could also be used for estimating the expected benefits of proposed new projects and programs.

Scenic Byways Economic Impact Spreadsheet. For the National Scenic Byways Resource Center, EDR Group developed a guidebook and evaluation tool to classify and assess of the ways in which scenic byways lead to economic impacts on surrounding communities through changes in tourism and pass-through traveler spending.

EDR-LEAP Web Tool. EDR Group subsequently broadened the Local Economic Assessment Package into a web-based system that is applicable for local and regional agencies across the nation. The system won national recognition awards from the International Economic Development Council and the Council for Community Economic Research. EDR-LEAP and its components have been applied in many states, including Alabama, Colorado, Florida, Georgia, Indiana, New York, Oregon, and Tennessee.

Transportation Analysis Tools

TREDIS Spreadsheet and Web Tool . EDR Group initially developed TREDIS (Transportation Economic Development Impact System) as a spreadsheet tool for use in assessing the regional economic benefits of transportation investments. Initial uses were for the Vancouver (BC) and Portland (OR) areas. It was subsequently redeveloped as a web-based economic impact and benefit-cost analysis tool for all forms of transportation projects and programs. Today it is the only system that spans all modes of passenger and freight transportation - including highway, rail, marine and air travel, and all types of intermodal terminals and facilities. It has been across Canada (Ontario, British Columbia, Saskatchewan, New Brunswick and Nova Scotia) as well as in 26 US States.

ADE Airport Development Evaluation Spreadsheet. ADE (Airport Development Economics) is a software calculation system for individual airport planning. The system estimates economic impact of existing airport activity and the economic development and land use implication of expanded future airport services and facilities. The system has been applied for Atlanta Hartsfield Airport, Lansing Capital City Airport and for studies of planned airport expansions ranging from Pretoria (S. Africa) to Glasgow (Scotland).

ABC Airport Benefit Cost Database. ABC (Airport Benefit Cost) is a relational database system for statewide airport system planning. This system calculates the economic impact of existing airports (from both local and state perspectives) under existing and future scenarios. It also provides benefit-cost analysis for alternative scenarios for future packages of state or regional airport improvements. It is used on an ongoing basis by Wisconsin DOT (as ABC - the Airport Benefit-Cost system) and by Michigan DOT (as CBA - the Community Benefit Assessment system). Colorado and Virginia statewide airport studies have also utilized variants of this system.

Energy Efficiency Evaluation

Economic Impacts to the Eastern CN Provinces of Energy Efficiency Programs. EDRG recently completed an analysis (under subcontract to Environment Northeast) of economic impacts from proposed energy-efficiency program ramp-up in Nova Scotia, Prince Edward Island, Quebec, and New Brunswick. Programs were assessed by market (residential, commercial, and industrial) for each of three fuel sources - electric, natural gas and heating oil and three possible load reduction targets. An economic model framework was developed and applied to measure the economic impacts of net customer investments, ratepayer effects, off-sets to the energy/fuel supply sectors, and persistent energy savings.

Economic Impact of Northeast Regional Energy Efficiency Programs. EDRG assessed the economic impacts from proposed energy-efficiency program ramp-up in each of six New England states to achieve cost-effective energy efficiency targets. Programs were assessed by market (residential, commercial, and industrial) for each of three fuel sources - electric, natural gas and heating oil. An economic model framework was developed and applied to measure the economic impacts of customer investments, and eventual energy savings.

Economic Impact of Energy Efficiency in Texas. For City Public Service (CPS) of San Antonio, EDR Group conducted the economic model evaluation of opportunities to enhance energy efficiency for its customers as a means of reducing costs and helping to enhance customer retention, economic development and job growth for the region. The role of EDR Group was to evaluate existing conditions, identify impacts of proposed energy programs on households and businesses, and apply its model to assess impacts on economic competitiveness and future economic growth of the region.

Economic and Policy Implications of Wisconsin Public Benefits Programs. For the Wisconsin Dept. of Administration, EDR Group assessed economic impacts of the statewide Focus on Energy program, which uses a public benefits charge to support programs for energy efficiency and renewable energy generation, spanning information, incentive, installation and R&D incentives. EDR Group developed the economic model framework to evaluate both macroeconomic impacts and statewide policy implication. In addition, EDR Group developed and applied alternative benefit-cost measures that built off of the macroeconomic analysis findings.

Economic and Cost Impact of Iowa Energy Efficiency Programs. For the State of Iowa, in coordination with the State's electric and gas utilities, Glen Weisbrod of EDR Group had developed a model for assessing the impacts of changing energy prices on the state's business competitiveness. The analysis examined how different types of business in the state benefit from traditional and renewable power investments, and how different types of businesses are affected by shifts in energy efficiency programs. Impacts on business output and employment were estimated for alternative program scenarios.

Energy Technology Policies & Programs

Economic Impact of Small Solar & On-Site Distributed Generation Programs. For the Connecticut Clean Energy Fund, EDR Group developed a state economic impact evaluation of the state solar rebate program and future solar strategies, including solar renewable energy credits, power purchase agreements, and zero net energy homes. An economic development benefit-cost analysis was performed considering the value of avoided energy savings, federal tax incentives, value of emissions savings, and wider economic impacts.

Economic Impact of Clean Technology Standards. Under contract to the University of Lowell, EDR Group analyzed the economic impact of hazardous substances regulation on the Massachusetts economy. In addition, a matrix model was developed of economic and social benefits that flow from five clean technology practices: materials reuse, safer alternatives, clean energy, green buildings, and emerging materials.

Massachusetts Statewide Low Income Conservation Services. For the Massachusetts Division of Energy Resources, of EDR Group conducted a comprehensive impact and process evaluation of the Massachusetts statewide Energy Conservation Service (ECS) program. The RCS program provides energy audits, contractor arranging, financing options and DSM program referrals. The evaluation included assessment of the technologies and methods used, the efficacy of the statewide implementation and funding processes, state/utility relationships and documentation of impacts.

Energy Production & Distribution

Pacific Gas & Electric. PG&E engaged EDRG to assess the economic impacts of proposed new generation and distribution facilities. These include a range of generation technologies and distribution equipment to be employed in the future. Effects on energy savings, costs, jobs and income are being assessed. Additional studies for PG&E are assessing the economic consequences of alternative future scenarios.

Economic Impact of Natural Gas Production Facilities. For Equitable Resources (EQT), EDR Group evaluated the economic impacts of natural gas production in the Appalachian Basin. The study of economic impacts covered four states and encompassed on-going operations as well as capital projects related to development of wells, pipeline expansion and compression plant construction. It also included fiscal (tax) impacts.

Economic Impacts of New York Renewable Power Portfolio. For the New York State Energy Research and Development Authority (NYSERDA), EDR Group led the impact model analysis for an evaluation of the New York State Renewable Portfolio Standard (RPS) Program. EDR Group developed a model framework to calculate economic impacts of the construction and on-going operations of projects including bio-fuel, hydro, and wind power facilities. Results were presented in terms of jobs, income and output.

Economic Impacts of Massachusetts Biomass Power Generation Initiative. EDR Group (under subcontract to University of Massachusetts) evaluated the expected impact of developing biomass generated power & thermal applications in the state. EDR Group focused on how investment in physical plant, on-going operations & maintenance spending for biomass-fired generation facilities and wood chip supplier market development translate into economic development.

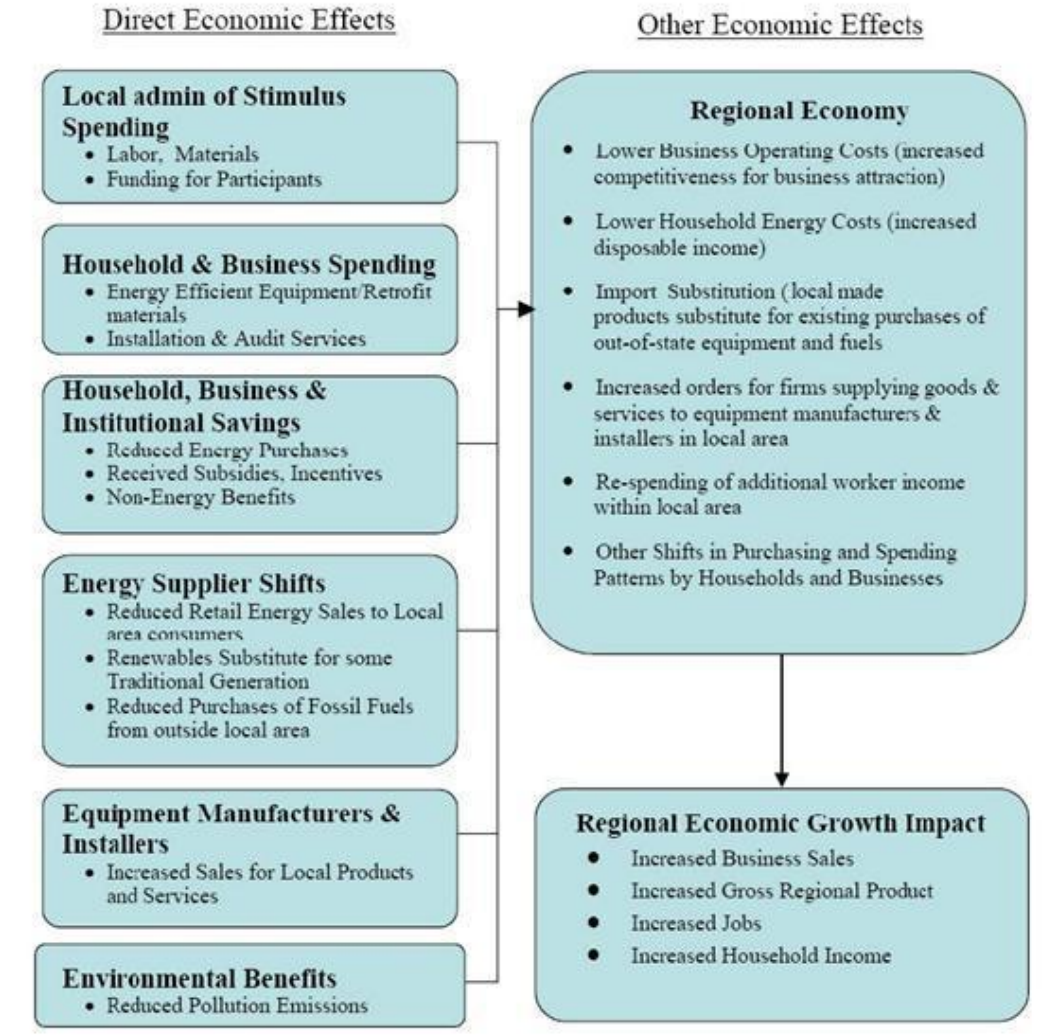
Air Quality

Economic Impact of Regional Greenhouse Gas Initiative. EDR Group was technical consultant for analysis of Regional Greenhouse Gas Initiative (RGGI) – a consortium of nine Northeastern & Mid-Atlantic states to implement a regional strategy for controlling emissions of carbon dioxide. RGGI hired EDR Group to analyze the impact of a "cap and trade" program on retail electricity prices and economic activity in the region, including changes in household and business costs, jobs and income generation.

3 RENEWABLES & ENERGY EFFICIENCY ECONOMIC MAPPING (REEM SYSTEM)

EDR Group has a long established practice of measuring the impacts of energy efficiency and investment programs. The flowchart shown below illustrates the program aspects incorporated into various spreadsheet tools and analysis studies.

REEM Framework for Energy Impact Analysis



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STAFF

For analysis of spreadsheet or other tools pertaining to energy efficiency, the applicable senior staff are Lisa Petraglia and Glen Weisbrod. Both are highly experienced in energy program evaluation. Working under their direction are Adam Winston and Derek Cutler. Both are analysts with strong expertise in the development and application of spreadsheet tools, and both have had prior experience conducting critical reviews of existing analysis tools as well as reconciliation of inconsistencies among evaluation studies and their tools. Examples of the latter include [a] work for the National Academies to reconcile differences in databases concerning job impacts of ARRA Recovery Act job generation, [b] work for the federal government to reconcile alternative the benefit-cost analysis systems of different transportation modal agencies, and [c] work for state agencies to reconcile old and new economic impact models.

Hourly Rates:

Senior Oversight: Lisa Petraglia and Glen Weisbrod - $200 per hour
Model Analyst: Adam Winston and Derek Cutler - $110 per hour

Blended Daily Average (2 hrs Sr. Oversight, 6 hrs. Analyst) - $1,060 per day

Glen Weisbrod is President and founder of Economic Development Research Group (EDR Group), brings a unique combination of two backgrounds. First, he is an expert on economic impact techniques, who has been working throughout the US and internationally on economic impact studies for a wide range of public policy issues. He has also authored guidebooks and lectured at several universities on this topic. Second, he has strong credentials evaluating energy programs, as the former director of the northeast office of Hagler Bailly Consulting and HBRS.

Mr. Weisbrod's work over the past 25 years has focused on the relationship of economic development to transportation, energy and technology development. This includes projects spanning Japan, the UK, Finland and the Netherlands, as well as around the US. Mr. Weisbrod is the author of over 30 published articles on these topics. He holds a MS in Engineering and MCP in City Planning from the Massachusetts Institute of Technology (M.I.T.), and BA in Economics from Brandeis University. His experience includes the following:

- **Economic Development Impacts of Energy Programs** -- Evaluating regional economic competitiveness and economic growth implications of energy programs and projects; includes impacts of gas pipelines (Michigan, Wisconsin, Minnesota), Renewable energy and energy conservation impacts on the economy (for Iowa), energy efficiency and energy technology programs (California, Wisconsin, Massachusetts, New York and Texas).

- **Industry Market and Impact Studies** -- Assessment of business growth opportunities, covering broadband telecom, plastics, medical instruments & electronics industries and globalization of technology.

- **Energy Program Impact and Process Evaluation** -- Evaluations and market assessments of commercial and industrial energy programs, including statewide energy program evaluations for Massachusetts, New York and Wisconsin, and evaluations of individual programs in Arkansas, California, Connecticut, Delaware, Massachusetts, New York, Ohio, Oklahoma, Washington, India and South Africa. These have included renewable and end-user technology programs, pricing options, billing methods, dealer programs and incentive programs, as well as issues pertaining to deregulation and competition.

Lisa Petraglia is Director of Economic Research at EDR Group. She was formerly Director of Client Consulting at Regional Economic Models, Inc. and is one of the most experienced nationally in applying the REMI model. She has experience applying economic impact models for energy program and pricing studies in Wisconsin, Michigan, Louisiana, Wyoming, New York, Connecticut Vermont, other New England states and national evaluation studies.

Ms Petraglia has given numerous speeches on economic impact modeling before organizations around the country, including the Energy 2020 National Users' Group, Development Districts of Appalachia Association, ACEEE Summer Conference, Council for Urban Economic Development, National Association of State Development Agencies and the National Association of Management and Technical Assistance Centers. Ms. Petraglia holds a M.S. in Applied Economics from the University of Massachusetts, Amherst. Representative of her economic analysis experience are the following projects:

- Impacts from Proposed Ramp-up for All Cost-Effective Energy-Efficiency for Eastern Canadian Provinces and New England States
- Wisconsin Statewide Focus on Energy Program Evaluation.
- Benefit-cost Analysis of Proposed Solar Strategies (NY/CT)
- Impacts from NYSERDA's Main-Tier RPS Awards
- Impacts and Benefit/Cost Evaluation of Connecticut's Residential Small Solar and OSDG Programs
- Impacts from Biomass-based Electricity Generation & Thermal Applications on W Massachusetts
- Impacts of the Proposed Regional Greenhouse Gas Initiative
- Impacts from Proposed Carper and Clear Skies Amendments
- Impacts of Electric Industry Deregulation
- Impacts from Limited ZEV Adoption in Massachusetts.
- Impacts from Utility DSM Programs.
- Impacts from Proposed Air Quality Regulations

Adam Winston is an Economic Analyst at Economic Development Research Group. His work specializes in the application of spreadsheet and database tools for evaluation of programs and policies. This work spans topics of energy, environmental and transportation issues. Examples of his spreadsheet work include:

- Wisconsin DOT Bureau of Aeronautics: Assisted in developing an enhanced version of the statewide ABC (Airport Benefit Cost) system to provide enhanced reporting and analysis capability that is also applicable for a wider range of airports and airport capital improvement projects.
- Durham, ON Regional Transit Strategy. Mr. Winston performed a literature review and conducted cost-benefit analysis using Transdec and TREDIS to assess various transit scenarios for proposed investments in the Durham GO Rail system to determine each scenario's performance. The analysis evaluated benefits associated with long-term changes in worker job access, goods movement, congestion reduction, and mobility enhancement.
- Massachusetts State Freight and Rail Plan. Mr. Winston provided cost-benefit and economic analysis assessment for the Commonwealth of Massachusetts' proposed infrastructure investments in the freight transportation system and the effect on economic development and quality of life.
- NCFRP Analytic Tools. Using a comprehensive freight analytical framework and related tools for estimating public and private benefits to evaluate potential freight infrastructure investments, Mr. Winston authored three case studies (WorldPort at DIA, Port of Huntsville, & Tchoupitoulas corridor). Each case study outline the project scope, specific benefit categories, participating stakeholders, benefit allocation to linked stakeholders, sources of information, cost details, benefit cost analysis and other performance measures

Prior to joining EDR Group, Mr. Winston worked for the Boston Redevelopment Authority where he developed an economic supply and demand analysis to support local economic growth and development. He also previously worked four years as a Supply Chain Senior Analyst for Best Buy and Polaroid Corp., where he managed forecasts and inventory systems, identified strategic improvements in warehouse scheduling and capacity, and developed a Root Cause Analysis Tool to enhance supply chain visibility. Mr. Winston holds a Bachelor's degree in Economics from Brigham Young University and an MBA from Boston University

Derek Cutler is an Economic Analyst at Economic Development Research Group. His current work at EDR Group focuses on spreadsheet and database analysis for policy research and program evaluation studies. Examples include:

- ASCE – Water – developed spreadsheet model to generate estimated inputs for LIFT/INFORUM model pertaining to household and commercial impacts of deteriorating water infrastructure
- T-pics (SHRP…) – For thew National Academies, a database or prior infrastructure projects. Updated existing model's logic and parameters to generate performance metrics for infrastructure investment. In addition generated policy levers which would further interact with the model to add more depth of analysis.

- Michigan Rail Model – developed a dynamic spreadsheet impact assessment tool for passenger rail ridership impacts stemming from changing speeds, adding removing station service, etc.
- ASCE – Highway Infrastructure – generated an interwoven spreadsheet model to generate inputs to drive LIFT/INFORUM model to assess impacts of deteriorating infrastructure.
- Secondary Projects
- Soybeans – developed spreadsheet model to estimate costs of shipping and delay along the Mississippi river and the reliability costs imposed due to deteriorating locks/dams.
- Did numerous smaller side tasks to implement new features or update existing in-house models as part of future development. (airport model update)
- Consumer side cost-benefit analysis of solar investment – generated a model to conduct consumer oriented cost/benefit analysis of solar investment which used monte-carlo type analysis of iterated probability weighted occurrences to estimate attractiveness of residential PV investments, and investor horizons.

Prior to joining EDR Group, Mr. Cutler interned at RiskMetrics conducting business and industry research and working with the databases to streamline the creation of reports, and establish a protocol that allows for increased rate of output. Before that, he had a research assistantship at Beacon Hill Institute where he helped gather data and assist in policy research on varied topics. He has also held positions at Empire Solar Store, Trojan Solar and Gneiss Software. Mr. Cutler holds a Master's Degree is Economic Policy from Suffolk University. He received his Bachelor of Arts from Rensselaer Polytechnic Institute.

Navigant – Summary of changes to ENSC EERAM – April 18, 2012

This outlines where changes were made to the ENSC EERAM due to the issue with Net to Gross as well as the inclusion of Free Rider Costs in the TRC calculation. Listed are the tabs and cell blocks where changes were made and a small explanation as to what change was made and why.

Cost-Benefits Tab:

Technology cost (Cell Block: G40:AG500 in Cost-Benefits Res; G40:AG800 in Cost-Benefits C&I):
The multiplication by Net to Gross that existed in the calculation was taken out. This is because the technology cost was already being applied to net savings numbers, and therefore another multiplication of NTG in this formula was a double application of NTG.

Avoided Costs (Cell Block CU40:DV500 in Cost-Benefits Res, CU40:DV800 in Cost-Benefits C&I):
Same issue/change as the Tech cost above. Took out the application of NTG because the Avoided Costs were being applied to Net Savings and the application of NTG in this formula before the change caused a double application of NTG to the Avoided Costs.

Financial Tests Tab (RES, C&I and ALL):

Total Resource Cost Test (Columns P, AB, AN, AZ, BL, BX, and CJ)
The formula for the test was changed so that it did not include incentive paid to free riders in the costs denominator.

The test changed from:
(net avoided costs)/((net technology cost)+(net admin costs)+(incentives paid to free riders))

To: (net avoided costs)/((net technology cost)+(net admin costs))

All previous EERAM tools had used the later formula. However, this new EERAM, used by the California PUC, changed the TRC calculation due to a decision by the CPUC to include the incentives paid to free riders as a part of the TRC Costs. This was carried over the ENSC when we converted the old EERAM into the new EERAM file. The decision to change it back to the old way of calculating TRCs was to remain consistent with past year's calculations.

TRC Tab:

This tab was changed to reflect the above changes. A double application of NTG was taken out of the calculation and the incentive for free riders was also taken out to remain consistent throughout the model.

Other Changes:

There are a few other places in the Model where TRC Costs are pulled together. These also had to be changed in order to take out the costs for incentives paid to free riders. These changes occurred in the following places:

DSM Tech Tables: The Tech Tables that show Program Results (Res: Tech Tables 1-4; C&I: Tech tables 11-13) have TRC costs in Columns H, N and T of each of those tabs/tables. These had to be changed to not include the incentive paid to free riders.