

I. TABLE OF SERA ENERGY UTILITY PROJECT EXPERIENCE

SERA ENERGY UTILITY PROJECT EXPERIENCE		
Type of Project	Client	Project
Non-Energy Benefits (NEB), "Hard to Measure" effects	CPUC/CIEE	<ul style="list-style-type: none"> ▪ White Paper on NEB, NTG / Attribution, Measure Lifetimes ▪ NEB analysis of on premise laundry water conservation technology ▪ NEB analysis of commercial dishwasher program ▪ Integrated model for program evaluation and estimating broad range of program effects – economic, environmental, participant NEBs, utility effects ▪ NEB analysis for SF Lighting program ▪ NEBs for green campus program ▪ NEBs for water heater wrap and solar design programs ▪ NEBs work measuring progress toward sustainability goals including participant, agency, and societal, including substantial work on environmental, job creation/economic, and hardship / equity impacts. ▪ NEB analysis for boiler program ▪ NEB analysis of statewide SF new construction and remodeling programs (EnergyStar®) ▪ Workshops on NEBs, measurement methods, results, implications ▪ NEB analysis of energy smart, low energy, and solar homes programs ▪ NEB analysis of statewide MF ENERGY STAR® Homes program ▪ NEBs for low income weatherization program including participant, utility, & societal ▪ NEBs work measuring detailed analysis of economic multiplier and job creation impacts / differentials by state, program, over time ▪ NEBs work measuring progress toward sustainability goals including participant, agency, and societal, including substantial work on environmental, job creation/economic, and hardship / equity impacts. ▪ Measuring NEBs for new homes and remodeling programs for NYSERDA / EPA ▪ NEBs for commercial and institutional commissioning program ▪ Evaluation of NEBs for portfolio of 5 major residential programs – Home Performance with Energy Star®, Energy Star® Homes, Energy Star® appliances, Keep Cool, and Residential CEM program. ▪ Evaluation of NEBs for portfolio of several R&D programs, including wholesale renewables, retail renewables, DGCHP. ▪ Evaluation of NEBs for NYSERDA's portfolio of C&I and mid-market programs, including new construction commercial, Commercial institutional pilot program, technical assistance, smart energy choices, mid-market (HVAC, motors), and others. ▪ Task force analyzing approaches for NEB analysis for low income weatherization program ▪ Detailed analysis of emissions and valuations for assessing environmental and health NEBs for utilities generating using coal, gas, hydro, biomass, nuclear, other ▪ Detailed analysis of direct, indirect, and job creation NEBs for commercial and residential programs. ▪ NEBs of metering program, low income air conditioner program ▪ NEBs of lighting program ▪ NEBs of Green Campus program – 6 campuses ▪ NEBs of real time pricing program ▪ NEB in residential low energy homes ▪ NEB awareness / recognition for HP Commercial decisionmakers; includes owners, developers, engineers and architects for office and education bldg ▪ Comprehensive NEB research and modeling for new PUC low income
	South. Cal Gas	
	South. Cal Gas	
	CPUC	
	Xcel Energy	
	ASE	
	New Zealand	
	City of San Francisco	
	Xcel Energy	
	PG&E, Calif Utils	
	New Zealand	
	PG&E, Calif Utils	
	NREL, ECW, Xcel, NWPPC, BCHydro, other	
	Wisconsin DAS	
	Multiple clients	
Oakland		
ACEEE		
NW EE Alliance		
NYSERDA residential programs		
NYSERDA R&D / renewables		
NYSERDA C&I portfolio		
ORNL		
ACEEE, other		
ACEEE, other		
NGRID		
Rightlights		
Alliance to Save Energy		
Community Energy Coop		
New Zealand		

SERA ENERGY UTILITY PROJECT EXPERIENCE

Type of Project	Client	Project
	<p>Energy Ctr Wisc (ECW) PG&E, SCE, SCG, SDG&E</p> <p>Northeast Utilities PG&E, research, SCL PG&E</p> <p>PG&E Sea. City Light</p> <p>PG&E</p> <p>Research Paper Energy & Enviro. Management Calif Utility Alameda County</p>	<p>public purpose test; conducted all research on NEBs (35 categories) and programmed user-friendly model.</p> <ul style="list-style-type: none"> ▪ Estimating NEBs for low income residential weatherization and education program for benefit cost and regulatory use ▪ Innovative methods for valuing customer-side benefits of conservation programs (residential and non-residential) ▪ Non-energy benefits of 5 residential and multi-family programs; (3 perspectives -- utility, customer, and societal perspective); quantification of customer and environmental benefits; developed flexible program design model ▪ NEB estimates for low income bill payment assistance program ▪ NEB for commercial/industrial program; included customer-side benefits / efficiencies analysis ▪ Comprehensive non-energy benefits scoping, literature search, methodology development, estimation, quantification, model development, and scenario analysis for 2 dozen categories of benefits for low income program (customer, utility, and societal) ▪ Analysis of customer-side NEB for residential, commercial, and industrial ▪ Article on NEB participant-side benefits for Energy & Environmental Management (EEM) magazine. ▪ Detailed analysis of credit and bill payment issues ▪ Assessment of non-utility benefits for multi-resource audit program
<p>Environmental, Avoided Cost, Emissions, Valuation, Benefit/Cost</p>	<p>ACEEE Paper</p> <p>Marin County, CA San Francisco Reason Found.</p> <p>WA DO Ecol. OR PUC/PGE N/E/R/A BPA</p> <p>BPA</p> <p>WA DO Ecol. Delmarva PG&E BPA BPA BPA DO Energy</p> <p>DO Energy</p>	<ul style="list-style-type: none"> ▪ Detailed research to develop multipliers and relationships to estimate values from environmental / emissions and economic multiplier impacts from DSM programs; research on differences by program type, territory ▪ Modeling environmental impacts and carbon footprint reductions from integrated programs in energy, water, and other. ▪ Economic development multipliers from DSM programs & codes/standards ▪ Detailed analysis of alternative market-based strategies for reducing emissions in Houston/Galveston area ▪ Power related environmental and emissions effects ▪ Witness for marginal cost pricing for T&D & marginal cost studies for filings ▪ White paper on electric system reliability ▪ Estimated and valued health and damage effects from BPA power plant emissions ▪ Developed weighting factors for environmental effects from new generation options for power procurement process ▪ Valuing power-related environmental externalities, power plant emissions ▪ Least cost / integrated planning and avoided / environmental cost work ▪ Value of environmental benefits of variety of energy conservation programs ▪ EIS (econ. analysis) for residential weatherization program ▪ EIS (econ. analysis) for institutional buildings weatherization program ▪ Evaluation of costs and benefits for T&D upgrades ▪ C/B analysis for coal plant operation ▪ Input/output model analysis of impacts of national appliance efficiency standards ▪ Analysis of potential for reprocessing nuclear materials
<p>DSM Program Evaluation, Process and Impact, Potential Studies, Integrated Planning</p>	<p>Marin County, CA Xcel Energy Alliance to Save Energy PG&E, ACEEE paper</p>	<ul style="list-style-type: none"> ▪ Evaluation of Energy efficiency and other programs to reduce carbon footprint ▪ Evaluation of Residential Lighting program ▪ Evaluation of 6-campus program, including process, impact NEB, and NTG analysis ▪ Comparison of impacts from outreach / education programs from various utilities / benchmarking, "Best practices"

SERA ENERGY UTILITY PROJECT EXPERIENCE

Type of Project	Client	Project
	MEEA BCHydro Xcel Energy PG&E NYSERDA NYSERDA CBEE / PG&E CBEE / SCE NYSERDA Community Energy Coop NU NYSERDA PG&E Energy Center of Wisconsin CBEE/SCE CBEE/PG&E Seattle City Light (SCL) ACEEE paper BPA Puget Power PG&E PG&E Sea. City Light Sea. City Light BPA BPA Puget Power PGE BPA BPA BPA	<ul style="list-style-type: none"> ▪ Conservation market potential project ▪ Conservation technical and economic potential study ▪ Evaluation of C&I boiler program ▪ Evaluation of MF and SF net-to-gross and attribution, interviews for process evaluation, and detailed NEB evaluation. ▪ Evaluation of portfolio of MT and RA/EE programs (all sectors); including market characterization, assessment, attribution, self-efficacy, pricing analysis, and NEBs. Included detailed evaluation and causality / attribution work on ENERGY STAR® products and lighting; ENERGY STAR® new homes, homes remodel, end-use renewables, low income, and other programs. ▪ Assessment of attribution, NTG, and indicators used for residential, commercial, and R&D programs nationwide to assess techniques and leverage results for evaluation / attribution work. ▪ Process evaluation of residential standard performance contract (SPC) pgm. ▪ Process evaluation of non-res standard performance contract (SPC) pgm. ▪ Attribution / causality evaluation of non-res SPC program ▪ Evaluation of Real Time Pricing program including Non-energy benefits – Energy Smart Pricing Plan ▪ Process evaluation for low income residential weatherization program ▪ Evaluation of self-efficacy / analysis of participation decisions and conservation impacts from outreach / education and R&D programs ▪ Developing appropriate evaluation methods for MT programs ▪ Process interviews and assessment of integration of High Performance design into offices & schools ▪ Process and impact evaluation of Non-Residential SPC program ▪ Process and impact evaluation of Residential SPC program ▪ Process, NEB, and impact evaluation of the ORA(Operations and Resource Assessment) Program (C/I) ▪ Detailed assessment of evaluations of conservation education studies / estimation of impacts of self-efficacy & community-based social marketing ▪ Energy Smart Design Assistance Program (multiple years) ▪ Low Income Weatherization program ▪ Venture Partners Program Evaluation (low income weatherization) ▪ Reach Program Evaluation (low income program) ▪ Air Compressor Efficiency Program Evaluation ▪ Remote Metering Pilot Evaluation ▪ First Visit's on Us program ▪ Conservation Transfers Program ▪ Commercial Lighting Program ▪ C/I Lighting programs ▪ Residential Weatherization Program (several years) ▪ Customer Service Efficiency Improvements Program ▪ Energy Smart Optional Services Program
Market Barriers, Market Transformation, Market Characterization, "Best Practices", Performance Contracting, Tracking	So. Cal Gas So. Cal Gas NYSERDA Xcel Energy NYSERDA NYSERDA PG&E	<ul style="list-style-type: none"> ▪ Market assessment for commercial / industrial on-premise laundry water recycling / energy efficiency technology ▪ Market assessment for commercial / industrial dishwashing technology ▪ Exhaustive market progress tracking and net to gross analysis for portfolio of residential and multifamily programs; non-residential; and R&D/renewables programs ▪ Evaluation of CFLs – results, lit review, best practices ▪ Incremental cost analysis for broad array of EE measures ▪ Evaluation / attribution assessment of Commercial / Industrial performance Program (CIPP) / SPC program. ▪ Evaluation of market transformation/ outreach /education programs; tracking, cost-effectiveness, and evaluation methods

SERA ENERGY UTILITY PROJECT EXPERIENCE

Type of Project	Client	Project
	PG&E PG&E SCE NYSERDA PG&E/CBEE SCE/CBEE PG&E SCE/CBEE TAC Seattle City Light (SCL) SCL DOE BPA	<ul style="list-style-type: none"> ▪ New tracking and evaluation methods for market transformation programs ▪ Incremental cost analysis for EE measures / residential ▪ Tracking of water heater sales / market transformation ▪ Market characterization for ENERGY STAR® Products, ENERGY STAR® homes, and retrofit programs. ▪ Evaluation of residential new construction program; program effects; builder, dealer manufacturer interviews. ▪ Evaluation of Res SPC / contractor program, lead for detailed utility, CBEE stakeholder & EESP interviews/analysis, and database analysis; program tracking scoping/design/analysis/testing ▪ Tracking and market shares projections for EE air conditioning (res&com'l) ▪ Evaluation of Non Res. SPC, lead for detailed utility, CBEE stakeholder & EESP interviews/analysis, and database analysis ▪ Developed evaluation matrix for res./non res. market transformation ▪ Eval of C/I Air Compressor Pgm (Market barriers, willingness to pay, satisf) large customer interview on new programs/services ▪ Eval of C/I Remote Metering Pgm (Market barriers, willingness to pay, satisf) large customer interview on new metering programs/services ▪ Actors, Market Barriers to acceptance of efficient ballasts ▪ Actors, Barriers, Renovation in C/I sector
Persistence/Measure Life	CPUC/CIEE CEC CPUC/SCE CPUC NU PG&E BPA SCE BPA CCIG Puget Power	<ul style="list-style-type: none"> ▪ White Paper on Measure Lifetimes, NEBs, NTG / Attribution ▪ Advice / support on regulatory processes for measure retention studies ▪ Review of measure retention studies and recommendations for new ex ante values for comprehensive list of residential and commercial measures; update EULs for DEER database, identify measures with insufficient EUL analyses; "Best Practices" in EUL studies ▪ Detailed analysis and review of 80 retention studies and best practices to validate earnings claims; conducted 4 residential and comm'l retention studies ▪ Residential measure persistence estimates for residential weatherization ▪ Residential New Construction Persistence Study ▪ Measure Life Study I (Comm'l) ▪ Persistence of Commercial Sector Measures ▪ Measure Life Study II (Comm'l) ▪ Measure Persistence Study ▪ Residential Measure Retention Study
Survey and Market Research	Alliance to Save Energy MEEA NYSERDA NYSERDA NYSERDA NYSERDA NYSERDA NYSERDA NYSERDA ECWisconsin Puget Sound En. Sea. City Light	<ul style="list-style-type: none"> ▪ Detailed surveys of residence halls students on program awareness, adoption, program attribution ▪ Detailed residential saturation study for conservation potential study ▪ Large-scale residential mail survey / phone follow-up on awareness, purchasing, attitudes, etc. for evaluation of portfolio of residential programs – including ENERGY STAR® products, ENERGY STAR® Homes, & others ▪ NEB surveys for renewables, residential, and commercial programs (including new construction) ▪ In-depth telephone surveys and analysis on renewables ▪ Phone surveys with ENERGY STAR® appliance and lighting purchasers for program evaluation ▪ Phone survey / analysis with ENERGY STAR® new homes purchasers and remodelers ▪ Phone survey / analysis with builders and contractors for ENERGY STAR® new and retrofit homes program evaluations ▪ On-site mystery shopping and interviews at appliance retailers ▪ Detailed interviews with appliance / lighting retailers and manufacturers ▪ Indepth and telephone interviews with HP commercial decisionmakers ▪ Load research sampling design for regulatory work – gas and electric ▪ On-site and phone surveys with large C/I customers on valuation of

SERA ENERGY UTILITY PROJECT EXPERIENCE

Type of Project	Client	Project
	NU PG&E PG&E PG&E SCE PG&E PG&E Sea.City Light PG&E PG&E PG&E PG&E Sierra Pacific PG&E PG&E Sierra Pacific Sierra Pacific Puget Power PG&E PSI WWP PG&E BPA BPA BPA BPA WWP BC Hydro	program impacts, attitudes, adoption <ul style="list-style-type: none"> ▪ Survey of participants/non-participants for impact, process, NEB evaluation ▪ On-site, phone, and panel survey for residential retention ▪ Conducted “willingness to pay” services for non-energy benefits for program participants ▪ Phone surveys with impact and control groups for residential builders ▪ Phone surveys with ESCOs, contractors, and stakeholders on program design, impacts, needs, administration / SPC program ▪ Phone surveys with manufacturers and dealers for efficient equipment ▪ Designed and analyzed ordered logit surveys to assess A/C market shares ▪ Detailed surveys of large C/I customers on attitudes, adoption of technologies ▪ Surveys of residential contractors and stakeholders on installation practices, decisionmaking, customer issues, and program “needs” ▪ Market research for conservation potential in multifam sector ▪ Survey of low income customers (multiple projects) ▪ Survey of commercial & industrial customers (multiple projects) ▪ Factor and discriminant analysis of C/I sector survey ▪ Residential Appliance Saturation Survey ▪ Logit hot deck imputation of missing data for residential survey ▪ Residential Wants and Needs Survey ▪ C/I Wants and Needs survey ▪ Residential saturation survey (mail and phone) ▪ Residential survey validation study ▪ C/I on-site survey analysis ▪ C/I saturation survey ▪ C/I validation survey -- on-site ▪ Program Evaluation surveys for Energy Smart Design ▪ Assistance, Residential Weatherization participants, First Visit's On Us, Conservation transfers ▪ Measure Life Study I; Phone, on-site surveys of C/I buildings ▪ Measure Life Study II; on-site surveys of C/I buildings and program participant ▪ Integrated Conservation Program Plan ▪ Technical Conservation Potential Assessment
Forecasting, Modeling, Modeling Tools	CPUC PG&E PG&E PG&E PG&E PGE PGE, N/E/R/A EPRI Publication Puget Sound En Puget Sound En PGE Sierra Pacific PG&E PG&E PG&E PG&E PG&E	<ul style="list-style-type: none"> ▪ Integrated model for program evaluation and estimating broad range of program effects – economic, environmental, participant NEBs, utility effects ▪ Logit analysis to estimate A/C market shares & impacts of program interventions, and adoption ▪ Imputation of missing data for 4 historical surveys ▪ Decomposition of efficiency components of price differentials for windows and residential equipment tracking ▪ Conditional demand model ▪ Demand forecasts and elasticity analysis ▪ Price elasticity of demand ▪ Estimating industrial demand models / elasticities for energy ▪ Price elasticities for time of day pricing for electricity ▪ Demand forecasting for gas ▪ Demand forecasts for electricity – multiple years ▪ Cost, revenue requirements, rate study work ▪ Factor and discriminant analysis ▪ Logit analysis of energy use differences ▪ Account matching ▪ Analysis of credit problems ▪ Analysis of revenue neutral rate designs ▪ Conservation potential in multifamily sector

SERA ENERGY UTILITY PROJECT EXPERIENCE

Type of Project	Client	Project
	BPA PG&E Non-profit	<ul style="list-style-type: none"> ▪ Survival analysis and age distribution of building equipment ▪ Logit hot deck imputation methods to reduce bias in survey responses ▪ Assessed operating costs between fossil and nuclear plants
Rates, Financial, Incentives Analysis	PGE PGE N/E/R/A PG&E PG&E	<ul style="list-style-type: none"> ▪ Rate design, revenue requirements, avoided cost filings ▪ Price elasticity of demand work for rate filings ▪ Demand elasticities estimation / research ▪ Analysis of alternative revenue neutral rate designs ▪ Projections for sectoral rate analysis, incentives