

PHILADELPHIA WATER DEPARTMENT  
STATEMENT NO. 8

BEFORE THE  
PHILADELPHIA WATER, SEWER AND STORM WATER RATE BOARD

In the Matter of the Philadelphia Water Department's Proposed Change in Water, Wastewater and Stormwater Rates and Related Charges	Fiscal Years 2022 - 2023
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**Direct Testimony**

**of**

**H. Gil Peach, Mark Thompson, and Yvonne Whitelaw**

**on behalf of**

**The Philadelphia Water Department**

Dated: January 2021

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**I. INTRODUCTION AND PURPOSE OF TESTIMONY**

**Q1. PLEASE STATE YOUR NAME AND TITLE.**

A1. My name is Hugh Gilbert (Gil) Peach. I am President of H. Gil Peach & Associates LLC. My office is at 16232 Oakhills Drive, Beaverton, OR 97006. Testifying with me are Mark Thompson and Yvonne Whitelaw who are collaborating with my office for purposes of this testimony.

**Q2. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?**

A2. Our testimony is submitted on behalf of the Philadelphia Water Department (“PWD” or the “Department”).

**Q3. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK HISTORY.**

A3. Our respective backgrounds and experience are summarized below:

Dr. Peach

I received the PhD in Sociology from New York University with specialties in study of economic sociology, social control, and social statistics. I received a M.A. in Economics from the New School for Social Research. I received a M.A. and B.S. in Sociology from Michigan State University. I also completed the equivalent of a minor in physics from Michigan Technological University and one year of Metropolitan Urban Service Training from Union Theological Seminary. My resume of experience is attached and marked as Schedule HGP-1.

1       Mr. Thompson

2       I hold a Master of Science degree in Agricultural and Natural Resource Economics from  
3       Oregon State University and a Bachelor of Science degree in Agricultural Economics  
4       from Oklahoma State University. I have over thirty years experience as an applied  
5       economist in the utility industry, housing, economic development and railroads. My  
6       resume of experience is attached and marked as Schedule MT-1.

7  
8       Ms. Whitelaw

9       I hold a Bachelor of Arts degree in Political Science and a Master of Arts degree in  
10      Education both from San Francisco State University. During the course of my career, I  
11      have worked in several capacities including adjunct professor, energy specialist and  
12      technical consultant in utility regulatory matters. My resume of experience is attached  
13      and marked as Schedule YW-1.

14  
15  
16   **Q4.   WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

17   A4.   The purpose of our testimony is to demonstrate the economic benefits associated with a  
18       typical year of construction and related activity for the Department's Capital  
19       Improvement Program ("CIP"). The above economic benefits are presented for the City  
20       of Philadelphia ("City"), the surrounding counties (Bucks, Chester, Delaware and  
21       Montgomery counties) and the Commonwealth of Pennsylvania ("Commonwealth" or  
22       "Pennsylvania").

1 **Q5. PLEASE IDENTIFY THE SCHEDULES THAT ACCOMPANY YOUR DIRECT**  
2 **TESTIMONY.**

3 A5. The following schedule accompanies my direct testimony:

4	Schedule HGP-1	Resume of H. Gil Peach
5	Schedule HGP-2	Summary of Results
6	Schedule MT-1	Resume of Mark Thompson
7	Schedule YJW-1	Resume of Yvonne J. Whitelaw

8  
9 **II. SUMMARY OF CONCLUSIONS**

10  
11 **Q6. PLEASE SUMMARIZE YOUR KEY CONCLUSIONS.**

12 A6. Based on the data and independent analysis presented in our report, we have reached the  
13 following conclusions:

14  
15 The economic benefits associated with planned capital expenditures for the Department's  
16 Capital Improvement Program, in a typical year (FY 2023), will generate wide-ranging  
17 substantial economic impacts in Philadelphia, the surrounding counties and the  
18 Commonwealth as a whole. Stated differently, the proposed PWD expenditures for  
19 capital projects as modeled in our analysis ("Capital Projects"), represent a substantial  
20 injection of investment dollars into the local economy that will promote economic  
21 activity, support jobs and generate tax revenues, thus providing important economic  
22 stimulus in Philadelphia and the region to counter-balance some of the negative impacts  
23 of the pandemic.

24  
25 Please see Schedule HGP-2 for a summary of results from the IMPLAN analysis.

**Q7. PLEASE EXPLAIN HOW YOUR CONCLUSIONS AND REPORT RELATE TO THE PENDING RATE CASE.**

A7. The proposed rates will support the Capital Improvement Program in FY 2022 and FY 2023 (the “Rate Period”). Capital investment throughout the Rate Period is required to address needed replacement of aging infrastructure, meeting regulatory requirements and maintaining existing levels of service, as stated in PWD Statements 3 and 4. PWD Statement 2 also emphasizes that, without the proposed rate increase, the Department’s revenues are insufficient to support the CIP in FY 2022 and 2023. Our conclusions and report indicate that, in addition to addressing the critical need to replace aging infrastructure, the capital improvement program can produce substantial economic benefits and serve as a lever to drive economic recovery.

**Q8. ARE YOU RECOMMENDING THAT THE PROPOSED RATE INCREASE BE APPROVED SOLELY BASED ON THE ECONOMIC BENEFITS ASSOCIATED WITH CAPITAL PROJECTS IN A TYPICAL FISCAL YEAR?**

A8. No. My testimony only points out that there are substantial, wide-ranging economic impacts associated with annual spending for the Department’s Capital Improvement Program that will benefit of the local economy with positive direct, indirect and induced effects on the regional and state-wide economies as well. These benefits are in addition to those operational benefits related to PWD investments to replace aging infrastructure to maintain current levels of utility services. See discussion in PWD Statements 3 and 4.

**III. ECONOMIC IMPACT ANALYSIS**

**Q9. DID YOU PERFORM AN ANALYSIS TO QUANTIFY THE ECONOMIC IMPACTS ASSOCIATED WITH THE INVESTMENT RELATED TO THE CAPITAL PROJECTS?**

A9. Yes. In order to evaluate the economic impacts associated with the Department's planned capital investments, I modeled the effects of the Capital Projects on the City, which is the Department's service territory, on the regional economy and on the Pennsylvania economy overall using a macroeconomic input/output ("I/O") model developed and maintained by IMPLAN Group LLC ("IMPLAN"). IMPLAN is a widely recognized I/O modeling platform used by various government agencies, universities, and public and private sector organizations for assessing the economic impacts of project decisions across numerous industries.

**The IMPLAN Model**

**Q10. COULD YOU PLEASE PROVIDE A BRIEF DESCRIPTION OF IMPLAN?**

A10. IMPLAN models the impact of investments and spending programs on the economies within which the investments and spending take place. More specifically, IMPLAN analyzes how dollars injected into one sector of the economy are subsequently spent and re-spent in sectors, generating what is known as economic multiplier effects that demonstrate how spending and investments flow within an economy. Using actual historical spending patterns of households, businesses and government agencies, IMPLAN is able to model an economic "event" (e.g., an expenditure leading to the production of goods or services) to analyze how and where the dollars associated with that event will be spent. IMPLAN estimates the economic impact of the event for the

1 specified regional economy in terms of both economic output and employment supported  
2 by the economic output.  
3

4 **Q11. DESCRIBE THE DATA USED FOR YOUR ECONOMIC ANALYSIS.**

5 A11. For the analysis, we have used the most recent data available from IMPLAN, which is  
6 from 2019 and 2018. Since economic data are available at both the county level and state  
7 level, for purposes of this analysis, we show impacts of PWD infrastructure investment  
8 which primarily generate economic benefits within the City, but also generate impacts for  
9 the region (Montgomery, Bucks, Chester and Delaware counties), as well as for the  
10 Commonwealth.<sup>1</sup>  
11

12 **Q12. DOES IMPLAN ASSUME THAT ALL OF THE DOLLARS EXPENDED**  
13 **RELATED TO A SPECIFIC ECONOMIC EVENT OCCUR WITHIN THE**  
14 **REGION BEING EVALUATED?**

15 A12. No. The model recognizes that not all dollars associated with a project will be re-spent in  
16 the region that is being studied as a result of what is termed “leakage.” The term leakage  
17 refers to the fact that a portion of these dollars will be either saved by households and  
18 businesses or spent on goods and services produced outside of the study region. In  
19 subsequent rounds of spending, income generated will also be taxed at the federal level,  
20 resulting in another source of leakage. In essence, the model assumes a portion of the  
21 dollars injected into the economy will not contribute to overall economic activity in the  
22 region being evaluated as a result of these leakages.  
23  
24

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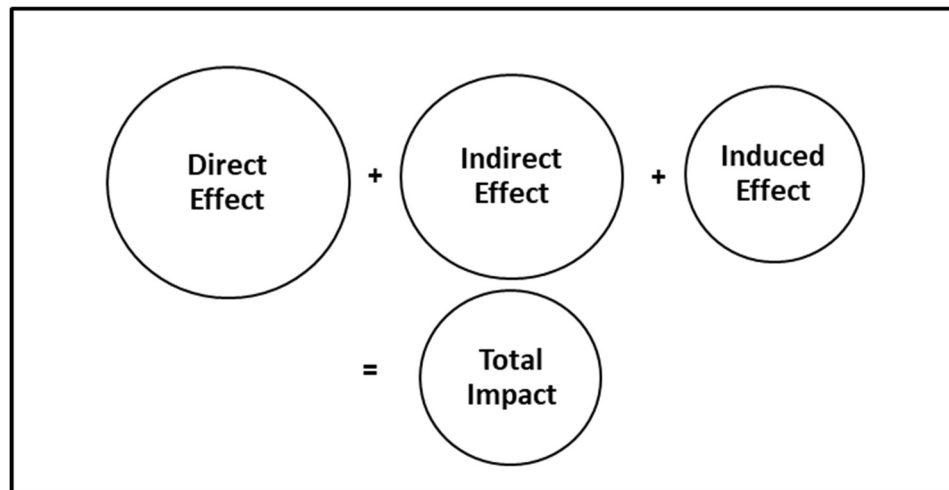
25 <sup>1</sup> IMPLAN relies on historic data from public sources that is reported on a trailing basis. The 2019 data was released on November 30, 2020.



**Q13. WHAT TYPES OF ECONOMIC IMPACTS DOES IMPLAN CAPTURE?**

A13. For a particular event, IMPLAN categorizes the economic effects of dollars injected into an economy as either direct effects, indirect effects, or induced effects. The direct effects result from an economic event being modeled and will then also lead to indirect and induced effects in the local economy being studied. These economic impacts in IMPLAN are summarized in Figure 1 below.

**Figure 1**  
**Overview of Economic Impacts Captured in IMPLAN**



**Direct Effects**

**Q14. WHAT ECONOMIC BENEFITS ARE CATEGORIZED AS “DIRECT EFFECTS” IN THE IMPLAN ANALYSIS?**

A14. Direct effects are the economic impacts resulting from dollars spent directly in the local economy as a result of an economic event (e.g., a construction project). The direct effects represent the dollar value of production changes or expenditures made by producers and

1 consumers as a result of a financial stimulus. In this case, the direct effects refer to the  
2 economic activity generated from the Department's investments in goods and services  
3 within the study region related to the Capital Projects.

4  
5 **Indirect Effects**

6 **Q15. WHAT ECONOMIC BENEFITS ARE CATEGORIZED AS "INDIRECT**  
7 **EFFECTS" IN THE IMPLAN ANALYSIS?**

8 A15. The indirect effects are defined as the supply chain, inter-industry or business-to-business  
9 impacts resulting from the direct effects of an economic event. In other words, beyond  
10 the direct effect of dollars being injected into an economy, there is also an indirect  
11 economic effect associated with the incremental economic activity resulting from  
12 subsequent spending by businesses in the local economy to produce additional goods and  
13 services to meet the demand created by the direct spending. In this case, the indirect  
14 impacts are the economic effects resulting from subsequent rounds of spending by the  
15 businesses within the regional economy from whom goods or services are purchased by  
16 the businesses that received the direct effects associated with the initial dollars invested  
17 by the Department associated with the Capital Projects.

18  
19 **Induced Effect**

20 **Q16. WHAT ECONOMIC BENEFITS ARE CATEGORIZED AS "INDUCED**  
21 **EFFECTS" IN THE IMPLAN ANALYSIS?**

22 A16. The induced effects, which are also referred to as income effects, are defined as the  
23 economic impacts of household spending resulting from either the direct or indirect  
24 impacts in the economy in the study region being evaluated. In other words, the induced  
25

effects relate to the spending of wages earned by the individuals holding jobs supported by the direct and indirect economic effects resulting from an economic event.

**Modeling the Department's Capital Projects**

**Q17. PLEASE DESCRIBE YOUR APPROACH TO MODELING THE ECONOMIC IMPACT OF THE DEPARTMENT'S PROPOSED CAPITAL PROJECTS.**

A17. The Department's projected expenditures for the Capital Projects is the primary input for the economic impact analysis. For modeling, the Capital Projects and associated spending are organized into primarily four categories, by type of activity, as discussed in the Department's filing. Three categories of spend are modeled as a separate economic event. As explained below, Engineering, Administration and Material Support expenditures are largely excluded from the analysis. The three key categories of the capital projects for purposes of this analysis are summarized in the table below:

<b>PWD Capital Improvement Program Categories</b>
<ul style="list-style-type: none"><li>• Improvements to Water and Wastewater Treatment Facilities;</li><li>• Wastewater Collector System/CSO/Flood Relief; and</li><li>• Water Conveyance System (New and Reconstruction).</li></ul>

This grouping of projects by major category reasonably balances the need to model the impacts of hundreds of individual projects and treating projects with similar characteristics as a single aggregated capital expenditure. The above categories of Capital Projects and associated percentages of spending are shown in Schedule HGP-2 (Table 2).

**Q18. DID YOU MAKE ANY ADJUSTMENTS TO THE DEPARTMENT'S PROJECTED EXPENDITURES ASSOCIATED WITH THE CAPITAL PROJECTS?**

A18. Yes. After consultation with PWD, we determined that the CIP budget for FY 2023 was representative of a typical year in the six-year plan. In other words, annual CIP expenditures are typically \$600 million or \$1.2 billion over a normal two year period. Additional adjustments were also made (in consultation with PWD) to reflect the removal of land acquisition and other items (i.e., engineering, administration and material support) that are more related to ongoing operations than infrastructure construction. This resulted in our definition of a typical year of PWD investment of \$571 million spread between three budget categories.

**Q19. AFTER EXCLUDING CERTAIN COSTS ASSOCIATED WITH CAPITAL PROJECTS, AS DESCRIBED ABOVE, ARE THERE SUBSTANTIAL ECONOMIC BENEFITS TO BE REALIZED?**

A19. Yes. A summary of the results of the economic impact analysis is depicted in the table below. The data reflects the projected impacts in each of the local/regional/state areas shown.

Table 1						
Estimated Economic Impact of Annual CIP Investments (dollars in millions)						
	Jobs Supported	Labor Income	Gross Regional Product	Economic Output	Local Taxes	State Taxes
Philadelphia	4,788	\$369	\$465.2	\$867.6	\$14.3	\$12.1
Collar PA Counties*	189	\$11.8	\$20.0	\$33.6	\$0.7	\$0.9
Other PA Counties	32	\$2.1	\$4.2	\$8.0	\$0.1	\$0.2
Total Pennsylvania	5,009	\$382.9	\$489.4	\$909.2	\$15.1	\$13.2
*Bucks, Chester, Delaware & Montgomery counties						

1  
2 **Q20. ARE THE BUDGETED AMOUNTS REFLECTED IN THE ECONOMIC IMPACT**  
3 **ANALYSIS THE SAME AS THE DOLLARS THAT THE DEPARTMENT HAS**  
4 **REFLECTED IN ITS COST OF SERVICE ANALYSIS?**

5 A20. No. Economic modeling is distinct from ratemaking. IMPLAN analyzes the economic  
6 effects from spending on a project and related benefits whether or not a given project is  
7 completed and in service in a given test year. For example, dollars may be spent on a  
8 capital project that may take a number of months to complete before it is placed into  
9 service, but the dollars that are spent will have economic impacts regardless of whether  
10 the project is completed and in-service. Therefore, expenditures for capital projects in a  
11 given year (whether associated with newly let projects or those with carry-over spending  
12 from prior years) are appropriately included in the economic impact analysis.  
13

14 **Q21. WILL BUDGETED EXPENDITURES FOR THE DEPARTMENT'S CAPITAL**  
15 **IMPROVEMENT PROGRAM FOR FISCAL YEARS 2022 THROUGH 2027**  
16 **PROVIDE FOR CONTINUED INVESTMENT IN THE COMING YEARS?**

17 A21. Yes, it is my understanding that the Department's proposed CIP for fiscal years 2022  
18 through fiscal year 2027 provides for [a level of main/sewer replacement, plant upgrades  
19 and other improvements] for many years into the future in order to enhance the safety and  
20 reliability of the distribution system for its customers.  
21

22 **Q22. WOULD A SIMILAR LEVEL OF ECONOMIC BENEFITS RESULT FROM**  
23 **FUTURE ANNUAL INVESTMENTS ASSOCIATED WITH THE CIP?**

24 A22. Yes, assuming that the extent of the Department's capital spend in the future is similar to  
25 the investment spending evaluated for FY 2022 and FY 2023, then it would be expected

1 that a similar magnitude of economic benefits would result each year over the CIP and  
2 any future expenditures beyond that period.

3  
4 **IV. CONCLUSION**

5  
6 **Q23. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

7 A23. Yes.

## **H. Gil Peach, PhD**

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H. Gil Peach works in the areas of rates and regulatory affairs, economic and policy studies, DSM program planning, program evaluation, energy and water programs, social programs such as low-income payment assistance programs, improving efficiency and effectiveness of services (including organizational analysis and management and staffing studies), decoupling and planning studies, program design and social studies of science and technology. His current interests are in these areas and in the areas of cost-effectiveness, strategic organizational improvement, energy sufficiency, and practical climate adaptation.

## **EDUCATION**

Doctor of Philosophy (PhD) Degree in Sociology (1985), New York University, New York, New York. Specializations in Social Statistics, Large-Scale Organizations/Society & Economy and Deviance and Social Control. Dissertation: *The Social Production of Applied Social Statistics*, a study of how organizational environments influence the construction of quantitative results when quantitative modeling and statistical results are developed in different organizations, including a large investor-owned electric utility, a government health agency, a small foundation, and a public advocacy organization.

Master of Arts Degree in Economics (1972), New School for Social Research, New York, New York with a focus on political economy and econometrics/statistics.

Master of Arts Degree in Sociology (1969) and Bachelor of Arts Degree in Sociology (1965), Michigan State University, East Lansing, Michigan

One Year of Metropolitan Urban Service Training, Union Theological Seminary, New York, New York (1969).

Undergraduate study in physics and mathematics, (1961-1964) Michigan Technological University, Houghton, Michigan.

## **EXPERIENCE OVERVIEW**

Dr. Peach has worked in rates and regulatory affairs, provided regulatory support and/or expert testimony in several jurisdictions both for commission hearings (Massachusetts, Vermont, Connecticut, Pennsylvania, Ohio, Kentucky, Utah, Oregon, Washington, Nova Scotia) and for federal district court (Oregon and Washington) primarily in the areas of programs, results

assessment (EM&V), measurement issues, low-income programs, and low-income rate design. He has also led decoupling examinations (Cascade Gas, Puget Sound Energy, Avista Energy), and followed CPUC case activity in California for a financial client focused on repayment to the California Water Department for Enron market manipulation. Gil has carried out management/organizational and/or policy studies for Los Angeles Department of Water & Power (the largest municipal electric utility in the US), Long Island Lighting, Boston Edison, the Philadelphia Gas Works (the largest municipal natural gas utility in the US) and PECO Energy and other utilities. He has served as a key planner for two of the largest community-based DSM programs in North America, the Hood River Conservation Project in Oregon, and the Espanola Power Savers Project in Ontario. In the early days of Demand Side Management, as a manager at a major multi-jurisdictional utility, Dr. Peach guided the development of the demand side of one of the first Integrated Resource Plans. He has led program portfolio development for many utility potential studies including Pacific Power, Vectren Indiana Electric, Vectren Indiana Gas, Indianapolis Power & Light, Citizens Energy, American Electric Power/Indiana, Duke Energy North Carolina, Duke Energy South Carolina, Duke Energy Indiana, Duke Energy Ohio-Kentucky, and Progress Energy. He has designed many individual energy efficiency programs and has also led over 200 energy program evaluations and other evaluations in the areas of health and human services. He has served on USDOE federal peer review panels, conducted evaluation for USDHHS, and has provided technical services for the Michigan, Massachusetts, Wisconsin, California, and New York Commissions and for the Nova Scotia Utilities and Review Board. Since the 1980's he has been a member of the Society for Social Studies of Science (4S) and is currently a member of the American Energy Services Professionals (AESP), the European Committee for an Energy Efficient Economy (ECEEE), the American Statistical Association (Past President of the Oregon Chapter), the Union of Concerned Scientists, the Long Now Foundation, the American Sociological Association, and the American Society of Adaptation Professionals (ASAP) where he served as co-chair of the professional ethics working group. In addition to studies in energy and evaluation, Dr. Peach has presented several papers in the area of social study of science and technology and written in the area of environment and natural resources, including climate change.

- **Manager/Principal Investigator:** Regulatory Support, Evaluation Research, Organizational & Management Studies to improve government and utility services, Process Evaluation, Behavioral program analysis, Survey Research, Socioeconomic Studies, Applied Statistics, Planning & Policy Studies, Strategic Policy Support, Adaptation Support.
- **Expert Services:** Program design, Evaluation design and Methods; Rate design. Seasoned Expert Witness Services on Measurement and Evaluation issues; Strategic Intelligence/Policy Development and Program Research; Due Diligence & Savings Verification Projects. Oversight of Auditors and Inspectors.
- **Academic Specialization:** Organizational Studies, Social Study of Science and Technology, Political Economics, Applied Social Statistics, Sociology of Economic Life, Sociology of Deviance and Social Control, Applied Economics.



- **Experience:** Forty years of experience in organizational and program research, inspection and verification, field studies, program development and evaluation work, and studies of science and technology, economic and policy studies.

## EXPERIENCE

Principal, *H. Gil Peach & Associates (HGPA)*. January 1988 to present. *HGPA provides regulatory support, program design, evaluation design, process, and impact evaluation services, planning and program development services, management and organizational studies, studies in environment, resources, and strategic practical climate adaptation. HGPA also provides policy studies, expert witness services, and support for consensus building/collaborative initiatives.*

Manager, Evaluation & Coordinator, Demand Side Management Planning, *Pacific Power & Light*. 1988 to April 1989. *Managed DSM evaluation, development of conservation supply curves, demand side of least-cost planning, development of portfolio of conservation programs.*

Manager, Research & Evaluation, *Pacific Power*. 1984 to 1988. *Managed evaluation research studies while maintaining consensus among industry, government, and public interest groups in a multi-year program of energy policy related social research.*

Research & Evaluation Coordinator, *Pacific Power*. 1983 to 1984. *Managed project evaluation for the Hood River Conservation Project, at the time the most ambitious community weatherization effort in the United States.*

Senior Analyst, Analyst, *Pacific Power*. 1980 to 1982. *Reviewed, designed, and coordinated survey research projects, load studies, statistical, and energy conservation studies; coordinated improvements in computer supported statistical analysis; developed staff capability in research methods. Responsible for direct day-to-day supervision of load research staff.*

Research Statistician/Computer Analyst, *Fund for the City of New York*. 1978 to 1980. *Conducted social research and statistical analysis for public sector management studies to improve efficiency and quality of service in hospital outpatient services, subways, and taxi regulation, social services, training, and employment programs. Pioneered the role of research planning and technical analytic support for joint projects of non-profit agencies which developed, for a time, as a major focus of the foundation.*

Marketing Consultant. 1975 to 1980. *Applied analytic problems, primarily in survey research. Principal clients: Pan Am, Citibank, Avon Products, American Market Research Bureau.*

Senior Quantitative Analyst, Program Research Analyst, *City of New York*. 1972 to 1978. *Evaluation research for Health Department; represented Director to funded university and hospital research teams. Various positions 1969 to 1972: Applied housing program research, urban renewal, training, budgeting, applied statistics.*

Senior Clerk - *New York Stock Exchange* - 1969. *Assisted on trading floor, developed statistical reports.*

## SELECTED PAPERS & PUBLICATIONS

- Peach, H. Gil, John Mitchell & Mark Thompson, “Moving Towards Energy Sufficiency”, presented at the Association of Energy Service Professionals Conference. Anaheim, California, February 2020. This paper combines climate imperatives with energy efficiency benefit-cost analysis for program planning using the doughnut economics approach developed by Kate Raworth and further focused by the Sarah Darby, Tina Fawcett for the European Committed for an Energy Efficiency Economy (ECEEE).
- Peach, H. Gil, “Normal Weather and Utility Costs,” Poster presented at the National Adaptation Forum. Madison, Wisconsin, April 2019.
- Peach, H. Gil, “Hidden in Plain Site, Problems in Pattern Recognition,” Presentation to E1, Efficiency Nova Scotia. Dartmouth, Nova Scotia, October 2017.
- Peach, H. Gil, “Perception of Time and Climate Warming,” Poster presented at the National Adaptation Forum. Saint Paul, Minnesota, May 2017.
- Peach, H. Gil, “Advances in Cost Effectiveness,” Bright Business Conference. Halifax, Nova Scotia, October 2013.
- Spector, Allison & H. Gil Peach, “All Natural: Straightforward ways to acknowledge the Continued Value of Natural Gas Conservation Programs,” ACEEE Efficiency as a Resource Conference. Nashville, Tennessee, September 2013.
- Peach, H. Gil & John Mitchell, “350/650/1050 – Implications of Global Warming for Demand-Side Management,” *Proceedings of the 2011 International Energy Program Evaluation Conference*. Boston, Massachusetts: International Energy Program Evaluation Conference (IEPEC), Aug. 2011.
- Peach, Hugh Gilbert, “Coal” and “Fossil Fuels,” sections of a freshman/sophomore year college textbook on energy, *Battleground: Science & Technology*, Sal Restivo and Peter H. Denton, eds. Westport, Connecticut & London: Greenwood Press, 2008.
- Peach, H. Gil, “Global Perspectives on Technology in History” and “Public Understanding of Technology,” essays in Sal Restivo, ed., *Science, Technology, and Society, an Encyclopedia*. Oxford, UK and New York, NY: Oxford University Press, 2005.
- Peach, H. Gil, et al., “Evaluator as Fool; Tricking the Evaluator into Confirming Phantom Savings as Real,” *Proceedings of the 2005 International Energy Program Evaluation Conference*. Brooklyn, New York: International Energy Program Evaluation Conference (IEPEC), Aug. 2005.
- Peach, H. Gil, Ryan N. Miller, Anne West, and Howard Reichmuth, “Cost Evaluation Issues in Energy and Water Assistance Programs,” Session on Cost Evaluation at the American Evaluation Association Meetings, Atlanta, GA, Nov. 2004.
- Peach, Hugh, Ryan Miller, and Howard Reichmuth., “Representations of Inequality in the Context of Free Trade and Globalization,” Joint Meetings of the Canadian Statistical

Association and American Statistical Association, Toronto, Ontario, Canada, Aug. 8-12, 2004.

Peach, H. Gil, "Globalization: What do we owe the Future?" National Low-Income Energy Conference/NLIEC 2000, Workshop on Globalization, Los Angeles, CA, June 2000

Peach, H. Gil, "Improving Customer Service--The Customer Perspective." Paper presented to Workshop on Maintaining Quality Customer Service during the Transition to Competition, NLIEC 1999 Conference, Pittsburgh, PA, June 1999. Based on evaluation results, this paper contrasts the perspectives and pressures on utilities with the perspectives and needs of customers during organizational and economic transition.

Peach, H. Gil, "Implications of Income Shifts & Globalization for Program Evaluation in the United States." Beaverton, OR: H. Gil Peach and Associates, Monograph 99-1-1, 1999. Preliminary theoretical developments of this monograph were presented in Session 227, "Global Thinking in Evaluation," at the 1998 Annual Meeting of the American Evaluation Association, "Transforming Society through Evaluation," Chicago, IL, Nov. 4-7, 1998; and at the Affordable Comfort Conference, Madison, WI, in the spring of 1998. This research monograph is an "alert to evaluators" detailing the need to take secular economic trends into account in evaluations, in that changes in social organization and economic context have become stronger factors than direct program influences in contributing to the outcomes of many programs.

Peach, H. Gil, Paul A. DeCotis, and Luisa M. Freeman, "Evaluating Consumer Energy Aggregations: A Policy Perspective," Pp. 2.241-2.256 in the *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings*, Panel 2, Residential Buildings: Program Design, Implementation, and Evaluation.

Peach, H. Gil, "Industrial Energy Efficiency in the Michigan Collaborative." in *Energy Program Evaluation: Uses, Methods, Results*, CONF-950817, Pp. 43-47. Chicago, IL: National Program Evaluation Conference, 1997. Based on evaluation results, this paper presents a public-responsibility perspective on industrial energy programs.

Peach, H. Gil, C. Eric Bonnyman, and Joseph C. Ghislain, "What Works for Energy Efficiency in Large Industry." In *ACEEE Summer Study on Energy Efficiency in Industry*, Pp. 473-482. Saratoga, NY: American Council for an Energy Efficient Economy, 1997. Based on evaluation results, this paper presents industrial energy efficiency programs from the industrial perspective of global auto companies.

Castelow, Carl, C. Eric Bonnyman, Joseph Ghislain, Phares A. Noel, Mary A. Kurtz, Jim Malinowski, H. Gil Peach, and Martin Kushler, "Energy Efficiency in Automotive and Steel Plants." In *Sustainable Energy Opportunities for a Greater Europe: The Energy Efficiency Challenge for Europe*, Pp. 166 1-10. Spindleruv Mlyn, Czech Republic: European Council for an Energy-Efficient Economy, 1997. This paper presents a technical perspective, based on a three-year evaluation of industrial programs at three major auto companies and two major steel plants in the US.

Peach, H. Gil, "Low Income Program Evaluation for a Competitive Era," in *The Future of Energy Markets: Evaluation in a Changing Environment*, Pp. 293-300. Chicago, IL:

- National Program Evaluation Conference, 1997. This paper introduces improvements in evaluation perspectives and methods in the evaluation of low-income programs.
- West, Anne Minor, Howard S. Reichmuth, Pamela Brandis, and H. Gil Peach, "Seven Years After: Impact Evaluation Results Employing Extensive Site Inspection Data and Associated Pre/Post Billing Analysis," Pp. 3.97-3.104 in the *Proceedings of the 1996 ACEEE Summer Study on Energy Efficiency in Buildings*, Panel 3, Residential Programs: Program Evaluation.
- Peach, H. Gil, Pamela Brandis, C. Eric Bonnyman, and Agneta Persson, "Market Transformation in Manufactured Housing: A Pacific Northwest Experience," Pp. 3.115-3.122 in the *Proceedings of the 1996 ACEEE Summer Study on Energy Efficiency in Buildings*, Panel 3, Residential Programs: Program Evaluation.
- Peach, H. Gil, Ralph Pahl, Jeff Schlegel, and Rick Fleming, "Moving Towards Market Transformation", *Proceedings of the 1993 ECEEE Summer Study: The Energy Efficiency Challenge for Europe*. R. Ling & H. Wilhite (eds.). The European Council for an Energy Efficient Economy, Oslo, Norway, Pp. 141-151, 1993. This paper deals with using market forces to promote program goals, and with how evaluation changes in a market context.
- Peach, H. Gil, "Performance Contracting: Advice to Utilities." *Home Energy*, Vol. 9, Pp. 19-21, 1992. This article alerts readers to several differences in how some performance contractors approach evaluation and measurement issues, in contrast to program sponsors.
- Peach, H. Gil, "Energy Conservation Technical Collaboratives," Paper presented to the 4S/EASST Joint Conference, Gothenburg, Sweden, August 1992. This paper contrasts the collaborative styles of California and New England in multi-party program and evaluation design.
- Peach, H. Gil, "Verification and Sample Design." *Evaluation Exchange*, Vol. 1, No. 7, Pp. 12-13, 1991. This is a short technical contribution to quantitative method in evaluation.
- Keating, Kenneth, and H. Gil Peach, "Demonstration Projects: What's in Them for Utilities?" *Energy and Buildings*, Vol. 13, Pp. 85-91, 1989. This article calls for sponsorship of demonstration projects to promote social and organizational learning.
- Peach, H. Gil, and Eric Hirst, "Factors in the Practice, Organization, and Theory of Evaluation," *Evaluation and Program Planning*, Vol. 12, Pp. 163-170, 1989. This is an article on evaluation method, calling for positive inclusion of organizational context as a factor in evaluations.
- Morse, William L., and H. Gil Peach, "Control Concepts in Conservation Supply," *Energy*, Vol. 14, No. 11, PP 727-735, 1989. This is a technical/statistical publication on energy conservation, incorporating evaluation as a tool for incremental social and organizational learning.
- Peach, H. Gil, "Evaluation Strategies and Customer Response to Energy Efficiency Programmes: Pro-Active Evaluation--Lessons for the Future." *Workshop on Conservation Programmes for Electric Utilities*, Pp. 341-351. Paris, France: International Energy Agency and Organization for Economic Cooperation and Development, 1988. This paper is a call for evaluators to work with program planners and implementation staff. Thesis: While

retaining a responsibility to “call things as they are” in the final evaluation, evaluators should share a common interest in and contribute to program success and social learning along with other parties.

Peach, H. Gil, "Utilization Focused Field Experiments", Paper presented to Conference on Advances in Knowledge Utilization: Impacts of Sciences and Professions in the Information Society, A Joint Conference Sponsored by the Howard R. Davis Society for Knowledge Utilization and Planned Change and the University of Pittsburgh, Oct. 8-10, 1987. A short paper contrasting different approaches to evaluation and knowledge development in different kinds of projects.

Peach, H. Gil, "Argumentation in Applied Research", Paper presented at the 10th Annual Meeting of the Society for Social Studies of Science, Rensselaer Polytechnic Institute, Troy, NY, Oct. 24-27, 1985. A paper illustrating the Dunn/Toulmin policy analysis approach to multi-party evaluation, employing “argument maps.”

Keating, Kenneth M., Ruth L. Love, Terry V. Oliver, H. Gil Peach, & Cynthia B. Flynn, "The Hood River Project -- Take a Walk on the Applied Side", *The Rural Sociologist*, Vol. 5, No. 2, Pp. 112-118, 1985. This paper deals with the learning experience for program planners and evaluators in the contrast between evaluation planning and the encounter with realities in the field.

Peach, H. Gil, Terry V. Oliver, Mark Cherniack, David Goldstein, and Marion Philips, “Dialectic of Cooperation: How the Hood River Project Worked.” In *ACEEE Summer Study on Energy Efficiency in Buildings*. University of California at Santa Cruz: American Council for an Energy Efficient Economy, 1984. The paper details the ‘back and forth’ relations of continued collaboration in a multi-year multi-party evaluation.

Peach, H. Gil, “The Hood River Conservation Project: A Model for Consensus-Building in Applied & Energy Research.” Paper presented to the eighth annual meeting of the Society for Social Studies of Science, Session I, Taking Scientific Practice Seriously. Blacksburg, VA, 1983. The paper emphasizes the relationship of research quality, a focus on measurement and evaluation, and collaboration.

For additional papers, projects, and clients, please see [www.peachandassociates.net](http://www.peachandassociates.net)

<b>HGP-1</b>	<b>List of Testimony Previously Provided by H. Gil Peach</b>		
<b>Year</b>	<b>Jurisdiction</b>	<b>Subject</b>	<b>For</b>
2020	Pennsylvania	Economics	Philadelphia Gas Works
2017	Pennsylvania	Economics	Philadelphia Gas Works
2016	Pennsylvania	Decoupling	Pennsylvania Public Utility Commission
2015	Washington	Gas DSM	Independent Expert
2013	Pennsylvania	Low-Income	Tenant Union Representative Network & Action Alliance of Senior Citizens of Greater Philadelphia
2012	Nova Scotia	DSM & Low-Income	Nova Scotia Utilities and Review Board
2011	Nova Scotia	DSM & Low-Income	Nova Scotia Utilities and Review Board
2010	Nova Scotia	DSM & Low-Income	Nova Scotia Utilities and Review Board
2007	Nevada	Low-Income	Nevada Housing Division
2005	District of Columbia	DSM & Low-Income	DC Energy Office
2005	Utah	Low-Income	Salt Lake CAP & Utah Housing Division
2005	Nevada	Low-Income	NV Welfare Division & NV Housing Division
2004	Pennsylvania	Low-Income	Philadelphia Gas Works
2000	Washington	Measurement	Snohomish PUD No. 1
1999	Kentucky	Low-Income	Kentucky Association for Community Action
1990s	Connecticut	DSM	Conservation Law Foundation
1990s	Rhode Island	DSM	Conservation Law Foundation
1990s	Massachusetts	DSM	Conservation Law Foundation
1990s	Vermont	DSM	Conservation Law Foundation
1989	Massachusetts	Measurement	Northeast Utilities/Connecticut Light & Power

## Description of Economic Impact Analysis of Philadelphia Water Department Capital Improvement Program

### Executive Summary

The objective of the analysis is to estimate the economic impacts that will accrue within the City of Philadelphia (City) from Philadelphia Water Department (PWD) spending on capital improvements. The City/County of Philadelphia is the retail service area of the PWD.<sup>1</sup>

This executive summary presents the economic impacts occurring within the City from annual CIP spending over a two-year period. Typical year CIP spending refers to the expected investment in infrastructure improvements to achieve PWD service objectives. A two-year period of typical spending is used for congruence with PWD CIP spending expectations over fiscal year 2022 and 2023 and the rate case. As explained below, a typical annual level of CIP spending is estimated at approximately \$600 million (before adjustments).

Results from our analysis show that two years of typical annual CIP investment in infrastructure will generate the following economic benefits within the City of Philadelphia:

- Nearly 4,800 jobs are supported each year
- An additional \$738 million of wage and salary income flows to workers and business owners
- Gross Regional Product (Value Added), the total value of labor income, profits and taxes is increased by \$930 million
- CIP investment of \$1,142 million generates \$1,735 million of total economic output, a multiplier effect of 1.5
- City/County taxes of \$28.6 million are generated

Our approach, assumptions and analysis results including larger regional impacts are discussed in the following section.

### Methodology

Construction spending entails hiring workers and procuring services and materials to complete the project. Total annual spending for these resources represent the direct impacts of the CIP in any given year. We know that economic impacts do not stop with the direct effects of CIP spending. In order to supply the services and materials required for construction, suppliers require labor and materials from other suppliers. These supply-chain effects from construction spending are referred to as indirect impacts. Finally, additional labor income from direct and indirect impacts results in additional household spending for goods and services. These household effects are referred to as induced impacts and are the result of greater household incomes from direct CIP spending.

We utilized an approach known as Input-Output Analysis to estimate the direct, indirect, and induced impacts from PWD investments in CIP infrastructure. Input-Output Analysis was first developed in the 1930's as a method for quantifying interdependencies between economic sectors and regions and is currently used extensively in the field of regional economics. We ran our analysis using an Input-Output

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<sup>1</sup> The City's boundaries are coterminous with the boundaries of Philadelphia County.

model called IMPLAN which is maintained by the IMPLAN Group. IMPLAN was first developed in 1976 and supports in-depth Input-Output modeling with the ability to estimate between region interdependencies. This makes IMPLAN an excellent tool to address the study objectives utilizing a well-established and comprehensive input-output framework.

### Annual Capital Improvement Spending by PWD

PWD's CIP is part of a long-term investment plan to provide safe and reliable water, sanitary sewer and stormwater management services to meet the needs of the City. In 2020 the timing of CIP expenditures has varied significantly from plan due to COVID-19 related circumstances. COVID-19 related variances from plan, positive and negative, are expected through Fiscal Year ending 2022. We adopted the "typical year" approach which established construction spending for economic modeling at a level that is representative of a typical year from the 6-Year CIP plan. "Typical year" analysis relies on planned spending and is not based on any specific project or construction contract. This approach has the advantage of normalizing construction spending to an expected average annual level. Calculations to estimate typical year CIP spending for economic modeling are shown in Table 1.

*Table 1. Estimated Typical Year CIP for Economic Impact Modeling*

<b>Project Type/Budget Category</b>	<b>FY 2023</b>	<b>Annual Adjustments</b>	<b>Typical Year After Adj.</b>
Improvements to Water and Wastewater Treatment Facilities	\$309.3	\$0.4	\$308.9
Wastewater Collector System/CSO/Flood Relief	\$155.4	\$0.0	\$155.4
Water Conveyance System (new and reconstruction)	\$111.8	\$5.0	\$106.8
Engineering, Administration & Material Support	\$27.3	\$27.3	\$0.0
<b>TOTAL</b>	<b>\$603.7</b>	<b>\$32.7</b>	<b>\$571.0</b>

After consultation with staff at PWD, we determined that the CIP budget ending in June 2023 was representative of a typical year from the 6-year capital spending plan. In other words, annual CIP spending amounts to just over \$600 million or \$1.2 billion over a normal 2-year period. Consultation with PWD staff led us to make adjustments to annual CIP spending for the purpose of modeling economic impacts of PWD infrastructure investment. These adjustments are also shown in Table 1 and reflect the removal of land acquisition cost (an economic transfer with no impact) and items that are more related to ongoing operations than infrastructure construction. This resulted in our definition of a typical year of PWD investment of \$571 million dollars spread between three project types and is the amount used for modeling annual economic impact.<sup>2</sup>

<sup>2</sup> This is considered a conservative (low) spending level due to the removal of the entire internal PWD spending on the Engineering, Administration and Material Support category. While conservative, we feel it better reflects amounts actually planned for infrastructure construction.



## Customization of IMPLAN Model

IMPLAN uses average industry spending patterns, the percentages of labor and materials purchased from suppliers from other industries, to trace the economic impacts through the various linkages that makeup a region's economy. Average spend patterns are built into IMPLAN. However, these assumptions were refined with input from PWD. These customized spending percentages are shown in Table 2.

*Table 2. Customization of Construction Spending for IMPLAN Modeling*

Project Type	Labor	Concrete & Paving	Piping	Pumps & Equip.	Buildings	Prof. Services (External)	Other	Total
Water and Wastewater Treatment Facilities	45.0%			18.0%	18.0%	8.1%	10.9%	100.0%
Wastewater Collector System/CSO/Flood Relief	40.0%	10.0%	20.0%			13.5%	16.5%	100.0%
Water Conveyance Systems (new and reconstruction)	45.0%	10.0%	20.0%			7.5%	17.5%	100.0%

The spend percentages in Table 2 were developed through detailed conversations with PWD staff to define the categories of expense and percentage allocation between categories.

We also customized IMPLAN by defining three unique regions for analysis that collectively makeup up all Pennsylvania counties. They are Philadelphia City/County, the four "collar" counties of Bucks, Chester, Delaware and Montgomery, and all other Pennsylvania counties. In this manner we are able to estimate the economic impacts from typical year CIP spending that falls within each of these regions. While our focus is the economic benefits that occur within the City of Philadelphia, it is recognized that spillover benefits occur to neighboring counties and beyond due to regional economic interdependencies, especially between the economies of Philadelphia and the greater Philadelphia area.

## Economic Impact Results

A summary of the results of the economic impact analysis is shown in Table 3. All of the reporting is for what happens discretely in each of the areas listed below. Because the three areas collectively cover all Pennsylvania counties, their sum represents the total impact for the Commonwealth of Pennsylvania during a typical annual period.

*Table 3. Estimated Economic Impact from Annual CIP Infrastructure Investments (dollars in millions)*

	Jobs Supported	Labor Income	Gross Regional Product	Economic Output	Local Taxes	State Taxes
Philadelphia	4,788	\$369.0	\$465.2	\$867.6	\$14.3	\$12.1
Collar PA Counties (A)	189	\$11.8	\$20.0	\$33.6	\$0.7	\$0.9
Other PA Counties	32	\$2.1	\$4.2	\$8.0	\$0.1	\$0.2
Total Pennsylvania	5,009	\$382.9	\$489.4	\$909.2	\$15.1	\$13.2
(A) - Collar PA Counties are Bucks, Chester, Delaware and Montgomery counties.						

Typical year CIP investment in construction of infrastructure has the following estimated economic impacts within Philadelphia each year:

- Nearly 4,800 jobs are supported annually
- An additional \$369 million of wage and salary income flows to workers and business owners
- Gross Regional Product (Value Added), the total value of labor income, profits and taxes is increased by \$465 million
- The initial investment of \$571 million generates \$867.6 million of total economic output, a multiplier effect of 1.5
- City/County taxes of \$14.3 million are generated

Collar counties annual economic impacts:

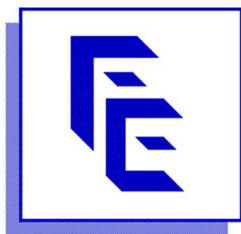
- 189 jobs are supported
- An additional \$11.8 million of wage and salary income flows to workers and business owners
- Gross Regional Product (Value Added), the total value of labor income, profits and taxes is increased by \$20 million
- Total economic output increases by \$33.6 million
- City/County taxes of \$0.7 million are generated

All other Pennsylvania counties annual impacts:

- 32 jobs are supported
- An additional \$2.1 million of wage and salary income flows to workers and business owners
- Gross Regional Product (Value Added), the total value of labor income, profits and taxes is increased by \$4.2 million
- Total economic output increases by \$8 million
- City/County taxes of \$0.1 million are generated

The total annual economic impacts for the Commonwealth of Pennsylvania:

- Over 5,000 jobs are supported
- An additional \$382.9 million of wage and salary income flows to workers and business owners
- Gross Regional Product (Value Added), the total value of labor income, profits and taxes is increased by \$489.4 million
- Total economic output increases by \$909.2 million
- State taxes of \$13.2 million and local taxes of \$15.1 million are generated, or a total of \$28.3 million in annual tax revenue for funding local and State government.



## MARK E. THOMPSON

Mark is President of Forefront Economics Inc. and has over 30 years of experience as an applied economist in the electric and natural gas utility industry. In 1993 Mark founded Forefront Economics (FE), an economics consulting company specializing in data organization and analysis services for natural gas and electric companies. Forefront Economics has conducted energy tracking and benchmarking, DSM planning and evaluation, load research, load forecasting, customer segmentation, demand modeling, and cost effectiveness analysis for energy clients. Mark has managed a variety of analytical projects to support regulatory and planning efforts for gas and electric utilities, including customer response modeling, market segmentation and profiling, and demand side planning and evaluation projects.

### WORK EXPERIENCE

- 10/1993 - Present    **Forefront Economics Inc, Beaverton, Oregon**  
**President**  
*Responsibilities:* Manage consulting practice specializing in econometric analysis and information delivery for energy utilities. Primary focus is on the use of econometric methods for load analysis, forecasting, program evaluation, market segmentation, and consumer predictive modeling.
- 8/1987 - 9/1993    **Portland General Electric Company, Portland, Oregon**  
**Senior Analyst**, Rates and Regulatory Affairs Department  
*Responsibilities:* Determine the economic impact of energy efficiency programs. Work with PGE, OPUC, BPA, ODOE, and NWPPC personnel to collaboratively develop plan for cost-efficient evaluation of DSM programs. Project Leader, Short-Term Forecast. Conduct economic analysis and forecasting. Project Leader on various market research projects.
- 8/1983 - 7/1987    **Union Pacific Railroad Company, Omaha, Nebraska**  
**Manager**, Economic Forecasts  
*Responsibilities:* Supervised a staff of three professional economists with the objective of developing the Marketing Department's forecast of Union Pacific's business levels; advised upper management of any potential impacts on business from changes in the economic climate; planned for staff training; and procured computer equipment and other resources.
- 7/1980 - 7/1983    **Louisiana State University, Baton Rouge, Louisiana**  
**Economic Analyst**, Fishery Resources  
*Responsibilities:* Conducted economic research on fisheries at the state and national levels; developed econometric models for analysis of supply and demand conditions and market forecasting.

### EDUCATION

- June 1980    **Master of Science, Agricultural and Natural Resource Economics**  
 Oregon State University, Corvallis, Oregon  
 Major Emphasis: Natural Resource Economics    Minor: Statistics
- May 1978    **Bachelor of Science, Agricultural Economics**  
 Oklahoma State University, Stillwater, Oklahoma

### PUBLICATIONS

Available upon request

### CONTACT

3800 SW Cedar Hills Blvd, Suite 285    Beaverton OR 97005  
 Email: [mark@forecon.com](mailto:mark@forecon.com)    URL: [www.forecon.com](http://www.forecon.com)

## Bio for Mark Thompson

Mark has over 30 years of experience as an applied economist in the natural gas and electric industries. In 1993 Mark founded Forefront Economics (FE), an economics consulting company specializing in analytical services for natural gas and electric companies. Throughout his career in energy economics, Mark has focused on applied analytics to provide insights into how people and buildings use energy. This focus has resulted in engagements with dozens of electric and natural gas utilities across the U.S. to conduct customer usage modeling and analysis projects including energy efficiency tracking and benchmarking. Mark has led teams that completed over a dozen conservation potential studies in several states. Forefront Economics has conducted load research, load forecasting, customer segmentation, demand modeling, and cost effectiveness analysis throughout the U.S. Mark has managed a variety of analytical projects for gas and electric utilities, including customer response modeling, market segmentation and profiling, and demand side planning and evaluation projects. Prior to founding Forefront, Mark worked in the DSM Strategic Planning and the Rates and Regulatory Affairs departments at Portland General Electric (1987-1993). While at PGE, Mark developed the company's load forecast, managed market research projects, and coordinated DSM program evaluation efforts. Mark also established and coordinated the efforts of the Program Evaluation Working Group at PGE, a committee made up of PGE employees, regulators, and industry stakeholders to facilitate communication between PGE and interested parties. He has also worked as Manager of Economic Forecasting at Union Pacific Railroad.

### Continuing Education and Training

Mark is a member of the Association of Energy Service Professions (AESP) and regularly attends AESP conferences and webinars and a somewhat less frequent attendee of the International Energy Program Evaluation Conference (IEPEC) and the ACEEE Summer Study conferences. Mark has also attended conferences and training programs of the US DOE Energy Information Agency (EIA) (annual energy conference), National Association of Business Economics (Economic Measurement Seminar), and the International Association of Energy Economics (IAEE) (US and foreign conference locations).

Mark has presented papers at the ACEEE Summer Study for Energy Efficiency in Buildings, ACEEE Summer Study for Energy Efficiency in Industry, the IEPEC, the IAEE (Taiwan) and the SAS Users Group International (SUGI) annual conference. Mark was awarded “Best Contributed Paper in Statistics, Data Analysis and Modeling” for his paper on market segmentation at the SAS Users Group International conference (SUGI 24, Miami Beach, FL). Mark regularly attends SAS Global Forum (SGF, previously SUGI), regional SAS conferences and SAS training programs to maintain and develop strong data management and analytical skills.



Mark holds two certifications from the SAS Institute: “Certified Statistical Analyst Using SAS 9: Regression and Modeling” and “Certified Base Programmer for SAS 9”.

## Example Projects

Selected projects completed to support utility regulatory actions and directives are listed in the table below along with an indication of the relevant work area(s) represented by the experience. An expanded description of each project including dates follows the table.

Example Project #			
Year			
Client			
Project Title			
DSM Planning and Evaluation			
Market Analysis and Research			
Measure Analysis			
Modeling Assistance			
Special Investigations			

Schedule MT-1

1	2000 to 2015	Duke Energy & Others	Multiple Electric and Natural Gas Demand Side Management (DSM) market potential studies	X	X	X	X	X
2	2011	NW Natural	Economic Impacts of Space Heating: Comparison of High Efficiency Gas Furnaces and Heat Pumps	X	X	X	X	X
3	2014 to 2017	Puget Sound Energy, Avista Energy and Cascade Natural Gas	Evaluation of Impacts from Electric and Gas Rate Decoupling	X	X	X		X
4	2014 to 2020	Philadelphia Gas Works	Evaluation of Policy Options for Percentage of Income Payment Plans	X	X		X	X

**Table 1. Example Projects**

## Detailed Project Description and Links to Examples of Reports and Work Products

Additional details are provided below for each project in the order that the projects are listed in the table above. Links to examples of work are provided for the first three projects.

### **Example Project #1: Multiple Electric and Natural Gas DSM Market Potential Studies (multiple electric and natural gas utilities)**

Mark Thompson has lead teams conducting energy efficiency potential studies for several electric and gas utilities including Vectren Energy, Indianapolis Power and Light, Citizens Gas, Duke Energy (Ohio, Kentucky, North Carolina, South Carolina and Indiana), Progress Energy and Snohomish PUD. Cyndi Thompson contributed analytical and administrative support for these studies. Forefront Economics has been the prime contractor for each of the projects.

Mark was project lead in each of these studies, leading consulting teams with a wide range of technical expertise. His role included specification of the overall approach, definition of data needs, development of customer segmentation approach and analysis, sample design, billing analysis, coordination of end-use model development with engineering team, measure and program cost effectiveness calculations, estimation of economic potential, coordination of DSM portfolio modeling and development and communications with clients and third party stakeholders. Forefront's work has been used to guide DSM implementation for these jurisdictions. A link to one such study conducted for Duke Energy Ohio is provided below.

([Link to Duke Energy Ohio Report](https://dis.puc.state.oh.us/); from dis.puc.state.oh.us; filed February 19, 2013; case no. 13-0431-EL-POR)

### **Example Project #2: Economic Impacts of Space Heating: Comparison of High Efficiency Gas Furnaces and Heat Pumps (NW Natural)**

This research compared the life-cycle costs of two equipment choices; a high-efficiency natural gas furnace and a high-efficiency heat pump. Benefit-Cost analysis is developed comparing these equipment choices from both the customer and the Total Resource Cost (TRC) perspectives. The project demonstrates expertise in billing analysis, energy engineering calculations, equipment assumption development and documentation, economic analysis and sensitivity analysis. The white paper (link below) demonstrates clarity with communication and serves to document the approach, assumptions and findings of the analysis. The paper was provided by NW Natural as part of the Oregon PUC UM 1565 work sessions. A review of the paper written by Fred Gordon (ETO) is also provided via link.

Mark Thompson completed this work at Forefront and authored the referenced paper. This research demonstrates Mark's ability to combine multiple assumptions from disparate sources in the context of a coherent life cycle cost effectiveness analysis. Analysis inputs include results from Marks' billing analysis and energy conversion calculations across fuels and

name plate efficiency levels. They also include data from the ETO, the Northwest Power and Conservation Council and ad-hoc surveys. Scenarios were developed to test and document the influence of key assumptions across plausible values.

[\(Link to Paper, Link to ETO Review\)](#)

**Example Project #3: Evaluation of Impacts from Electric and Gas Rate Decoupling (various utilities)**

Forefront Economics was a subcontractor to H Gil Peach and Associates on these projects and took the lead responsibility for data management and analytical support. The project involved annual review of the impacts of electric and gas rate decoupling over a three-year period. Work focused on a set of researchable issues developed by the utilities and stakeholders as directed by the Washington Utilities and Transportation Commission in various orders.

Mark's work primarily involved compilation of the data required for the analysis and quantitatively describing the impacts of several elements of the decoupling mechanism. Examples include analysis of DSM project data to assess the impact of decoupling on conservation activities of large customers, assessment of the balancing account balances for trends by rate schedule and the influence of weather and non-weather trends in use per customer and the likely impact of such trends on decoupling balances. Most of the work on this project was descriptive in nature and required an understanding of detailed operations of a complex decoupling mechanism.

**Example Project #4: Evaluation of Policy Options for Percentage of Income Payment Plans (Philadelphia Gas Works)**

Forefront Economics was a subcontractor to H Gil Peach and Associates on this project and took the lead responsibility for data management and analytical support. Mark Thompson served as team lead in these areas of the project. The objective of this work was to develop analysis and recommendations for consideration in a low-income bill assistance program to support program design recommendations and regulatory filings. The Customer Responsibility Program (CRP) is a percentage of income payment plan (PIPP) serving natural gas customers of Philadelphia Gas Works. Program options reviewed include ways to increase participation levels, improve affordability, lower program costs and minimize adverse impacts on non-participants.

Analysis involved the use of utility billing and payment data with multiple records per month for participants, demographically similar non-participants and all other non-participants. These records were combined and summarized in a variety of ways depending on the policy question addressed. Descriptive and analytical techniques applied include distribution analysis, identification of high-use customers, and reconstruction of the gas bill under alternative billing strategies including extension of PIPP to eligible non-participants. From the analysis estimates of the financial impact on participants and non-participants were developed and in some cases bounded by scenario analysis.

## YVONNE J. WHITELAW

### PROFESSIONAL SUMMARY

- Demonstrated achiever with a highly varied skill set and exceptional knowledge and practice in energy, public policy and finance.
- Strong research and analytical skills and background combined with extensive experience in energy and utility rate research, analysis and report writing and socioeconomic research.
- Extensive knowledge of energy and utility issues include utility regulatory research and analysis, renewable energy project management, energy efficiency market research studies and outreach, and energy management data analysis and studies.
- Experienced in working collaboratively, effectively and efficiently, internally and externally.

### ENERGY EXPERIENCE

#### **CONSULTANT, YJW ASSOCIATES, MANAGEMENT CONSULTING 870 MARKET STREET, SUITE 765, SAN FRANCISCO, CALIFORNIA**

June 1981 to Present

- Manage and direct a management consulting practice, providing research and business consulting in energy, finance, and public policy.
- Clients include: NERA Economic Consulting, City and County of San Francisco, City of Pasadena Department of Water and Power, Pacific Gas and Electric Company (PG&E), PacifiCorp, H. Gil Peach and Associates, San Francisco Bay Girl Scout Council, San Francisco Foundation, San Francisco Public Housing Tenants Association, The City of Richmond Public Housing Authority, The Ford Foundation, The Marin Community Foundation, The San Francisco Public Housing Authority, The San Francisco Women's Foundation, and Wells Fargo Bank.
- Energy consulting projects include utility electric rate design research and analysis, energy conservation and energy efficiency program development, renewable energy research and program development, and low-income energy education and utility rate impact and program evaluations.
- Conducted electric rate design study of 14 utilities' electric rate structures for residential, commercial and industrial rates, nationwide, for the City of Los Angeles, Department of Water and Power, under contract to NERA Economic Consulting.
- Monitored, reviewed, analyzed and summarized electric utility rate design and utility deregulation issues at California Public Utilities Commission for: 1) the City of Los Angeles, Department of Water and Power under contract to NERA Economic Consulting, 2) the City of Pasadena, Department of Water and Power and 3) PacifiCorp, of Portland, Oregon.

- Conducted impact and program evaluations of residential low-income rate programs for Detroit Edison and PECO Energy under contract to H. Gil Peach and Associates.
- Conducted energy audit and provided energy efficiency recommendations for electric, gas and water consumption under contract to the Housing Authority of the City of Richmond, California.
- Developed operating and program procedures for utility low-income electric and gas residential rate discount program for the Department of Water and Power of the City of Pasadena, California in 2001.
- Conducted feasibility studies under contract to PG&E to assess energy efficiency and energy management programs among mortgage lenders and property management firms and public housing programs.
- Produced an award winning videotape titled "Take Control" on energy conservation concepts and shows savings tips subtitled in Spanish and Cantonese.

**SENIOR ENERGY SPECIALIST, SAN FRANCISCO DEPARTMENT OF THE ENVIRONMENT, CITY AND COUNTY OF SAN FRANCISCO, 1455 MARKET STREET, SUITE 1200, SAN FRANCISCO, CALIFORNIA**  
January 2002 to December 2004

- Provided project management for the installation of 54 solar water heaters and 6 kW of photovoltaic for San Francisco's Bayview Hunter's Point neighborhood.
- Assisted in the development of an energy efficiency program (SFPEP) designed to reduce 16 MW of peak demand in San Francisco, including creating and maintaining a financial management reporting system and a detailed task and budget schedule using Microsoft Project Management software.
- Designed and implemented marketing and outreach activities in the predominately African-American Bayview Hunters Point neighborhood to provide energy audits and to educate and distribute energy efficiency LED lighting technology and information.

**ENERGY POLICY ANALYST INTERN, UNIVERSITY OF CALIFORNIA, LAWRENCE BERKELEY NATIONAL LABORATORY, ENERGY & ENVIRONMENT DIVISION, BERKELEY, CALIFORNIA**  
August 1978 to June 1981

- Planned and conducted original research for the U. S. Department of Energy (DOE) at the University of California, Lawrence Berkeley National Laboratory (LBNL)
- Researched and analyzed institutional and political impacts of future energy development siting issues based on national energy supply scenarios developed by DOE for Region 9: California, Nevada, Arizona, and Hawaii.
- Evaluated socioeconomic issues, using census and statistical data, and standard reference sources and computerized data base searches on population, education, housing, and economic development trends.



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RELATED PROFESSIONAL  
EXPERIENCE

ACCOUNTING AND FINANCE EXPERIENCE	<b>CONSULTANT, ACCOUNTING, MANAGEMENT AND TAX CONSULTING</b> <b>870 MARKET STREET, SUITE 765, SAN FRANCISCO, CALIFORNIA 94102</b>
	March 2006 to Present
	<ul style="list-style-type: none"> <li>▪ Extensive experience in all phases of fund and cost accounting for various business operations, non-profit corporations, and government agencies providing accurate and timely accounting and financial reporting as an independent consultant, project manager and as senior staff.</li> <li>▪ Develop and install, manual and computerized, accounting and bookkeeping systems, and fiscal management policies and procedures for business operations and non-profit organizations, including chart of accounts development, purchasing and inventory control, profit and expense control, and accounting policies and procedures.</li> <li>▪ Perform financial analysis as required by management, local, state and federal agencies, and non-profit board of directors.</li> <li>▪ Provide small business development including start-up planning and development, business plan preparation, loan packaging, business management consulting, technical assistance and training.</li> <li>▪ Traveled extensively in the West and Canada as a business management consultant.</li> </ul>

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TAX PREPARATION EXPERIENCE	<b>TAX ACCOUNTANT, ACCOUNTING, MANAGEMENT AND TAX CONSULTING</b> <b>870 MARKET STREET, SUITE 765, SAN FRANCISCO, CALIFORNIA</b>
	June 1981 to Present
	Over 10 years' experience in business, trust and individual tax accounting and preparation:
	<ul style="list-style-type: none"> <li>▪ Prepare computerized individual, partnership, corporate federal and multi-state income tax returns and related schedules including Schedules A, B, C, D, E, F, K-1, SE.</li> <li>▪ Prepare Form 1041, U.S. Income Tax Return for Estates and Trusts.</li> <li>▪ Prepare Form 706, United States Estate (and Generation-Skipping Transfer) Tax.</li> <li>▪ Prepare Form 990, Return of Organization Exempt from Income Tax.</li> <li>▪ Prepared complicated fiduciary tax returns under contract with Peat Marwick and Main.</li> <li>▪ Performed (with Fast Tax and Peat Marwick Main audit) account comparative analysis of unit reconciliation of Wells Fargo trust fund investment accounts and merger accounts from Bank of America to enable Wells Fargo Bank to meet tax deadline and avoid tax penalties and interest fees.</li> </ul>

TEACHING  
EXPERIENCE

**BUSINESS OFFICE TECHNOLOGY AND COMPUTER APPLICATIONS - NONCREDIT  
 INSTRUCTOR, CITY COLLEGE OF SAN FRANCISCO (CCSF)  
 33 GOUGH STREET, SAN FRANCISCO, CALIFORNIA**

January 2001 to Present

- Teach classes at CCSF in office technology, accounting and business math, conducting instruction in a lecture/lab setting, addressing the learning objectives as identified in course outlines.
- Design student centered instructional materials, activities and assessments that promote student learning and achievement and help students relate course content to the real-world topics.
- Create and maintain up-to-date records for all students in compliance with Department and College policies and meet important deadlines such as submitting grades.
- Advocate an awareness of diversity, careers, trends, and activities in technology and accounting professions.

EMPLOYMENT  
HISTORY

**2001 – Present     Adjunct Professor, Business Department, City College of San Francisco,**  
 San Francisco, California

**2002 – 2004     Senior Energy Specialist Department of the Environment,**  
 City and County of San Francisco, San Francisco, California

**1981 – Present     Energy, Management and Tax Consultant, YJW Associates,**  
 San Francisco, California

**1978 – 1981     Energy Policy Analysis Intern, Lawrence Berkeley National Laboratory**  
 Berkeley, California

EDUCATION

**SAN FRANCISCO STATE UNIVERSITY, SAN FRANCISCO, CALIFORNIA, MASTER OF ARTS, EDUCATION**  
 May 2015, Concentration in Instructional Technologies graduated with 3.5 GPA

**SAN FRANCISCO STATE UNIVERSITY, SAN FRANCISCO, CA. BACHELOR OF ARTS, POLITICAL SCIENCE**  
 May, 1980, Minor in Accounting Dean's List, Fall 1978, graduated with 3.0 GPA

## YJW ASSOCIATES Established 1981

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*YJW associates* formally *LADSON associates*

870 Market Street Suite 765

San Francisco, California 94102

<https://yiw.associates/>

[yvonnejwhitelaw@comcast.net](mailto:yvonnejwhitelaw@comcast.net)

### Biography of Yvonne J. Whitelaw

Yvonne J. Whitelaw, formally Yvonne Ladson Webb, is founder and principle of *YJW associates*, formerly *Ladson associates*, with over 35 years in private practice in San Francisco, California. Her firm is a minority-women owned accounting and management consulting firm specializing in energy, accounting, management consulting and tax preparation.

Originally from Elkhart, Indiana, following her career, she has resided in Indianapolis, Indiana, Washington D.C., New York City and San Francisco.

Earning both her bachelor's degree in political science and her master's degree in education, with a concentration in instructional technology, from San Francisco State University, she has a breadth of management experience in energy and finance gained over 45 years of experience in the interrelated fields of public policy, program analysis and development, regulatory research and analysis and business and financial management.

Her specific experience includes 1) regulatory research, analysis and assessment, 2) program development and evaluation, and 3) community and economic development gained as senior staff and as a consultant to utilities, international economic research firm, local governments, public housing agencies, banks, foundations, nonprofits and small business enterprises. In 1983 she lectured on energy, public policy and the Black community at San Francisco State University.

In addition to teaching accounting, technology and business at City College of San Francisco (CCSF), she also develops and conducts workshops for students and professionals on office technology, accounting and business management. Yvonne currently serves as CCSF's faculty union's Treasurer and previously served as Treasurer for a nonprofit housing cooperative.

Prior to forming her consulting business, from 1978 to 1981 Yvonne served a two-year energy and environmental policy research internship, conducting primary research at the University of California, Lawrence Berkeley National Laboratory on institutional and political impacts of future energy development siting issues, and evaluated socioeconomic trends for geothermal development in the Geysers-Calistoga KRG, as a policy analyst intern. Her work formed a basis for assessing institutional impacts of national scenarios developed by U.S. Department of Energy.

Major utility contractors for regulatory and utility projects include: H. Gil Peach & Associates, LLC, National Economic Research Associates (NERA) under contract to Los Angeles Department of Water and Power (LADWP), City of Pasadena Department of Water and Power and PacifiCorp.

## List of Major Utility Regulatory Projects

The table below is a list of projects which support YJW Associates' utility regulatory work.

Year	Client	Project Title	Brief Project Description
1991-2002	NERA/LADWP 555 S. Flower Street Los Angeles, CA 90071	Electric Rate Design and Deregulation Regulatory Analysis of PG&E, Southern California Edison & SDG&E	Monitor & report CPUC general rate case proceedings in preparation of cost and rate studies and recommendations. R-94-04-031 & I-94-04-032
1994	H. Gil Peach & Associates 16232 NW Oakhills Drive Beaverton, OR 97006	Detroit Edison Low-Income DSM Program Evaluation	Conduct & report program evaluation of residential low-income rate program per Rate Order Case U- 10102
1996-1998	City of Pasadena Water & Power Department 150 S. Los Robles Dr Pasadena, CA 91101	Electric Restructuring and Unbundling Decision; Modesto Irrigation District Electric Sales	Monitor & report CPUC Unbundling Decision. PG&E Revenues, IOU Cost Recovery Plans & Merger Proceedings R-94-04-031 & I-94-04-032
1997-1998	PacifiCorp 825 NE Multnomah St Portland, Oregon 97232	Role of Marketers in California's Restructured Electric Industry	Monitor and report on CPUC Electric Restructuring Proceedings R-94-04-031 & I-94-04-032
2002	H. Gil Peach & Associates	Regulatory mandated studies of PECO Customer Assistance Program	Conduct & develop reports for Impact and Process Evaluations of residential low-income rate program
2003-2006	NERA/LADWP	National Electric Rate Design Study of 14 Utilities	Conduct and report research on 14 utility electric rate structures by rate design characteristics
2019-Present	H. Gil Peach & Associates	Nova Scotia Utility and Review Board 2019 DSM Savings Verification	DSM verification including site visits and evaluation reporting
2019 - Present	H. Gil Peach & Associates	Philadelphia Gas Works General Rate Case 2021	Analyze A/R, uncollectable accounts & Universal Service and Energy Conservation Plan, in support of PGW proposed rate increase
2019 - Present	H. Gil Peach & Associates	Philadelphia Water Department	Analyze capital improvement program, arrearage forgiveness & TAP in support of rate case

## Descriptive Examples of Selected Related Energy Experience

- Conducted energy audit and provided energy efficiency recommendations for electric, gas and water consumption under contract to the Housing Authority of the City of Richmond, California.
- Developed operating and program procedures for utility low-income electric and gas residential rate discount program for the Department of Water and Power of the City of Pasadena, California in 2001.
- Conducted feasibility studies under contract to PG&E to assess energy efficiency and energy management programs among mortgage lenders and property management firms and public housing programs.
- Developed and implemented energy conservation and efficiency education program for public housing residents in San Francisco, including producing an award-winning videotape, titled "Take Control", (subtitled in Spanish and Cantonese), as an educational tool. Conducted 6 workshops onsite for 150 tenants. Study findings showed that saved twenty-five percent (25%) of the workshop participants decreased electric and gas use by twenty percent (20%).

- Provided project management for a \$1.4 million community solar project to install 54 solar water heaters and 6 kW of photovoltaic for San Francisco's Bayview Hunter's Point neighborhood in 2003.
- Assisted in the development of an energy efficiency program (SFPEP) designed to reduce 16 MW of peak demand in San Francisco, including creating and maintaining a financial management reporting system and a detailed task and budget schedule using Microsoft Project Management software.
- Designed and implemented marketing and outreach activities in the predominately African American Bayview Hunters Point neighborhood to provide energy audits and to educate and distribute energy efficiency LED lighting technology and information.
- Planned and conducted original research for the U. S. Department of Energy (DOE) at the University of California, Lawrence Berkeley National Laboratory (LBNL) analyzing institutional and political impacts of future energy development siting issues based on national energy supply scenarios developed by DOE for Region 9: California, Nevada, Arizona, and Hawaii.
- Assessed long term geothermal energy development paths evaluating socioeconomic issues, using census and statistical data, and standard reference sources and computerized data base searches on population, education, housing, and economic development trends for LBNL.
- Developed flow chart and descriptive narrative of California's power plant siting process; wrote summary of California's "energy agencies" and their legislative authority; published results of case study of the Sun Desert Nuclear Power Plant demise concluding that nuclear power would not be developed in California due to political and institutional constraints regarding nuclear waste disposal.

## Selected Examples of Related Professional Experience

### Public Policy

- Managed urban policy research studies for the City of Indianapolis, Community Services Program, which identified and recommended alternate policy strategies for community development programs.
- Wrote and published various reports and studies on public policy issues.
- Evaluated socioeconomic issues, using census and statistical data, and standard reference sources and computerized data base searches on population, education, housing, and economic development trends, for LBNL, for the City of Indianapolis in analyzing the impact of community development services, and as a consultant to the City Manager's Office, Oakland, California, in assessing future needs for persons over age 65.

- Manage and direct Haight Ashbury Free Clinic's 24-hour respite for poor women and their families installing and providing statistical reporting to the City of San Francisco, and providing respite including bathroom and showers and programming for women from AA meetings to cooking classes to babysitting service for their children.

#### Accounting and Tax Preparation

- Extensive experience in all phases of fund and cost accounting for various business operations, non-profit corporations, and government agencies providing accurate and timely accounting and financial reporting as an independent consultant, project manager and as senior staff.
- Develop and install, manual and computerized, accounting and bookkeeping systems, and fiscal management policies and procedures for business operations and non-profit organizations, including chart of accounts development, purchasing and inventory control, profit and expense control, and accounting policies and procedures.
- Perform financial analysis as required by management, local, state and federal agencies, and non-profit board of directors.
- Provide small business development including start-up planning and development, business plan preparation, loan packaging, business management consulting, technical assistance and training.
- Traveled extensively in the West and Canada providing business management consulting.
- Over 15 years' experience in business, trust and individual tax accounting and preparation.

#### Publications

- Peach, H. Gil, Bonnyman, Eric C., Ladson, Y., "Verification Review of Program Year 2019 Evaluation Results, Report for the Nova Scotia Utility and Review Board", May 11,2020
- Ritschard, R., Ladson, Y., Haven, K., Sextro, R., Smith, S., Sathaye, J., and Ruderman, H., "Perspectives on Energy-Related Environmental Issues in California, Hawaii and Nevada: A White Paper", Lawrence Berkeley Laboratory, Berkeley, CA (December 1978)
- Sextro, R., Ladson, Y., et al., "Regional Issues Identification and Assessment", Energy and Environmental Division Annual Report, Lawrence Berkeley Laboratory, Berkeley, CA (April 1979)
- Ladson, Y., "Three Mile Island and Its Portents", The Crisis Magazine, New York, New York, (April 1980)
- Ladson, Y., et al., "Institutional and Political Issues in Power Siting in the State of California", Lawrence Berkeley Laboratory, Berkeley, CA LBL-10320 (April 1980)
- Ladson, Y., "Getting There", LBL Newsmagazine, (Spring 1980)
- Haven, K., Berk, V. and Ladson, Y., "Local Population Impacts of Geothermal Energy Development in the Geysers-Calistoga Region", LBL 10150 (September 1980)

- Ladson, Y., "Energy Issues in Housing, The Future of Black Communities. Is The Dream Deferred?" NAACP National Housing Corporation, New York, New York (March 1981)

### Employment History

2001 – Present    Instructor Business Department, City College of San Francisco,  
San Francisco, California

2002 – 2004      Senior Energy Specialist Department of the Environment, City and County of  
San Francisco, San Francisco, California

1981 – Present    Accounting, Management, Energy and Tax Consultant, YJW Associates,  
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1978 – 1981      Energy Policy Analysis Intern, Lawrence Berkeley National Laboratory  
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