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**Commission de l'énergie
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BY E-MAIL

February 28, 2022

Nancy Marconi
Registrar
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Marconi:

**Re: Enbridge Gas Inc. – EB-2021-0002
Application for new DSM Framework and 2022-2027 DSM Plan
Optimal Energy Inc. Curriculum Vitarum (“CV”)**

In advance of the Technical Conference commencing on February 28, 2022, OEB Staff is providing, as Attachment 1, CVs for OEB Staff's expert witnesses, Phil Mosenthal and Cliff McDonald of Optimal Energy Inc.

Sincerely,

Josh Wasylyk
Senior Advisor – Application Policy & Conservation

cc: All parties in EB-2021-0002



PHILIP H. MOSENTHAL, PARTNER

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PROFESSIONAL EXPERIENCE

Optimal Energy, Hinesburg, VT. *Founding Partner*, 1996-present.

As the Founding Partner Mr. Mosenthal is responsible for business development as well as direct consulting and analysis for numerous electric and gas utilities, government entities and other non-utility parties on energy efficiency, resource planning, regulatory issues, program design, and evaluation and market assessments. Mr. Mosenthal has over 30 years' experience in energy efficiency consulting, including facility energy management, utility and state planning, regulatory policy, program design, implementation, evaluation, and research. He has particular expertise in efficiency regulatory policy, assessment and integrated analysis of demand-side energy resources, valuation of energy resources and cost-benefit analysis, and program planning, design and evaluation. Mr. Mosenthal has developed numerous utility, state, and regional integrated resource and DSM plans, and has designed and evaluated energy efficiency programs throughout North America, Europe, and China. He has also led numerous efficiency and renewables potential studies and is a nationally recognized expert on efficiency resource assessment and valuation. Mr. Mosenthal has played key roles in many utility-stakeholder processes and successfully worked to build consensus among diverse parties in various assignments. This work has included leading policy and planning initiatives related to goal setting, EM&V frameworks, cost recovery, and performance incentives. Mr. Mosenthal has testified before numerous regulatory commissions, state legislatures, and the U.S. Nuclear Regulatory Commission. Mr. Mosenthal also has designed program implementation procedures, managed implementation contracts, trained efficiency program and planning staff, and performed numerous commercial and industrial facility energy efficiency analyses for end users.

Resource Insight, Middlebury, VT. *Senior Research Associate*, 1995-1996.

At Resource Insight Mr. Mosenthal consulted on DSM planning, program design, monitoring and evaluation, and resource characterization, specializing in the commercial and industrial sectors. He performed projects on behalf of utility and non-utility parties, in both cooperative settings and in contested regulatory proceedings.

Xenergy, Incorporated (now DNV-GL), Allendale, NJ. *Chief Consultant*, 1990-1995.

Mr. Mosenthal managed the consulting division for Xenergy's (now DNV-GL's) Research, Planning and Evaluation Group (RP&E) in its Mid-Atlantic Region. His responsibilities included direct utility consulting, as well as marketing, administration and staff management for RP&E. Mr. Mosenthal's consulting activities focused on assessment of DSM technology potential, DSM planning, program design and development, and process and impact evaluation for electric and gas utilities.

Private Consultant, Philadelphia, PA. 1988-1990.

Mr. Mosenthal's clients included non-profit, governmental and private entities. He performed energy-related research, developed and analyzed potential energy efficiency programs, wrote reports and proposals, aided in contract negotiations and performed building energy audits.

Community Energy Development Corp. (CEDC), Philadelphia, PA. *Acting Executive Director*, 1988, *Director of Technical Services*, 1986-1988.

With simultaneous positions as General Manager of Citizens Coalition for Energy Efficiency (C2E2) and General Manager of Community Energy Consumers (CEC), Mr. Mosenthal managed all aspects of CEDC, C2E2 and CEC operations including: program design and development; program implementation; provision of energy efficiency consulting services for affordable multifamily and institutional building owners; and delivery of a fuel oil cooperative program. CEDC and C2E2 were non-profit organizations providing direct energy efficiency services and energy policy research and advocacy, respectively. CEC was a for-profit CEDC subsidiary that brokered fuel oil for commercial and residential customers.

Pennsylvania Energy Center, Philadelphia, PA. *Director of Technical Services*, 1983-1986

As director of technical services, Mr. Mosenthal managed, designed and developed energy services for the southeast regional branch of the Pennsylvania State Energy Office. He designed and implemented technical energy services for commercial, industrial and institutional building owners; supervised staff of energy auditors; performed over 400 commercial and industrial energy audits; and taught energy management workshops.

EDUCATION AND LICENSING

University of Pennsylvania, Philadelphia, PA

Master of Science, Energy Management and Policy, 1990

University of Pennsylvania, Philadelphia, PA

Bachelor of Arts, Design of the Environment, 1982

Pennsylvania State University, Ambler, PA

Certificate in Electrical Engineering, 1984

REPRESENTATIVE PROJECT EXPERIENCE

Efficiency Resource Policy, Planning and Program Design

New Hampshire Office of Consumer Advocate, Technical Consulting Services Related to Policy, Program Planning, and Stakeholder Engagement (2015 - present)

Since 2015 Optimal Energy has engaged with the NH OCA to support all of its engagement as part of the Energy Efficiency & Sustainable Energy Board, which was created by the NH legislature “to promote and coordinate energy efficiency, demand response, and sustainable energy programs in the state.” Mr. Mosenthal serves as the project manager. Through this engagement, Optimal has played a leadership role in the development of all gas and electric DSM efforts in New Hampshire, and has participated in numerous working groups including ones related to cost recovery and lost revenue policy and estimation, performance incentive design, DSM plan development and program design, and EM&V. Key areas of focus have included: designing NH’s first Energy Efficiency Resource Standard (EERS) and negotiated its initial targets; analyzing and critiquing the methods for calculating lost revenue and its subsequent reform; negotiating policy issues around cost recovery practices related to lost revenue and amortization of program costs; design and implementation of performance incentive mechanisms; critical review, negotiations, and testimony on the utility gas and electric plans; development and updates of the TRM and other EM&V issues; critical review and negotiations on efficiency potential and baseline studies; and analyzed and made recommendations on electric grid modernization (the latter through Optimal’s subcontractor).

Illinois Office of the Attorney General, Advisor on Energy Efficiency Policy, Planning, Design, Implementation and Evaluation (2007 – present)

Mr. Mosenthal has served as the project manager and lead advisor to the Illinois Office of the Attorney General on all aspects relating to development and on-going participation in a statewide utility collaborative process, establishment of statewide energy efficiency policies and frameworks, development of statewide legislation, program planning, design, implementation, evaluation, and general oversight of utility electric and gas efficiency programs throughout Illinois. In this role, Mr. Mosenthal played a leadership role in the development of a statewide collaborative stakeholder process with the utilities and other parties, on behalf of the IL AG, and continues to be a lead technical consultant in this collaborative. Mr. Mosenthal has also assisted with development of legislative and regulatory laws and policies (including the most recent statute establishing a cost recovery and shareholder performance incentive model), provided expert testimony in numerous dockets before the Illinois Commerce Commission, assisted in development of grid modernization rules and policies, and worked on electric procurement issues related to the Illinois Power Agencies resource procurement process and mechanisms.

New York State Agencies, Assessment of Demand-Side “Non-Pipes” Alternatives (2019)

Optimal Energy engaged with various New York State agencies to assess the ability of energy efficiency and beneficial electrification to address gas supply constraints in down-state NY. Mr. Mosenthal served as a senior advisor and co-analyst on this project that quantified the potential for a rapid deployment of efficiency and electrification services as alternatives to new gas pipelines and other supply-side infrastructure. This project also performed research on leading gas efforts related to demand response and electrification in other jurisdictions. Mr. Mosenthal also contributed to development of recommendations for establishment of utility gas efficiency program goals and rate and bill analysis.

Massachusetts Energy Efficiency Advisory Council, Technical Consulting Services (2006 – present)

Optimal Energy has led the Technical Consultant team for the Massachusetts Energy Efficiency Advisory Council (EEAC) since its inception in 2006. Mr. Mosenthal has served in various roles on this team, including overall Team Manager, Team lead for the commercial and industrial sector, and senior advisor on efficiency policy, planning, programs, and EM&V. Optimal’s role includes representing the EEAC on all aspects of negotiating efficiency policies, programs, plans, goals and budgets with the program administrators, and oversight of all program implementation and evaluation, monitoring and verification activities. Prior to the EEAC’s inception, Mr. Mosenthal served in a similar role as a manager and lead for the C&I sector on numerous Massachusetts’ Utility Collaboratives working directly with the utilities on behalf of the non-utility parties, from 1998-2006.

Natural Resources Defense Council, Sierra Club and Renew Missouri, Consultant and Expert Witness on Missouri Energy Policy, Utility Integrated Resource Plans, and Energy Efficiency Program Planning, Design, and EM&V. (2009 – present)

Mr. Mosenthal has served as the project manager and lead advisor to Natural Resources Defense Council, Sierra Club and Renew Missouri since the beginning of utility administered DSM in the State. Through this engagement Mr. Mosenthal has played a lead role in establishing energy efficiency policy frameworks, design of utility cost recovery and performance incentive mechanisms, critical review of utility integrated resource plans and efficiency potential assessments, program planning and design, and development and on-going participation in utility-specific and statewide energy collaboratives. This project has involved expert testimony and IRP comments in numerous dockets before the Missouri Public Service Commission related to Ameren and Kansas City Power & Light (now Evergy) efficiency efforts, work on development of commission rules related to integrated resource planning and the

Missouri Energy Efficiency Investment Act, and direct negotiation with parties on goals, budgets and efficiency programs and policies.

Natural Resources Defense Council, Efficiency Assessment and Development of a New Policy Framework and Targets for a New Gas and Electric Efficiency Resource Standard for New York State (2018)

Mr. Mosenthal was the project manager and lead investigator in development of a proposal in support of New York State Governor Cuomo's plans to announce new efficiency resource policy and goals. This project included proposing an aggressive new EERS for achieving electric efficiency savings of 3% per year and gas efficiency savings of 1.5% per year. In addition, it developed a new all fuels EERS framework and shareholder incentive recommendations that would encourage not only efficiency but also beneficial electrification of existing fossil fuel fired thermal loads. This project also included engagement with senior State Government. This proposal was largely adopted by New York State and announced by Governor Cuomo on Earth Day 2018. It has led to New York having the most aggressive electric efficiency goals in the U.S., as well as an innovative new beneficial electrification policy and goals from heat pump deployment in lieu of gas and oil energy systems.

Rhode Island Energy Resource Management Council, Technical Consulting for the Energy Resource Management Council (2006 – present)

Optimal Energy has led the Technical Consultant team for the Rhode Island Energy Resource Management Council (ERMC) since its inception in 2006. Mr. Mosenthal has served in various roles on this team, including as the team lead for the commercial and industrial sector, and senior advisor on policy, planning, programs, and EM&V. Optimal's role includes representing the ERMC on all aspects of negotiating efficiency policies, plans, programs, goals and budgets with National Grid, the program administrator. We also provide oversight of all program implementation and evaluation, monitoring and verification activities.

Efficiency Vermont, Development and Consulting Services (2000 – present)

At Efficiency Vermont's (EVT) inception in 2000, Optimal was a founding partner with Vermont Energy Investment Corp. in its initial start-up and early years of operation. As EVT grew and its internal capabilities expanded, Optimal transitioned to a consulting role to the world's first Energy Efficiency Utility. In these roles, Optimal has provided numerous services related to organizational structure, planning, program design, market assessment, and EM&V. Mr. Mosenthal's roles have included leading the commercial and industrial planning team, representing EVT before the VT Department of Public Service in assessing, evaluating and verifying commercial and industrial sector savings, development of the nation's first Technical Resource Manual (including as lead investigator for the C&I portion), negotiating performance incentives with the VT Public Service Board, and leading various market analyses.

New York State Energy Research and Development Authority, Statewide Efficiency and Renewable Potential Studies (2003 – present)

Optimal has led numerous studies for NYSERDA to assess the energy efficiency and renewable potential throughout New York. Mr. Mosenthal has managed a number of these studies, as well as served as the lead investigator for the commercial and industrial segments, and overall senior advisor. Studies have assessed the efficiency potential from electricity, natural gas, and petroleum fuels, as well as the electric and thermal potential from renewable energy resources. Numerous studies have considered the potential statewide, as well as by utility region and load control zone. Many of these studies have directly led to establishment of New York State energy resource requirements as promulgated by various NY governmental administrations.

New York State Energy Research and Development Authority, Statewide Efficiency and Renewable Heat Pump Assessment (2014)

Mr. Mosenthal was a project director and senior advisor on an analysis and market assessment of the potential achievable, economic and environmental impacts from adoption of air source and ground source heat pumps in the residential and commercial sectors. This analysis included assessing the energy savings potential and cost-effectiveness of heat pump technology as compared to fossil-fuel-fired thermal solutions, and considered the overall likely economic and environmental impacts of conversion of building thermal loads to heat pumps.

Vermont Electric Power Company, Northwest Reliability Project and Southern Loop Integrated Resource Alternatives Project (2005 – 2008)

Optimal assisted the Vermont Electric Power Company in two separate projects to analyze and propose resource solutions to address transmission and distribution (T&D) constrained areas in Northwest and Southern Vermont as alternatives to major T&D infrastructure investment. In both these projects Mr. Mosenthal led the analysis for the commercial and industrial sectors. This included analyzing the energy efficiency potential in the regions, proposing and designing portfolios of efficiency programs to avoid or defer the need for substantial T&D upgrades, assessment of the economic and environmental impacts of pursuit of the efficiency alternatives, and providing expert testimony in support of alternative targeted efficiency strategies.

Citizens for Pennsylvania's Future, Development of Framework for Efficiency as a Resource Under an Alternative Energy Portfolio Standard (February 2005 – 2006)

Consulting team C&I leader providing technical assistance supporting rulemaking to implement energy-efficiency provisions as qualifying resources for the Pennsylvania Alternative Energy Portfolio Standard. Developed policies, mechanisms and sample verification protocols for inclusion of efficiency resources to meet AEPS standards.

Ecology Action Center, Nova Scotia, Critical Review and Expert Testimony on NS Power IRP and EfficiencyOne DSM Plan, (2019)

Mr. Mosenthal was the lead analyst, reviewer and expert witness in Nova Scotia EfficiencyOne's Application for Approval of Supply Agreement for Electricity Efficiency and Conservation Activities between E1 and Nova Scotia Power (NS Power) and – 2022 Demand Side Management Resource (DSM) Plan. This project included a critical review of NS Power's IRP, and EfficiencyOne's efficiency potential study and DSM Plans. Mr. Mosenthal provided expert testimony and participated in a settlement process on the value of efficiency as alternatives to supply-side investments and advocated for a more aggressive efficiency plan and ensuring that efficiency was properly valued in NS Power and EfficiencyOne's Analyses. The project resulted in a successful settlement in which the DSM Plans were expanded.

New Hampshire Public Utilities Commission, Development of an Independent Study of Energy Policy Issues (2011)

With team member Vermont Energy Investment Corporation, Optimal Energy conducted a critical review of New Hampshire's existing policies related to demand-side management, and its current programs and levels of investment, and made recommendations on modifications. Mr. Mosenthal was the author of a chapter on shareholder performance incentive frameworks, and contributed to the development of the other chapters.

New York State Energy Research and Development Authority, Statewide Efficiency and Renewable Combined Heat and Power and Fuel Cell Market Assessment (2014)

Optimal led an analysis and market assessment of the potential achievable, economic and environmental impacts from adoption of combined heat and power (CHP) and fuel cell technologies throughout New York, and by utility and load control region. Mr. Mosenthal served as a senior advisor on this project.

New York State Energy Research and Development Authority, Statewide Efficiency and Renewable Street Lighting Efficiency Market Assessment (2012)

Mr. Mosenthal served as a senior advisor on a market assessment of the potential for costs, benefits and energy and environmental impacts from conversion of street lights to LED technology and advanced controls. This study also included development of programmatic recommendations targeted for utilities and municipalities to achieve this efficiency resource.

New York Power Authority, Various Analyses and Studies (1990 – present)

Beginning in 1990 Mr. Mosenthal has led or played a senior advisor role in numerous projects for the New York Power Authority. These have included numerous efficiency potential assessments, both territory wide, and for selected market segments and or specific municipal or governmental customers. These studies identified and assessed possible efficiency opportunities, and modeled likely penetrations and economic and environmental impacts from various program and planning scenarios. Optimal has also developed targeted analyses of the efficiency potential in State Agency facilities, leading to two Executive Orders passed by Governor's Spitzer and Cuomo. Optimal subsequently assisted NYPA in developing the framework and tools to assess, track and evaluate agency progress toward meeting these Executive Orders. Optimal also developed NYPA's evaluation, monitoring and verification plans, has assisted NYPA in developing and implementing EM&V and cost-effectiveness frameworks, advised on program implementation, developed innovative strategies and proposals to address geographic transmission and distribution constraints, and developed a manual to guide public facilities engagement with performance contracting energy service providers.

Vermont Department of Public Service, Design and Development of a Statewide Efficiency Utility and Portfolio of Electric Efficiency Programs (1995 – 2000)

Mr. Mosenthal served as a lead consultant on all aspects of the development and structure of a new Statewide Efficiency Utility. He was the lead author of the first plan for an efficiency utility in North America, and led the design and analysis of a portfolio of DSM programs to be initially delivered by the efficiency utility, as well as institutional, regulatory, organizational and evaluation processes to support the ongoing transformation from electric utility led programs to an independent entity. Mr. Mosenthal served as an expert witness providing testimony in support of the establishment of an efficiency utility and the elimination of the existing role of design and delivery of efficiency services by the electric utilities in the State. The project involved development of efficiency and administrative policy frameworks; program design and development; measure characterizations; analysis of program impacts and costs; assessment of achievable market-driven and retrofit potential; modeling of program participation; economic screening; and development of monitoring and evaluation guidelines. The project also developed criteria for the delivery of the core programs during a transition to the efficiency utility and electric utility restructuring, and established the proposed structure and role of the efficiency utility.

New York City, NRDC, PACE, et. al., Natural Gas Energy Efficiency Potential and Program Design (2004)

Led a commercial and industrial sector analysis and report on gas energy efficiency programs for

Consolidated Edison of New York, on behalf of New York City Economic Development Corporation, NRDC, Pace Energy Project, Association for Energy Affordability and Public Utility Law Project.

U. S. Environmental Protection Agency, EPA Clean Energy Partnership, State Clean Energy Action Plans (2006 — 2009)

Led energy efficiency analysis, research and product development for EPA's Clean Energy Partnership with State and Local Governments to advance State Clean Energy Action Plans. Projects included development of a Clean Energy Fund Manual to guide state planners in development of Clean Energy Action Plans; development of an energy efficiency potential assessment guide as part of the EPA's National Action Plan on the use, value and performance of efficiency and renewable potential assessments; and development of multi-year plans for efficiency programs for Ohio Office of Energy Efficiency. For EPA.

Natural Resources Defense Council, Development of a Clean Energy Power Plant in China (July 2003 — 2007)

Mr. Mosenthal served as a lead advisor and the Consulting team C&I Sector leader on development and assessment of demand-side management investment portfolios for China, for the Natural Resources Defense Council. This project included developing and analyzing the potential for a portfolio of efficiency programs to serve as model programs for China in the Provinces of Shanghai and Jiangsu and the municipality of Chongqing. It included addressing political and regulatory barriers, long term funding mechanisms and development of an administrative organizational structure, as well as analyzing the efficiency opportunities and designing efficiency programs. In addition, it included an assessment of the ability of demand-side resources to retire a specific aging coal power plant. Mr. Mosenthal also served as a trainer and instructor to the China State Electrical Grid, local utilities and other stakeholders. This project led to development of a \$500 million fund from the Asian Development Bank to invest in efficiency programs.

Massachusetts Non-Utility Parties, Technical Consultants to the Non-Utility Parties in Multiple Utility Collaboratives (1998 — 2006)

Mr. Mosenthal service as a C&I consultant and Sector Team Lead representing the non-utility parties (NUPs) in multiple utility collaboratives, including for Boston Edison, Commonwealth Electric, Cambridge Electric, Eastern Utilities, Massachusetts Electric, National Grid, NSTAR and Western Massachusetts Electric In this role Mr. Mosenthal advised on policy, planning, program design, negotiations of goals and budgets, and evaluation, monitoring and verification.

Cape Light Compact, Program Planning and Design (2003 — 2005)

Mr. Mosenthal served as project manager assisting the Cape Light Compact in designing a portfolio of C&I programs, development of savings goals and budgets, and analysis of measures, cost-effectiveness and implementation issues. Projects have included revising the current offerings to improve and expand them, and to bring greater consistency with other Massachusetts utility programs. This project also included assistance with evaluation, monitoring and verification through improved savings estimates.

Connecticut Municipal Electric Consortium, Program Planning and Design (2005 — present)

Optimal assisted the Connecticut Municipal Electric Consortium to design and develop a portfolio of municipal efficiency programs. This project included analysis of opportunities and design and development of program designs, and implementation services including development of tracking systems and provision of technical services directly to C&I customers. Mr. Mosenthal has served as a senior advisor program planning and development.

Connecticut Office of Consumer Counsel, Design of Efficiency Policy and Shareholder Performance Incentives (2003 – 2004)

Mr. Mosenthal provided consulting and expert testimony on behalf of the Connecticut Office of Consumer Counsel related to setting energy efficiency policy, goals and development of utility shareholder performance incentives.

Long Island Power Authority, Program Design, Development, Planning and Implementation Support (1998 – 2007)

Optimal Energy led the development and analysis of a portfolio of C&I market transformation and retrofit programs for the Long Island Power Authority. This project includes program design of utility and regional market transformation programs targeting new and replacement building and equipment markets, and the estimation of the achievable potential for selected markets on Long Island. In addition, Optimal served as LIPA's lead consultants on all aspects of planning, program design, reporting and EM&V, on an on-going basis. Mr. Mosenthal served in various roles including as team lead for the C&I sector.

Northeast Energy Efficiency Partnerships, Economic and Technical Advisor on Program Design, Planning and Resource Assessment (1998 – 2008)

Optimal has served as an economic and technical advisor to Northeast Energy Efficiency Partnerships, a not-for-profit regional consortium of utilities pursuing market transformation in efficiency markets. Various studies have included: economic analysis and report on cost-effectiveness of NEEP initiatives involving high-efficiency motors, CoolChoice unitary HVAC, clothes washers, and residential lighting; and multiple assessments of the energy efficiency potential in the Northeast U.S.

New Jersey Clean Energy Collaborative, Advisor on Commercial and Industrial Program Planning, Design and Implementation (November 1996 – 2003)

Mr. Mosenthal served as a commercial sector advisor on program planning and implementation of multi-year statewide energy-efficiency programs in the New Jersey Clean Energy Collaborative involving all the state's electric and gas utilities and the Natural Resources Defense Council. Initially he co-directed collaborative work on program development, planning, and implementation for Conectiv prior to representing NRDC in the Collaborative process.

Citizens Utilities Corporation's Arizona Electric Division, Design and Development of Efficiency Programs (2000 – 2001)

Optimal served as advisors to the Citizens Utilities Corporation's Arizona Electric Division, developing a program strategy to capture maximum achievable potential among targeted sectors to effect immediate load reductions in response to energy shortages and rate shock resulting from the California electric market. This project included assessing the efficiency and load reducing opportunities, and developing implementation strategies to capture them, among food processing and storage, wastewater treatment and school facilities.

Efficiency Vermont, Energy Efficiency Potential Analyses (2008 – 2013)

Mr. Mosenthal served as the lead analyst on development of electric and unregulated fuels C&I efficiency potential and development of 20-year forecasts of expected Efficiency Vermont achievements under various policy, planning and funding scenarios. This project included zonal analysis to support distributed utility planning for transmission system reliability and for all 22 VT electric utilities distribution system planning. Mr. Mosenthal has also served as a senior advisor on additional follow-up studies.

Northeast Energy Efficiency Partnerships, New England Efficiency Potential (2009 – 2010 & 2014)

Optimal performed two separate region-wide studies to estimate the efficiency potential in New England on behalf of the Northeast Energy Efficiency Partnerships. Mr. Mosenthal served as the lead analyst on the first study and as senior advisor on the second.

Delaware Department of Natural Resources and Environmental Control, Delaware Efficiency Potential Study (2012 – Present)

Lead analyst and senior advisor on a project to estimate detailed electric and gas efficiency potential in the State of Delaware. This study was intended to support current legislative efforts in Delaware to establish efficiency targets and funding mechanisms. As a follow up to this study, Optimal continues to advise DNREC and the Delaware Energy Efficiency Advisory Council on development of efficiency and EM&V policies and frameworks, and oversee the utility planning process. Mr. Mosenthal was a lead author and developer of EM&V regulations in Delaware.

Natural Resources Defense Council, Ceres, Environmental Defense Fund and Public Citizen, Texas Assessment of Electric Efficiency Potential and Policy Recommendations (2006 – 2009)

Principal investigator and author of an assessment of electric efficiency potential and policy recommendations for Texas as an alternative to supply-side investment in coal-fired power plants. Analyzed the residential, commercial and industrial potential for electric load reductions from efficiency programs, appliance standards, enhanced building codes, demand response and combined heat and power programs. Also recommended policy and programmatic changes to advance efficiency in Texas. Provided expert testimony before the Texas Legislature.

Wal-Mart, Wal-Mart Energy Efficiency Rate Tariff Design and Analysis (2005 — 2006)

Developed an innovative “efficiency rate tariff” designed to benchmark commercial facilities energy efficiency and price electricity to them based on their efficiency levels to create incentives for efficiency and reduce cross subsidies. This electric rate would develop threshold efficiency levels by facility type with increasing block rates that remove current disincentives to efficiency that exist with traditional electric rate design. Mr. Mosenthal served as project manager and lead investigator.

Vermont Department of Public Service, State of VT Economically Achievable Efficiency Potential (2001 – 2003)

C&I project lead for consulting team performing a statewide projection of economically achievable efficiency potential for electricity and natural gas for the state of Vermont.

Vermont Department of Public Service, Distributed Utility Alternatives Screening Tool (September 2001 – December 2002)

C&I project lead for consulting team supporting utilities in targeting demand-side resources to optimize distribution investment planning by easily assessing alternative resource options for as part of a statewide distributed utility planning collaborative. This project included developing a unique “distributed utility screening tool” that allowed small municipal and cooperative utilities to easily estimate achievable potential in their jurisdiction as a first step in considering least cost alternatives to infrastructure investment for distributed utility planning.

Maine Office of the Consumer Advocate, State of Maine Electric Efficiency Achievable Potential (2002)

Analyzed the C&I electric efficiency achievable potential for the State of Maine. This project included estimated economic and achievable opportunities over 10 years, in support of development of a statewide efficiency administration model.

American Council for an Energy Efficient Economy, State of Michigan Electric Efficiency Achievable Potential (2002 - 2003)

Analyzed the C&I electric efficiency achievable potential for the State of Michigan. This project included estimated economic and achievable opportunities over 10 years, in support of potential development of a statewide efficiency policies and goals.

Long Island Power Authority Advisor, C&I Baseline and Market Assessment (1999 - 2001)

Lead advisor to Long Island Power Authority on its C&I baseline analysis and market assessment. Project included support in developing program and market theory, evaluation plans and RFP, review of proposals, and ongoing advice and critical review of a third party analysis.

Evaluation, Monitoring and Assessment

Enbridge Gas Distribution, Evaluation Audit (2013-2015)

Optimal served as the EM&V auditor for all Enbridge Gas Systems evaluations for program years 2013 and 2014, on behalf of Enbridge and the Ontario Energy Board. This involved reviewing the processes and analyses used for the impact evaluation and making recommendations on ways to improve the programs, as well as developing realization rates for each program. Mr. Mosenthal served as lead auditor for the commercial and industrial retro commissioning programs.

Massachusetts Energy Efficiency Advisory Council, Technical Reference Manual for the State of Massachusetts (2008 – 2012)

Team leader on development of a statewide Technical Reference Manual for the State of Massachusetts in collaboration with the MA electric and gas utilities. This project included working with the program administrators to establish and document the initial policies and rules around development, maintenance, and usage of a statewide TRM, as well as development of the first TRM version to guide Massachusetts EM&V.

Natural Resources Defense Council, Kyoto Protocol, Clean Development Mechanism Framework and M&V Protocols (2004 — 2007)

Development of M&V protocols and mechanisms for two Chinese provinces to sell energy efficiency portfolio carbon dioxide savings into the Clean Development Mechanism (CDM) established under the Kyoto Protocol.

New York State Energy Research and Development Authority, Small C&I Lighting Market Assessment (2003 - 2005)

Market assessment of small commercial lighting market and activity support to the evaluation and design of a NYSERDA Small C&I Lighting Program. This project included advising on scope of analysis and interpretation of interview and survey data, and review and recommendations on program design and implementation.

Multiple Clients, Development of EM&V Plans and Technical Reference Manuals (2000 – Present)

Mr. Mosenthal was a key stakeholder in leading the development of the first technical reference manual in North America, and was the lead analyst and negotiator for the development of the commercial and industrial sector TRM entries, for Efficiency Vermont in the early 2000's. Since then, Mr. Mosenthal has served as a senior advisor on the development of numerous EM&V frameworks, plans and technical reference manuals in a number of jurisdictions, including projects in: DE, IA, IL, IN, OH, LA, MO, NC, NJ, NY, PA, MD, MA, RI and VT.

Massachusetts Energy Efficiency Advisory Council, and Rhode Island Energy Resource Management

Council, Code Compliance Initiative EM&V Plans and Framework (2013 – Present)

On behalf of the MA EEAC and separately for the RI EERMC, Mr. Mosenthal has directly negotiated and developed an EM&V framework for attributing savings from a code compliance and standards initiative. In this capacity Mr. Mosenthal has also reviewed and contributed to all EM&V planning for the codes and standards efforts.

Efficiency Vermont, C&I Evaluation Planning, Savings Verification and Coordination (2000 – 2008)

Mr. Mosenthal served as the lead advisor and negotiator to Efficiency Vermont on C&I evaluation planning and coordination with Department of Public Service on evaluation and savings estimation and verification.

Orange and Rockland Utilities, Impact Evaluations (1994 – 1995)

Mr. Mosenthal managed a project and served as the lead investigator for performing impact evaluations on all programs within Orange & Rocklands energy efficiency portfolio.

REPRESENTATIVE PUBLICATIONS

“The Energy Efficiency Extra Value Menu: Streamlining Energy Efficiency Delivery,” (with Socks, M., et. al.) ACEEE 2016 Summer Study on Energy Efficiency, Pacific Grove, CA, August 2016.

“Marrying Economic Development with Energy Efficiency in the Public Sector,” (with Socks, M., et. al.), ACEEE 2014 Summer Study on Energy efficiency, Pacific Grove, CA, August 2014.

“Upstream Strategies for Commercial and Industrial Market,” Proceeding of the 6th Rocky Mountain Utility Efficiency Exchange, October 2013.

“Alternative Energy Savings Goals in Michigan: Promoting Longer Term Savings,” ACEEE 2013 Energy Efficiency as a Resource, 2013.

“A New Regulatory Framework to Support Behavioral Programs,” Proceeding of the 2012 ACEEE Behavior Energy and Climate Conference, November 2012.

“Contracting Services in the Ameren Energy Efficiency Industry,” Proceedings of the 2nd German American Energy Conference, German Energy Agency (DENA), March 2010.

“Advancing Clean Energy Funds, Options for Administration and Funding,” (with Loiter, J.), prepared for the U.S. EPA Climate Protection Partnerships Division, May 2008.

“Guide for Conducting Energy Efficiency Potential Studies,” (with Loiter, J.), A Resource of the National Action Plan for Energy Efficiency, U.S. EPA, November 2007.

“Energy Efficiency Potential Studies: Why, How and So What?,” American Council for an Energy Efficient Economy Conference on Energy Efficiency as a Resource, October 2007.

“Integrated Resource Solutions to Localized Transmission and Distribution Reliability,” Proceedings of the International Energy Program Evaluation Conference, August 2007.

“Removing Disincentives for Efficiency from Electric Rate Design,” (with Galura, J., Gupta, A., Loiter, J.), 17th National Energy Services Conference Proceedings, Las Vegas, NV, February 2007.

Power to Save: An Alternative Path to Meet Electric Needs in Texas, published by Natural Resources Defense Council and Ceres, New York, NY, January 2007.

“Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs,” (with Plunkett, J.) The National Academy of Sciences, National Academies Press, Washington D.C., 2006.

“Gas Efficiency Potential and a Portfolio of Integrated Gas and Electric Statewide Programs for New York,” (with Hogan, E.), American Council for an Energy Efficiency Economy 2006 Summer Study Proceedings, Pacific Grove, California, Forthcoming August 2006.

“Demand-Side Management Strategic Plan for Jiangsu Province, China: Economic, Electric and Environmental Returns from an End-Use Efficiency Investment Portfolio in the Jiangsu Power Sector,” (with Finamore, B., Plunkett, J., Moscowitz, D., Slote, S., Wyatt, F.), American Council for an Energy Efficiency Economy 2006 Summer Study Proceedings, Pacific Grove, California, Forthcoming August 2006.

“Purchasing Efficiency Power Plants in Jiangsu,” (with Finamore, B., Plunkett, J., Moscowitz, D., Slote, S., Wyatt, F.), Greener Management International, Forthcoming August 2006.

“Purchasing Efficiency Power Plants in Jiangsu and Shanghai” with (Song, H., Chen, R., and B. Finamore), Rightlight 6 International Energy Efficiency Lighting Conference, Shanghai, China, Forthcoming May 2005.

“Transmission System Integrated Resource Planning: Leveling the Playing Field” (with S. Slote), ACEEE 2004 Summer Study on Energy Efficiency in Buildings, Pacific Grove, California, August 2004.

“Long-Term Energy-Efficiency and DSM Investment in the Northeast United States,” (with J. Plunkett), presented at the China-US Workshop on DSM Policy Research, sponsored by the China State Grid Corporation, Beijing, China, March 2004.

“The Big Picture: An Overview of Energy Savings Opportunities,” PACE University Energy Law Center, presented as plenary session at PACE Recharge Energy Conference, September 2003.

“Energy Efficiency and Renewable Energy Resource Development Potential in New York State” (with C. Donovan, N. Elliott, D. Hill, S. Nadel, C. Neme, J. Plunkett), New York State Energy Research and Development Authority, August 2003.

“Documentation of the Northwest Energy Efficiency Alliance Efforts to Support Energy Codes and Participate in the Federal Standards Setting Process” (with S. Slote and D. Baston), Northwest Energy Efficiency Alliance, 2003.

“Efficiency And Renewable Electricity Potential Studies: Approaches, Results, Uses And Implications,” ACEEE 2003 Electricity Reliability Conference, Berkeley, California, June 2003.

“The Technical and Economic Potential for Energy-Efficient Products and Services,” ACEEE 2003 National Symposium On Market Transformation, Washington DC, April 2003.

“Light-Years Ahead: A New Approach to Transform Commercial Lighting” (with P. Richards and S. Lacey) ACEEE 2002 Summer Study on Energy Efficiency in Buildings, Pacific Grove, California, August 2002.

“A Modified Delphi Approach to Predict Market Transformation Program Effects” (with R. Pahl, C. Neme and R. Cuomo) ACEEE 2000 Summer Study on Energy Efficiency in Buildings, Pacific Grove, California, August 2000.

“A Systematic Application of Theory-Based Implementation and Evaluation of Market Transformation Programs,” (with S. Hastie and R. Pahl), ACEEE 2000 Summer Study on Energy Efficiency in Buildings, Pacific Grove, California, August 2000.

“The Link Between Program Participation and Financial Incentives in the Small Commercial Retrofit Market,” (with M. Wickenden), 1999 International Energy Program Evaluation Conference, Denver, Colorado, August 1999.

“Delivering Statewide Efficiency Programs In a Competitive Environment — Vermont’s Model,” 1997 Annual Conference of the Association of Energy Service Professionals, Boca Raton, Florida, December 1997.

“Marketing with Community Involvement,” (with Shel Feldman, Jane Peters, Lynn Goldfarb and Bill Stieglemen), Panel presentation and discussion at the Association of Energy Service Professionals 1997 Annual Conference, Boca Raton, Florida, December 1997.

“Vermont ‘Efficiency Utility’ to Deliver Core Efficiency Programs,” (with S. Parker), Strategies, Vol. 8, No. 3, Association of Energy Service Professionals, Summer 1997.

“The Power to Save: A Plan to Transform Vermont’s Energy-Efficiency Markets” (with J. Plunkett), Vermont Department of Public Service, May 1997.

“Capturing Comprehensive Benefits from Commercial Customers: A Comparative Analysis of HVAC Retirement Alternatives” (with J. Plunkett and M. Kumm). 1996 ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA, August 1996.

“Achieving Market Transformation with Pepco’s Save and Save Again Program” (with A. Flinchum). Association of Energy Service Professionals’ 1995 Implementation Conference, Dallas, TX, March, 1995.

“Potomac Electric Power Company’s Early Chiller Retirement Option” (with G. Simpson), 1994 Annual Member Meeting of the Association for Demand Side Management Professionals, San Diego, CA, December 1994.

“Innovative DSM Programs,” Moderator of presentation session at the 1994 Annual Member Meeting of the Association for Demand Side Management Professionals, San Diego, CA, December 1994.

“Home Energy Rating Systems,” Moderator of presentation session at the 1994 Affordable Comfort Conference, Philadelphia, PA, March 1994.

Demand-Side Management Planning and Implementation Guide, Association of Demand-Side Management Professionals, Boca Raton, FL, December 1991.

Performance Based Hook-Up Fees: Issues and Options (with R. Wirtshafter, et al.). New York Power Pool and Staff of the New York Public Service Commission, Schnectady and Albany, NY, August 1990.

Buyer’s Guide to Energy Efficient Gas Furnaces. Citizens Coalition for Energy Efficiency, Philadelphia, PA, 1987.

“Hot Water Heating Energy Savings”, Pennsylvania Energy Report, Citizens Coalition for Energy Efficiency, Philadelphia, PA, Summer 1986.

“Lighting: Sorting Through the Options”, Pennsylvania Energy Bulletin, Pennsylvania Energy Center, Philadelphia, PA, January 1985.

TESTIMONY

The following is a summary of Regulatory Testimony before State or Federal Regulatory Bodies for Philip H. Mosenthal.

Jurisdiction	Proceeding Number/Dates	On Behalf of	Nature of Testimony
Connecticut DPUC	Docket No. 03-01-01, October 2003	Connecticut Office of Consumer Counsel	Critical review of Connecticut investor owned utility electric efficiency programs and goals, and recommendation of adoption of more aggressive goals and a performance incentive mechanism to reward utility

			shareholders for exemplary performance.
Florida PSC	Docket Nos. 080407-EG thru 080413-(E.G.,, July 2009	Natural Resources Defense Council and Southern Alliance for Clean Energy	Review and Critique of 8 Florida utility DSM plans, goals, budgets and efficiency potential analyses.
Florida	Dockets 160186-EI, January 2017	Sierra Club	Petition for rate increase by Gulf Power Company
Florida	Docket 16-0170-EI January 2017	Sierra Club	Petition for approval of 2016 depreciation and dismantlement studies, approval of proposed depreciation rates and annual dismantlement accruals and Plan Smith Units 1 and 2 regulatory asset amortization, by Gulf Power Company
Illinois ICC	Docket No. 07-0539, December 2007	Illinois Office of Attorney General	Testimony on 2008 – 2011 DSM Plans of Central Illinois Light Company (dba AmerenCILCO). Testimony addresses recommendations for modification of DSM Plans, as well as issues related to cost recovery and evaluation and verification of savings.
Illinois ICC	Docket No. 07-0540, December 2007	Illinois Office of Attorney General	Testimony on 2008 – 2011 DSM Plans of Commonwealth Edison. Testimony addresses recommendations for modification of DSM Plans, as well as issues related to cost recovery and evaluation and verification of savings.
Illinois ICC	Docket No. 07-0541, December 2007	Illinois Office of Attorney General	Testimony on 2008 – 2011 DSM Plans of Illinois Department of Commerce and Economic Opportunity. Testimony addresses recommendations for modification of DSM Plans, as well as issues related to cost recovery and evaluation and verification of savings.
Illinois ICC	Docket No. 08-0519, October 2007	Illinois Office of Attorney General	Formal comments on the Illinois Power Agency Petition for Power Procurement Plan.
Illinois ICC	Docket No. 10-0568, November 2010	Illinois Office of Attorney General	Testimony on 2011 – 2014 DSM Plans of Central Illinois Light Company (dba AmerenCILCO), Central Illinois Public Service) Company, (dba AmerenCIPS) and Illinois Power Company (dba AmerenIP). Testimony addresses appropriateness of EE goals and budgets, recommendations for modification of DSM Plans, as well as issues related to state statutes, cost recovery and evaluation and verification of savings.
Illinois ICC	Docket No. 10-0570,	Illinois Office of	Testimony on 2011 – 2014 DSM Plans of

	November 2010	Attorney General	Commonwealth Edison. Testimony addresses appropriateness of EE savings goals and budgets, interpretation of state statutes, recommendations for modification of DSM Plans, as well as issues related to cost recovery and evaluation and verification of savings.
Illinois ICC	Docket No. 10-0562, November 2010	Illinois Office of Attorney General	Testimony on 2011 – 2014 DSM Plans of Northern Illinois Gas Company (dba Nicor Gas Company). Testimony addresses recommendations for modification of DSM Plans, appropriateness of EE savings goals and budgets and compliance with Illinois Statutes, as well as issues related to opt-out provisions, transportation gas customer treatment, integration of gas and electric programs, cost recovery and evaluation and verification of savings.
Illinois ICC	Docket No. 10-0564, November 2010	Illinois Office of Attorney General	Testimony on 2011 – 2014 DSM Plans of North Shore Gas Company and The Peoples Gas Light & Coke Company. Testimony addresses recommendations for modification of DSM Plans, appropriateness of EE savings goals and budgets and compliance with Illinois Statutes, as well as issues related to opt-out provisions, transportation gas customer treatment, integration of gas and electric programs, cost recovery and evaluation and verification of savings.
Illinois ICC	Docket No. 10-0519, September 2011	Illinois Office of Attorney General	Testimony on Ameren Illinois PY2 (2010-2011) compliance with savings goals pursuant to Section 8-103(f) of the Public Utilities Act.
Illinois ICC	Docket No. 11-0593 August 2011	Illinois Office of Attorney General	Direct testimony on ComEd program year 3 (2011-2012) compliance with savings goals pursuant to Section 8-103(f) of the Public Utilities Act.
Illinois ICC	Docket No. 11-0593 November 2011	Illinois Office of Attorney General	Rebuttal testimony on ComEd program year 3 (2011-2012) compliance with savings goals pursuant to Section 8-103(f) of the Public Utilities Act.
Illinois ICC	Docket No. 11-0689, February 2013	Illinois Office of Attorney General	Testimony comments regarding on-bill-financing legislation, plans and evaluation plans in compliance with Public Act 96-0033 and ICC Initiating Order 11-0689.
Illinois ICC	Docket No. 11-0592 March 2013	Illinois Office of Attorney General	Rebuttal testimony on Ameren Illinois program year 3 (2011-2012) compliance

			with savings goals pursuant to Section 8-103(f) of the Public Utilities Act.
Illinois ICC	Docket No. 13-0498 October 2013	Illinois Office of Attorney General	Direct and Rebuttal testimony on Ameren Illinois Plan 3 (2014-2017) approval of the Energy Efficiency and Demand-Response Plan Pursuant to 220ILCS 5/8-103 and 220 ILCS 5/8-104.
Illinois ICC	Docket No. 13-0499 October 2013	Illinois Office of Attorney General	Direct and Rebuttal testimony on DCEO Plan 3 (2014-2017) approval of the Energy Efficiency and Demand-Response Plan Pursuant to 220ILCS 5/8-103 and 220 ILCS 5/8-104.
Illinois ICC	Docket No. 13-0495 November 2013	Illinois Office of Attorney General	Direct and Rebuttal testimony on Commonwealth Edison Plan 3 (2014-2017) approval of the Energy Efficiency and Demand-Response Plan Pursuant to 220ILCS 5/8-103.
Illinois ICC	Docket No. 13-0550 December 2013	Illinois Office of Attorney General	Direct testimony on Integrys Plan 2 (2014-2017) approval of the Energy Efficiency and Demand-Response Plan Pursuant to 220ILCS 5/8-104.
Illinois ICC	Docket No. 13-0549 January 2014	Illinois Office of Attorney General	Direct testimony on Nicor Plan 2 (2014-2017) approval of the Energy Efficiency and Demand-Response Plan Pursuant to 220ILCS 5/8-104.
Illinois ICC	Docket No. 16-0413 October 2016	Illinois Office of Attorney General	AMEREN ILLINOIS COMPANY Approval of the Energy Efficiency and Demand Response Plan Pursuant to 220 ILCS 5/8-103 and 220 ILCS 5/8-104
Illinois ICC	Docket No. 16-0420 October 2016	Illinois Office of Attorney General	COMMONWEALTH EDISON COMPANY Approval of the Energy Efficiency and Demand Response Plan Pursuant to Section 8-103(f) of the Public Utilities Act
Illinois ICC	Docket No. 16-0421 October 2016	Illinois Office of Attorney General	NORTHERN ILLINOIS GAS COMPANY Application Pursuant to Section 8-104 of the Public Utilities Act for Consent to and Approval of an Energy Efficiency Plan
Illinois ICC	Docket No. 16-0420 October 2016	Illinois Office of Attorney General	Direct Testimony, Commonwealth Edison Approval of its Energy Efficiency Portfolio and Plan Pursuant to Sections 8-103(e) and (f) And 8-104(e) and (f) of the Public Utilities Act
Illinois ICC	Docket No. 16-0422 October 2016	Illinois Office of Attorney General	ILLINOIS DEPARTMENT OF COMMERCE AND ECONOMIC OPPORTUNITY Approval of its Energy Efficiency Portfolio and Plan Pursuant to Sections 8-103(e) and (f) And 8-104(e) and (f) of the Public Utilities Act

Illinois ICC	Docket No. 16-0466 December 2016	Illinois Office of Attorney General	Direct Testimony, North Shore Gas Company And The Peoples Gas Light and Coke Company Petition Pursuant to Section 8-104 of the Public Utilities Act to Submit an Energy Efficiency Plan
Illinois ICC	Docket No. 17-0288 June 2017	Illinois Office of Attorney General	Direct Testimony, Ameren Illinois Petition for approval of Rider EE – Energy Efficiency and Demand Response Investment Pursuant to 220 ILCS 5/8-103B(k).
Illinois ICC	Docket No. 17-0310 July 2017	Illinois Office of Attorney General	Direct Testimony, Northern Illinois Gas Company Approval of its Energy Efficiency Portfolio and Plan Pursuant to Sections 8- 103(e) and (f) And 8-104(e) and (f) of the Public Utilities Act
Illinois ICC	Docket No. 17-0312 July 2017	Illinois Office of Attorney General	Direct Testimony, COMMONWEALTH EDISON COMPANY Approval of the Energy Efficiency and Demand Response Plan Pursuant to Section 8-103(f) of the Public Utilities Act
Illinois ICC	Docket No. 17-0309 August 2017	Illinois Office of Attorney General	Direct Testimony, North Shore Gas Company and Peoples Gas Light & Coke Company Approval of its Energy Efficiency Portfolio and Plan Pursuant to Sections 8- 103(e) and (f) And 8-104(e) and (f) of the Public Utilities Act
Illinois ICC	Docket No. 17-0311 July 2017 (and revised August 2017)	Illinois Office of Attorney General	Direct and Rebuttal Testimony, Ameren Illinois Company Approval of the Energy Efficiency and Demand-Response Plan Pursuant to 220 ILCS 5/8-103B and 220 ILCS 5/8-104
Illinois ICC	Docket No. 17-0310 August 30, 2018)	Illinois Office of Attorney General	Direct Testimony, Northern Illinois Gas Company (NICOR) Approval of the Energy Efficiency and Demand-Response Plan Pursuant to 220 ILCS 5/8-104
Indiana URC	Cause No. 43114 and No. 43114 SI, May 2007	Citizens Action Coalition of Indiana, Save the Valley Coalition, Valley Watch, Sierra Club	Testimony in Duke Energy and Vectren rate cases regarding the need for a new IGCC power plant. Addressed the achievable potential for electric efficiency in Duke Energy and Vectren’s territories, the associated costs and benefits, and the reliability impact of efficiency on their electric systems as an alternative to the IGCC plant. Addressed the need for establishment of a utility performance incentive mechanism to provide incentives for

			pursuit of energy efficiency initiatives.
Mississippi PSC	Docket No. 2010-AD-2	Sierra Club	Order Establishing Docket to Investigate the Development and Implementation of Energy Efficiency Programs and Standards
Missouri PSC	File No. EO-2011-0271, September 2011	Natural Resources Defense Council, Sierra Club, Renew Missouri, Mid-Missouri Peaceworks, Great Rivers Environmental Law Center	Direct and rebuttal testimony on Ameren's (dba as Union Electric Company) 2011 Utility Resource Filing pursuant to 4 CSR 240-Ch. 22 (IRP). Testimony addressed adequacy of IRP in terms of treatment of demand-side resources and integration of supply- and demand-side resources on an equal footing.
Missouri PSC	Case No. E)-2012-009, March 2012	Natural Resources Defense Council, Sierra Club, Renew Missouri	Testimony on KCP&L's DSM Plan filed pursuant to MEEIA. Testimony addressed regulatory framework for DSM, cost recovery, lost revenue recover, shareholder performance incentives, issues of tracking, counting and truing up savings over time, and program design issues.
Missouri PSC	Case No. EO-2012-0142, April 2012	Natural Resources Defense Council, Sierra Club, Renew Missouri	Testimony on Ameren UE's DSM Plan filed pursuant to MEEIA. Testimony addressed regulatory framework for DSM, cost recovery, lost revenue recover, shareholder performance incentives, issues of tracking, counting and truing up savings over time, and program design issues.
Missouri PSC	Case No. EO-2015-0084, February 2015	Natural Resources Defense Council	Filed formal comments on Ameren UE's 2014 Integrated Resource Plan, addressing DSM Efficiency potential, and the modeling and integration of efficiency resources with supply-side options.
Missouri PSC	Case No. EO-2015-0055, March 2015	Natural Resources Defense Council	Rebuttal testimony on Ameren UE's DSM Plan filed pursuant to MEEIA. Testimony addressed the efficiency potential and Ameren's program and portfolio plans, the regulatory framework for DSM, cost recovery, lost revenue recovery, shareholder performance incentives, issues of tracking, counting and truing up savings over time, and program design issues.
Missouri PSC	Case No. EO-2015-0055, April 2015	Natural Resources Defense Council	Surrebuttal testimony on Ameren UE's DSM Plan filed pursuant to MEEIA. Testimony addressed the efficiency potential and Ameren's program and portfolio plans, the regulatory framework for DSM, cost recovery, lost revenue recovery, shareholder performance incentives, issues of tracking, counting and truing up savings over time,

			and program design issues.
Missouri PSC	Case No. EO-2015-0252, August 2015	Natural Resources Defense Council	Filed formal KCP&L Greater Missouri Operations 2015 Integrated Resource Plan, addressing DSM Efficiency potential, and the modeling and integration of efficiency resources with supply-side options.
Missouri PSC	Case No. EO-2015-0084, May 2015	Natural Resources Defense Council	Filed formal comments on Union Electric d/b/a Ameren Missouri 2014 Integrated Resource Plan, addressing DSM Efficiency potential, and the modeling and integration of efficiency resources with supply-side options.
Missouri PSC	Case No. EO-2015-0252 and 0254, August and November 2015	Natural Resources Defense Council	Filed formal comments and supplemental comments on KCP&L Missouri 2015 Integrated Resource Plan, addressing DSM Efficiency potential, and the modeling and integration of efficiency resources with supply-side options.
Missouri PSC	Case No. EX-2016-0334, April 2017	Natural Resources Defense Council	Filed formal comments In the Matter of Proposed Amendments to the Missouri Public Service Commission's Rules Relating to the Missouri Energy Efficiency Investment Act.
Missouri PSC	Case No. EO-201-0038, February 2018	Natural Resources Defense Council	Filed formal comments on Union Electric d/b/a Ameren Missouri 2018 Integrated Resource Plan, addressing DSM Efficiency potential, and the modeling and integration of efficiency resources with supply-side options.
Missouri PSC	IRP Docket, April 2018	Natural Resources Defense Council	Filed formal reply comments on KCP&L Missouri and Greater Missouri Operations 2018 Integrated Resource Plan, addressing DSM Efficiency potential, and the modeling and integration of efficiency resources with supply-side options.
Missouri PSC	Case No. EO-2018-0211, September 2018	Natural Resources Defense Council	Direct and Surrebuttal testimony related to Union Electric d/b/a Ameren Missouri 2020-2022 Efficiency Plan.
Missouri PSC	Case No. EO-2019-0133, January 2019	Natural Resources Defense Council	Rebuttal testimony related to KCP&L Missouri and Greater Missouri Operations 2020-2022 Efficiency Plan.
New York PSC	Case 06-G-1322, March 2007	Natural Resources Defense Council, PACE Energy Project, Association for Energy Affordability	Presented analysis of the natural gas efficiency potential in Con Edison service territory, the associated costs and benefits to achieve it, and recommended funding levels and strategies to capture gas efficiency. Addressed the need for a revenue decoupling mechanism and performance

			incentives to overcome Con Edison disincentives to successfully administer efficiency programs.
Nova Scotia, Canada, Utility And Review Board	M09096, May 2019	Ecology Action Centre	Direct testimony, Efficiency One Approval of Supply Agreement for Electric Efficiency and Conservation Activities between E1 and Nova Scotia Power Inc.
Ontario Energy Board	EBRO 493/494, August 1996	Green Energy Coalition	Review and critique of Union Gas Company's 1997 DSM Plan
Ontario Energy Board	EBRO 487, 1998	Green Energy Coalition	Review and critique of Consumers Gas Company's 1999 DSM Plan
Texas Legislature	House Committee on Regulated Industries hearing on HB269, Feb. 2007	Public Citizen	Testimony on electric energy efficiency potential in Texas, reliability issues in ERCOT load zone, and benefits and costs of meeting new load growth with efficiency.
U.S. Nuclear Regulatory Commission	Docket Nos. 520912 & 52-013, May 2011	Sustainable Energy and Economic Development (SEED) Coalition, Public Citizen, South Texas Association for Responsible Energy	Direct and rebuttal testimony addressing the need for power to justify construction of South Texas Project Units 3 & 4 nuclear power plants, the accuracy of the electric forecast and analysis of future efficiency savings from codes and standards potential to avoid the need for new power.
Vermont PSB	Docket No. N/A, 1996	Vermont Department of Public Service	Critical review and recommendations on Green Mountain Power's (GMP) performance and plans for C&I New construction programs.
Vermont Legislature	Senate Natural Resources and Finance Committee hearings on S62, 1997	On behalf of the Committee	Testimony electric restructuring bill (S62) addressing the benefits and costs to Vermonters and potential environmental and consumer impacts.
Vermont PSB	Docket No. 5980, August 1997	Vermont Department of Public Service	Development and support of plan to establish a statewide energy efficiency utility (EEU), and present the efficiency programs and plans for the EEU.
Vermont PSB	Docket No. 5983, October 1997	Vermont Department of Public Service	Critique of GMP's analysis and decision to terminate its Small and Large Commercial and Industrial Retrofit Programs in 1994, in the context of Vermont regulatory requirements.
Vermont PSB	Docket No. 6018, February 1998	Vermont Department of Public Service	Testimony addressing cost recovery and lost revenue adjustments for CVPS's Small and Large C&I Retrofit Programs, and violations of agreements made in Dockets 5270 CV-1 & 3 and 5686 and in Dockets 5828 and 5835.
Vermont PSB	Docket No. 6107,	Vermont	Critique of GMP's performance in delivery

	September 1998	Department of Public Service	energy efficiency programs and appropriate cost recovery and lost revenue adjustments.
Vermont PSB	Docket No. 6120, October 1998	Vermont Department of Public Service	Review and critique of CVPS's DSM plans.
Vermont PSB	Docket No. 5980, May 1999	Vermont Department of Public Service	Phase 2: Present and defend modifications to the EEU efficiency plans.
Vermont PSB	Docket No. 6860, December 2003	Vermont Electric Power Company	Presentation and defense of Efficiency component of Vermont Electric Company's (VELCO) Transmission Integrated Resource Plan to assess the ability of efficiency to avoid or defer transmission upgrades.
Vermont Legislature	House Commerce Committee hearings on S. 52, April 2005	Efficiency Vermont	Testimony on aspects of s. 52, including the adoption of a VT renewable portfolio standard, inclusion of combined heat and power as eligible for funding under VT statewide electric energy efficiency programs, and mechanisms to allow large electric users to "opt-out" of energy efficiency utility funding surcharges.
Virginia SCC	Case No. PUE-2007-00066, November 2007	Southern Environmental Law Center	Testimony on the need for a new coal-fired power plant proposed by Dominion Virginia Power. Addressed the achievable potential for electric efficiency in Dominion's Virginia territory as an alternative to new coal-fired supply, and the associated costs and benefits of efficiency initiatives.



CLIFFORD S. MCDONALD, SENIOR CONSULTANT

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PROFESSIONAL EXPERIENCE

Optimal Energy, Hinesburg, Vermont. *Analyst*, 2006-2007; *Senior Analyst*, 2009-2011; *Consultant*, 2012-19; *Senior Consultant*, 2019-present.

Mr. McDonald provides project management services, DSM policy guidance, performs and reviews analyses, contributes to technology and policy white papers, performs program impact and process evaluations, provides testimony, and creates guidance documents. His project work includes developing and submitting testimony, supporting the design and implementation of statewide and utility specific energy efficiency programs for both the residential and commercial sector, and developing and critiquing analyses examining the potential for energy savings for specific programs and technologies. Mr. McDonald works largely in commercial and industrial sector electric and gas efficiency, but his expertise and project work expands to encompass the residential sector, electrification, utility ratemaking, demand response, clean energy, and biofuels.

Viridian Energy and Environmental, New York, New York. *Energy Analyst*, 2008–09.

At Viridian, Mr. McDonald used DOE2 to create energy models to analyze the energy use in existing and new construction buildings. He developed specific recommendations on the implementation of energy efficiency measures. He also worked with architects and developers to get LEED certification on new construction projects and building renovations.

University of Pennsylvania Medical Center, Philadelphia, Pennsylvania. *Medical Physics Researcher*, Summers 2004 and 2005, April-August 2008.

As a medical physics researcher, Mr. McDonald used computer simulations and Monte Carlo algorithms to support the development of new, state-of-the-art proton therapy for cancer treatment. He also developed recommendations on materials and dimensions to be used in multi-leaf collimator as well as created micro-dosimetry simulations to investigate neutron doses at a molecular level.

EDUCATION

Middlebury College, Middlebury, Vermont
Bachelor of Science, Physics, 2006

REPRESENTATIVE PROJECT EXPERIENCE

New York State Energy Research and Development Authority, Potential Study, 2019

Mr. McDonald led the effort to estimate the ten-year potential for energy efficiency in New York State in the Commercial Sector for electricity, natural gas, fuel oil, and propane. This analysis was built around significant primary baseline data. It also included an investigation of reduction potential for gas peak demand reduction, as well as beneficial electrification through emerging heat pump technology.

New Hampshire Office of Consumer Affairs, 2020

Mr. McDonald provides ongoing guidance and support to the New Hampshire Office of Consumer Affairs as the state reexamines its DSM policy framework. As part of the process the state is considering switching to amortization cost recovery model, and Mr. McDonald supported this process by looking at amortization in other jurisdictions and creating models of revenue requirements in order to help make the case for amortization. Other activities include reviewing the TRM updates and looking at the upcoming 3-year plan to ensure aggressive and cost-efficient electric and gas savings targets.

Orange and Rockland Support, 2015-2020

Mr. McDonald provides ongoing analysis, policy, and program support to Orange & Rockland Utilities in New York State. Specific tasks include custom project analysis and cost-effectiveness screening, program design and planning, efficiency and clean energy forecasting, and support on filing to the department of public service.

New Orleans Energy Efficiency Market Potential Study, 2018

Mr. McDonald led the project team for a demand-side management potential study for the New Orleans City Council to inform the 2018 Triennial Integrated Resource Plan (IRP) by Entergy New Orleans (ENO). The potential study was used to help power procurement planning, as well as to assess the most viable paths to achieving ENO's energy savings goals as set by the City Council.

Virginia Energy Efficiency Resource Standard Analysis and White Paper, 2019

Mr. McDonald led the development of an analysis and policy brief making the case for an energy efficiency resource standard in the state, and estimating its impacts on electric bills, electric rates, and GHG emissions.

Enbridge Gas Distribution, Evaluation Audit, 2013-2015

Mr. McDonald led the commercial sector EM&V audits of Enbridge Gas Systems program evaluations for program years 2013 and 2014, on behalf of Enbridge and the Ontario Energy Board. This involved reviewing the modeling processes and assumptions used to develop savings estimates for efficient boilers and consumptions, reviewing the data collected and used for all custom projects, and modifying the resulting savings as appropriate. The audits resulted in recommendations on ways to improve the programs, as well as realization rates for each program.

Ontario Energy Board, 2013-2014

Mr. McDonald worked on the evaluation audit for Enbridge's 2013 and 2014 gas energy efficiency programs. He specifically led the verification of the commercial and industrial custom programs. Activities included examining baselines, savings algorithms used, and program processes, as well as developing realization rates, and making recommendations for future evaluations.

Demand Response Potential Study, Michigan, 2016

Mr. McDonald worked on a team examining the potential for demand response activity in Michigan. In addition to other contributions, Mr. McDonald was the lead analyst and author for the section on potential contributions from time of use rates, critical peak pricing, and peak time rebates.

New Hampshire Public Utilities Commission, 2011

Mr. McDonald performed much of the research and writing involved in a comprehensive report on utility shareholder incentives. This included a wide look at the general types of incentives, a look at the overall impacts of performance incentives, as well as deep dive into the specific implementation details of specific US states. The report also discusses the pros and cons of each model, best practices, and provided detailed recommendations for New Hampshire.