
AGENDA

Members: Angela Adams Nora Ferm Nickum
 Derik Broekhoff Deborah Rudnick
 Lara Hansen (Co-Chair) Jane Rein
 Gary Lagerloef James Rufo-Hill (Co-Chair)
 David McCaughey

Liaison: Councilmember Joe Deets

6:15 Call meeting to Order

6:20 Public Comment

6:30 New and Developing Business

- Review of GHG Inventory proposals

7:30 Old Business – Updates

- CCAC member re-appointments
- Waste Subcommittee
- Transportation subcommittee
- Electrical generation subcommittee
- Adaptation subcommittee

7:40 Other Business

- Develop July Agenda and Confirm Date (July 18th)

7:45 Adjourn

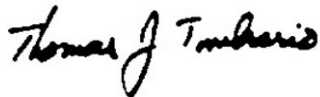
Proposal in response to RFP:

Creation of a Greenhouse Gas Emissions Inventory

Submitted to: **City of Bainbridge Island, Washington**

Submitted by:  **ALLIANCE** TECHNICAL SERVICES, INC.

Alliance Technical Services, Inc. Contacts



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May 24, 2018

RESTRICTION ON DISCLOSURE AND USE OF DATA

This proposal is considered proprietary and business confidential to Alliance Technical Services, Inc. No part of it or the concepts contained within it may be used without either a contract award to Alliance Technical Services, Inc. or written permission from an authorized Alliance Technical Services, Inc. representative. This proposal contains data that shall not be disclosed outside of the City of Bainbridge Island, Washington, and shall not be duplicated, used or disclosed – in whole or in part – for any purpose other than to evaluate this proposal.

May 24, 2018

City Administration
City of Bainbridge Island
280 Madison Avenue North
Bainbridge Island, WA 98110

Subject: Proposal to Create a Greenhouse Gas Emissions Inventory

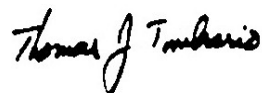
Alliance Technical Services, Inc. (ATS) is pleased to offer our proposal to provide expert professional services for creating a greenhouse gas (GHG) emissions inventory for the City of Bainbridge Island. ATS principals and senior staff have been helping clients create GHG and pollutant emission inventories, pollutant emissions, GHGs, energy use, and operating costs across the building, industrial and transportation functions in the nation's cities and towns for over 30 years, thus we have the "real world" experience and know-how to provide the City with a complete, accurate and credible GHG inventory. Our in-house team of GHG analysis professionals is enhanced even further by the addition of Stacey Nordgren, a Bainbridge Island resident of Foresight Partners and co-author of the Bainbridge Island Climate Impact Assessment. The combination of our team's applications experience and in-depth knowledge of GHG analysis requirements, knowledge of the uniqueness of the Bainbridge Island environment, range of protocols/procedures used to develop emission inventories, and practical data collection/analysis techniques, will allow us to help the City achieve its emission inventory development needs more quickly and completely than would otherwise be possible. One of the most useful features that ATS can offer is the opportunity to benefit from the application analysis and in-use validation experiences from GHG emission inventory and reduction analyses performed for other ATS client projects.

ATS is a founding member of the Carbon Management Council, a non-profit organization dedicated to helping organizations develop solutions to managing their carbon emissions and aiming to be the trusted information resource for business leaders on the principles and practices of carbon management. ATS was also one of the select international technical firms requested by the World Resources Institute (WRI) to assist in developing its next set of world-wide greenhouse gas inventory development analysis protocols and measurement standards addressing life cycle analysis methods for products and supply chain accounting.

In addition to the above, ATS is a woman-owned small business, thus contributing to City's diversity goals in contracting.

We look forward to the City's favorable review of our offer and to the opportunity to assist the City in achieving its contribution to reducing the impact of global warming in the Pacific Northwest.

Sincerely,



Thomas J. Timbario, P.E.
Vice President

I. Executive Summary/Understanding of Project Scope

Alliance Technical Services, Inc. (ATS) proposes to develop a baseline greenhouse gas (GHG) emissions inventory for the City of Bainbridge Island, Washington, to reflect recent City and community emission levels, and to present the results in a format that can be easily used for the City's planning purposes and can easily be updated. Accomplishing these tasks requires a solid understanding of the technical fundamentals of emission sources and their formation, the equipment that generates those emissions, and the functions performed by the community's operations and citizens to assure that a community's emission inventory is valid, accurate, and reliable, and that GHG reduction efforts yield the measurable and sustainable benefits desired. This document describes our proposed approach and defines the types of information that will be needed from the City in order to complete the analysis. It is important to understand that there is a range of methods that can be used to determine the City's carbon emissions "inventory" and that the methods to be used are a function of the type, quality and extent of data that are available, and how the results are to be used. Likewise, there is a wide range of emission reduction options and strategies that the City can consider depending on its goals/objectives, operational factors for consideration, and the degree of aggressiveness it chooses to apply.

While ATS understands that the scope of Bainbridge Island's RFP is limited to the development of a baseline GHG emissions inventory, it is important to note that the level of detail used in developing the inventory, as well as the level of documentation and quality of presentation of the results, will greatly affect the utility of the inventory in the City's GHG reduction and mitigation planning efforts. While a high-level accounting of the City's and community's energy use and corresponding GHG emissions is useful in identifying the need for low-carbon and renewable energy sources, it does not help in the identification of the need for, nor opportunities for, efficiency improvements, policies, and other potential low-cost strategies for reducing GHG emissions. In a community such as Bainbridge Island, where renewable energy is already a large part of the electricity portfolio, the highest-impact and least-cost options for reducing GHG emissions, especially in the near term, may be programs and policies that reduce use of energy, rather than renewable energy projects. The process proposed by ATS will delve deeply into the municipality's and the Bainbridge Island community's energy use patterns to show where energy is being used, in addition to identifying and quantifying emissions sources.

Please note that ATS projects involve staff and subcontract teaming partners who live and work all over the U.S., including Bainbridge Island, and this project will be no exception. Our highly collaborative work environment allows staff and teaming partners to work as effectively and efficiently as if they were all in the same room. As such, while we maintain our administrative office location in Dunkirk, Maryland, all of ATS staff work from their homes, at various locations throughout the U.S. (eliminating the need for travel to a central office location). This allows ATS to boast having one of the smallest corporate GHG footprints of any multi-staff consulting firm in the U.S. Thus, how the project is managed and delivered is far more important to this project than where it is managed. The remainder of this proposal describes how the ATS team will create the desired results specified by the project RFP.

II. Project Team

This project will be performed by the team of Alliance Technical Services, Inc. and Foresight Partners. Brief descriptions of each comprise the remainder of this proposal section.

Organization Background – Alliance Technical Services, Inc.

Our Mission

Virtually everything we do, directly or indirectly, is designed to advance a better environment ----- for our clients and the people and organizations they serve. ATS accomplishes this by providing the professional services needed to:

A. *Support the application of advanced energy, fuels, environmental and mobility system technologies for their intended markets,*

AND

B. *Design and implement effective energy and carbon management programs to achieve reductions in energy use, pollutants and greenhouse gas emissions.*

Our mission is to provide clear answers to complex questions, provide insight to addressing multi-faceted technical, deployment and organizational issues, develop a framework for business direction, and assist in structuring effective implementation strategies. We provide the necessary professional-level consulting services to help clients achieve their mission.

Staff

Our staff of seasoned professionals brings a wealth of experience along with the diverse backgrounds necessary for addressing the unique requirements of each client project assignment. Several of our staff are Registered Professional Engineers, and the majority of ATS staff have advanced degrees (Masters and PhD levels) in their respective fields of educational training and knowledge, major categories of which include:

Mechanical Engineering	Law	Business Administration/	Industrial Technology
Electrical Engineering	Public Relations	Management	Chemistry
Chemical Engineering	English	Technology Management	Finance
Environmental Engineering	Physics	Marketing	Accounting
Environmental Sciences	Geology	Economics	Fine Arts

Many of our staff have been recognized by their peers by having numerous reports, technical papers and books published, and presentations delivered at a growing number of national and international conferences and symposia. Every area of analytical skill is backed by senior professionals with strong problem-solving credentials developed over many years of hands-on application experience in their respective fields of expertise. Areas of specialization include:

- Equipment for power production and delivery
- Building energy/fuel systems and energy conservation measures
- Manufacturing process energy/fuel systems
- Distributed, combined heat and power, and cogeneration energy systems
- Engine-powered vehicles and equipment, stationary combustors, and motors
- Biofuel/biomass energy products and processing technologies
- Solar energy and renewable energy systems
- Conventional and alternative fuels, fuel distribution and delivery infrastructure
- Advanced fuel and power generation/storage technologies (hydrogen, fuel cells, hybrid systems and advanced batteries)

ATS principals and senior staff have been helping clients reduce energy use, emissions and operating costs for over 30 years. ATS staff are very knowledgeable in the equipment, processes and functions that comprise the basis for:

- Analyzing baseline greenhouse gas generation and emission reduction projects
- Establishing an organization's or community's carbon footprint
- Developing an effective carbon/GHG management program

ATS Services in Carbon Management

ATS principals and senior staff have been helping clients reduce energy use, pollutant and GHG emissions, and operating costs for over 30 years. ATS staff are very knowledgeable in the equipment, processes and functions that comprise the basis for establishing an organization's carbon footprint and developing an effective carbon management program. ATS offers a wide range of carbon management program development and implementation services to help organizations of all kinds measure, reduce, and monitor pollutant and GHG emissions from communities of all sizes, building operations, industrial/commercial

operations and mobile sources. ATS provides solutions designed to fit a wide range of client-specific needs, from program development to complete management of program implementation. These services include:

- Determining “carbon footprints”, emission inventories and emission reduction benefits that result from implementation of energy/emission reduction options
- Analysis of practical options for reducing energy/fuel use and emissions from internal combustion engines, other combustion source equipment, and industrial processes
- Program design development and development of implementation plans to achieve carbon neutrality, LEED certification and renewable energy credits (RECs)
- Development of carbon management strategies and implementation of processes, technologies and practices for achieving reductions in pollutant emissions and greenhouse gases that provide high quality emission reduction credits for sale in the credit trading market
- Analysis of environmental/regulatory issues and their relationship to technology application, sustainability and user acceptance
- Analysis of organization and stakeholder needs and development of policy guidance, education and outreach tools to support their needs
- Technical assistance for grant applications and other forms of financial assistance
- Acquisition of funding/financing for program implementation
- Development of procurement specification guidance for the acquisition of energy/emission-reducing products and services, and the selection and acquisition of products and services to match the needs
- Technical support for the installation, operation and maintenance of energy/emission reduction technologies
- Implementation training and day-to-day operational support

Through arrangements with financial providers, ATS frequently can design carbon management projects in such a way that no up-front capital investment is required and improvements are financed from savings in energy/fuel costs. This allows carbon reduction programs to go forward more rapidly and the savings in operating costs to accrue more quickly. For programs that generate emission reduction or renewable energy credits designed to meet the credibility requirements for the credit trading market, the sales of those credits create even greater financial asset value to the organization.

Client Examples

The entire professional careers of ATS principals and senior staff have been devoted to developing and implementing programs that have supported a wide range of client needs for reducing energy use, petroleum fuel use, pollutant emissions and greenhouse gases. Client examples are illustrated in the table on the following page, and include:

- Product manufacturers and supplier industries
- Fuels and petrochemical industries
- Gas and electric utility industries
- Energy and environmental technology industries
- Vehicle and equipment fleets (onroad and non-road)
- Investment firms, financial institutions and the legal profession
- Other providers of professional services
- Institutional and non-government organizations
- Various levels of communities and government agencies (civilian and military) in the U.S. and internationally

Biographic sketches for the ATS staff identified for this project are contained in Section IV of this proposal. All staff will be made available for the duration of this project to assure continuity to its completion.

<u>GOVERNMENT</u> Baltimore City Energy Office California Energy Commission Grand Traverse Band of Ottawa & Chippewa Indians Maryland Energy Office Maryland Mass Transit Administration Maryland Department of Transportation Maryland Port Administration Metropolitan Washington DC Council of Governments National Institute of Standards and Technology National Science Foundation National Tribal Environmental Council New York Energy Office New York State Attorney General's Office New York State Energy Research & Development Authority Northeast States for Coordinated Air Use Management South Coast (CA) Air Quality Management District State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officers U.S. Army Corps of Engineers U.S. Army Fuels & Lubricants Research Lab U.S. Army Mobility Equipment Research & Development Command U.S. Defense Energy Supply Center U.S. Department of Commerce U.S. Department of Energy U.S. Department of the Interior U.S. Department of Transportation U.S. Environmental Protection Agency U.S. Navy Energy Office Western Governors' Association, Western Regional Air Partnership Portland METRO <u>UTILITY</u> Baltimore Gas and Electric Company Bonneville Power Administration Chesapeake Utilities Corporation Delmarva Power Dominion East Ohio Dominion Virginia Power Company Keyspan Energy/Brooklyn Union Gas Company National Rural Electric Cooperative New York Gas Group Pacific Gas & Electric Company Potomac Electric Power Company Southern California Edison Southern Union Gas Company <u>COMMERCIAL and INDUSTRIAL</u> AirFlow Catalyst Systems AirTec AKRF Alliance Technologies, Inc. Allied Waste American Automobile Manufacturers Association American Battery Consortium American Gas Association American Paper Institute American Petroleum Institute American Trucking Associations Archer Daniels Midland Company Association of Vehicle Inspection Companies BMW Borla Specialty Products Cabot Corporation Continental Insurance Companies Digital Equipment Corporation EG&G Automotive, Inc. DuPont Exxon Oil Company	Fiat Fram Corporation Ford Motor Company General Motors Corporation Grinnell Products and Recycling Gulf Oil Company Honda Honeywell Innotech Institute of Clean Air Companies Koppers Company Lockheed Martin Lucas CAV Lubrizol/Engine Control Systems Manufacturers of Emission Controls Association Mazda Daimler Benz Methanol Institute Nanox, Inc. National Biodiesel Board National Corn Growers Association Nissan North Carolina Petroleum Marketers Association Oxygenated Fuels Association Propane Vehicle Council Propane Education & Research Council PSA (Peugeot) Renault Süd-Chemie Prototech Sun Oil Company Texaco Oil Company Toyota Umicore Research U.S. American Battery Consortium Velocys W.R. Grace Company Wyoming Oil and Refining Company <u>INTERNATIONAL</u> Canada Dept. of Energy, Mines & Resources Canada Dept. of the Environment Canada Dept. of Health Canada Dept. of Transportation Canadian Gas Association Ecofuel Sweden Ontario (Canada) Energy Corporation Ontario (Canada) Ministry of Energy Ontario (Canada) Ministry of Transportation and Communications Promon Technology Center (Brazil) Swedish National Board for Technical Development Union Gas Ltd. (Canada) U.S. Agency for International Development U.S. Environmental Training Institute U.S. International Energy Agency <u>INSTITUTIONAL</u> American Fuel Cell Association American Lung Association Argonne National Laboratory Battelle Pacific Northwest Laboratory Brookhaven National Laboratory Fuel Cell Institute Gas Research Institute Lawrence Livermore National Laboratory National Institute for Petroleum Energy Research National Renewable Energy Laboratory National Tribal Environmental Council Oak Ridge National Laboratory Sandia National Laboratory Southwest Research Institute
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Organization Background – Foresight Partners

Foresight Partners is a Bainbridge Island-based consulting practice that supports communities, non-profits, agencies, foundations, and natural systems building adaptive capacity to reduce the impacts of climate change. The partners work to develop projects, decision support tools, and methodologies through land use planning innovations to enable climate resilient communities.

III. Project Team’s Experience in GHG Inventories and Related Tasks

The process of developing a GHG emissions inventory is largely the same for a municipality or community as it is for an organization, a state, a country, an industry, a corporation, or transportation system. The first step in any GHG emissions inventory effort is to define the boundaries and scope of the inventory (base year, geographical and/or political boundaries, etc.). Protocols include calculation of GHG emissions from sources located within the boundary being considered (Scope 1 emissions), GHG emissions occurring as a consequence of the use of grid-supplied energy within the boundary being considered (Scope 2 emissions), and GHG emissions from all other sources outside the boundary resulting from activities taking place within the boundary being considered (Scope 3 emissions). Issues related to defining the boundary to be considered for this project are outlined under the discussion of Task A – Define Methodology. So, the fundamental approach to estimating GHG generation and creating a GHG inventory is the same for any entity and included in every valid protocol; the size or nature of the entity for which a GHG inventory is to be created (city, country, industry, corporation, etc.) does not matter.

The City is likely to receive proposals from other contractors who can claim to have developed GHG emission inventories using the International Council for Local Environmental Initiatives (ICLEI) Global Protocol for Community-Scale Greenhouse Gas Emission Inventories, however, if data for some emission sources are difficult to obtain or estimating processes not well developed or understood by the contractor, the contractor will have to depend on using the “plug” or reference number data contained in ICLEI for estimating GHG emission from those sources. This approach satisfies the penchant for “getting to a number” (for the GHG emission inventory), but the “number” may be very inaccurate or incomplete because the ICLEI reference data do not accurately represent the specific community functions being analyzed. In many cases, “double counting” can occur in developing GHG estimates without applying great care to not duplicate the accounting of emission sources in the inventory.

ATS’s 30 years of experience in performing energy use and GHG inventory development/reduction analyses across a wide range of economic segments has allowed us to create a number of science-based tools and GHG estimating methods to address the “difficult to obtain data” issue in a way that results in a high degree of accuracy and completeness for GHG inventory development. Numerous examples are contained in the remainder of this proposal section.

Of significant importance to this project is the inclusion of Stacey Justice Nordgren, a Bainbridge resident, of Foresight Partners who was a member of the EcoAdapt team which conducted the following Bainbridge Island GHG projects relevant to this project:

- **Climate Change Adaptation through Local Comprehensive Planning: Guidance for Puget Sound Communities** - This document resulted from collaboration between Foresight Partners and EcoAdapt which created a relevant, actionable guidance document intended to lead Puget Sound communities to the incorporation of climate change impacts and implications in their community planning. This document can serve as a framework for climate change adaptation planning well beyond the Puget Sound region.
- **Bainbridge Island Climate Impact Assessment** - Foresight Partners and EcoAdapt sought and received community and national foundation funding to assist Bainbridge Island with the acknowledgement and incorporation of climate change impacts and implications into their local comprehensive planning. Community engagement was a key component, as were the author’s clear and rational presentation of the climate science, local risk and vulnerabilities to changing climate, and the communication of that science to the elected officials and City staff; thus enabling Bainbridge

Island to incorporate the goals and policies of climate change adaptation into their active long-range planning processes.

The ICLEI Global Protocol for Community-Scale Greenhouse Gas Emission Inventories is the accounting and reporting standard for cities that develop GHG inventories. ATS is familiar with this protocol and will apply its framework in the development of Bainbridge Island's inventory to allow for future benchmarking to regional and other municipal inventories.

Numerous examples of ATS's project experience in performing emissions inventory development and related analyses are contained in Section IX, Additional Information.

IV. Experience of the Project Team Members

The following organizational chart lists each of our project team members and their respective roles and responsibilities for the project. Their resumes of experience comprise the remainder of this proposal section.

Team Member	Role	Responsibilities
Thomas J. Timbario, P.E. (ATS)	Officer/Project Director	Project direction, oversight and quality assurance
Melissa J. Laffen (ATS)	Project Manager	Project Manager and Principal Investigator for all tasks
Thomas A. Timbario, P.E. (ATS)	Project Engineer	Inventory development, reporting methodology
Rachel J. Davenport (ATS)	Project Support	Research support, preparation of report/presentations
Stacey Justus Nordgren (Foresight Partners)	Project Support	Research support, preparation of report/presentations, community outreach/liaison

Thomas J. Timbario, P.E.

Mr. Timbario offers nearly 40 years of experience and is an internationally recognized expert in the field of pollutant and GHG emissions, analysis, and reduction technologies and their related development and operational deployment. His national and international work has addressed the full range of fuel, energy and environmental technology implementation requirements, including research, product development, engineering analysis and systems modeling, manufacturing analysis and feasibility, field and laboratory testing, market development, product maintenance and service needs, policy and regulatory options analysis, GHG and pollutant impacts, and deployment. He has performed numerous assessments and multi-year, multi-million-dollar implementation programs involving the analysis, use and operation of a wide range of technologies to help improve operating efficiency, improve maintenance practices, reduce maintenance and operating costs, reduce energy/fuel consumption, reduce pollutant emissions and GHGs, and improve air quality. He is experienced in corporate, financial, personnel, and program management. Representative clients have included: all of the headquarters Program Offices of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (a continuous client for over 35 years), Office of Fossil Energy, Office of Environmental Management, and virtually all of the DOE laboratories; U.S. Environmental Protection Agency; U.S. Department of Transportation; U.S. Army; U.S. Navy; International Energy Agency; Energy, Mines and Resources Canada; Environment Canada; Transport Canada; Swedish National Board for Technical Development; California Energy Commission; South Coast Air Quality Management District, New York State Energy Research and Development Authority; New York Gas Group; and numerous utility and industrial organizations including Ford Motor Co., Fram Corporation, General Motors Corporation, EG&G Automotive, Inc., Lucas CAV, American Trucking Associations, DuPont, Gulf Oil Co., Sun Oil Co., Southwest Research Institute, American Petroleum Institute; and Ecofuel Sweden. Some of his more notable work for the U.S. DOE included: developing the original program plan for the concept that is now the DOE Clean Cities Program; development of policy options for implementing the requirements of the Energy Policy Act, EPACT (which established mandates for purchasing alternative fuel vehicles); establishing testing procedures and protocols for testing new fuel concepts, additives and other fuel-saving devices; and establishing R&D priorities and technical/market programs for the development of biodiesel and other renewable energy sources.

Following positions in engineering design and product development with a major manufacturer of industrial heat treating equipment and with the U.S. Naval Weapons Laboratory, Dahlgren, Virginia, Mr. Timbario joined the Powertrain Product Engineering Office of Ford Motor Company in 1972, where he held various project engineering positions with responsibilities for development and manufacturing of several light- and heavy-duty truck engine families. After leaving Ford in late 1976, Mr. Timbario joined the engineering consulting firm of Mueller Associates, Inc. (MAI) to develop the firm's Energy and Environmental Technology practice. In 1980, he became Vice President (and subsequently Sr. Vice President) and director of the firm's Energy and Environmental Technology Application Division. In 1988, MAI was acquired by EA Engineering, Science and Technology, Inc. At MAI and EA, he was responsible for the client development, management, oversight, and implementation of the firm's energy, environmental, and transportation technology programs for governmental, institutional, commercial, and industrial sector clients. A major focus of these programs was on developing practical and cost-effective means for reducing emissions and energy/petroleum consumption in building operations, vehicle operations, and industrial processes. As part of his international work experience, he performed projects for a number of foreign organizations and the U.S. Agency for International Development, including assignments in Canada (where he resided for over two years), Brazil, Peru, Sweden, Australia, and Egypt.

He served as the company's representative to the Fuel Cell Association (members of which included the major fuel cell and related component development organizations) for five years and was a member of its Board of Directors. He also served as President of its successor organization (the American Fuel Cell Association) from 1993 to 1995, and as Vice President of the Fuel Cell Institute, the educational outreach arm of the American Fuel Cell Association. From 2005 to 2009, he was a member of the U.S. EPA's Clean Air Act Advisory Committee (CAAAC) Mobile Sources Technical Review Subcommittee (MSTRS), where he worked with other Subcommittee members to provide recommendations for guiding EPA's mobile source emission reduction programs. He also served on the Board of Directors of the Carbon Management Council, a non-profit organization that promotes and disseminates information on sound practices in GHG analysis methods and carbon management principles.

From 2008 to 2010, Mr. Timbario served as the staff leader and Principal Investigator for ATS's work that supported the WRI/WBCSD international team development of a new protocol for determining Scope 3 GHGs, with emphasis on application to supply chain standards.

Mr. Timbario received a B.S. in Mechanical Engineering from Tri-State College (now Trine University) (1970) and an M.S. in Mechanical Engineering from Wayne State University (1975). He is a Registered Professional Engineer in Michigan and Maryland. He is the author or co-author of over 100 technical reports and papers on the subjects of advanced energy, GHG and pollutant emission control, and conventional and alternative fuels, and has organized, coordinated, and/or chaired activities of numerous U.S. and international conferences/seminars/workshops devoted to those subjects.

Melissa J. Laffen

Ms. Laffen is a chemical engineer and project manager with over 18 years of experience analyzing energy technologies and emissions sources. Her analytical experience includes analysis of GHG sources and reduction opportunities; cost and benefit analysis of energy and environmental policies; domestic and international energy resource assessments; analysis in support of program planning and management activities; engineering and economics analysis of alternative transportation fuel production, including hydrogen and renewable fuels; analysis of advanced automotive powertrain and emission control technologies such as fuel cells and diesels and the application of fuels therein; configuration analysis of hydrogen production, storage, and distribution infrastructure systems for transportation and stationary power generation applications; examination of transportation fuel use in various niche markets; and investigation of energy and emission characteristics of alternative fuels and advanced energy generation technologies.

At ATS, Ms. Laffen is a lead analyst in GHG analysis and carbon management program development and implementation for multiple private sector organizations and assisted in the development of ATS's GHG estimation and reduction models. She provided key contributions to the development of ATS's Carbon Management Bootcamp™ workshop series designed to educate various audiences on the fundamentals of GHG emissions, GHG reduction opportunities, and establishing carbon management programs. Ms. Laffen managed the technical analysis activities and hydrogen analysis database development for the Hydrogen Systems Integration Program (HSIP) of the National Renewable Energy Laboratory from 2006 to 2018, giving

her a broad background in hydrogen economy analysis and modeling. She currently manages ATS's support for the Hydrogen and Fuel Cells Technical Advisory Committee and the publication of the Hydrogen and Fuel Cells Program Annual Progress Report for the HSIP. She provided technical and analytical support to the U.S. DRIVE/FreedomCAR and Fuel Partnership Fuel Pathway Integration Technical Team from 2004 to 2018 and managed the publication of annual research progress reports for the Solid-State Energy Conversion Alliance (SECA) and Advanced Turbine Programs of the U.S. Department of Energy (DOE) from 2007 to 2012. She has broad exposure to and knowledge of transportation vehicle, electricity generation, industrial, and building energy systems, including renewable energy systems.

As a chemical process engineer for James Chemical Engineering, Inc., Ms. Laffen optimized operation of an ammonia/urea plant in Bangladesh using Hysim. Under a contract with the U.S. Trade and Development Agency, she conducted a strategic natural gas utilization study for Bangladesh to examine the costs and benefits of various options. Other responsibilities included research of domestic and international energy and fertilizer markets, promotion of methanol as a fuel, and development of a corporate website and newsletter.

Ms. Laffen received a B.S. in Chemical Engineering, with a minor in Professional and Technical Writing, from Carnegie Mellon University (1998), and an M.S. in Technology Management from the University of Maryland University College (2006).

Thomas A. Timbario, P.E.

Mr. Timbario serves as a project engineer and lead analyst on system-level energy consumption and GHG analysis/reduction projects and has 19 years of experience in energy use/analysis techniques; advanced vehicle propulsion system technologies; alternative fuels; vehicle safety systems; emissions inventory development, analysis and modeling; advanced emission reduction technology applications; and database development. His capabilities also include forensic engineering/analysis of vehicle crashes, vehicle accident reconstruction and design analysis with a specialty in vehicle dynamics and performance, and vehicle kinematics and computer simulation.

As a project engineer, Mr. Timbario provides energy and GHG analysis to clients, determining their carbon footprints and environmental impacts based on direct combustion of fuel; indirect combustion of fuel from external sources; supply chain serving the client; and products and services used by or on behalf of the client. Responsibilities on carbon footprint projects include 1) energy consumption analysis; 2) vehicle emissions analysis; 3) energy consumption reduction options analysis; 4) external source emission analysis; and 5) implementation recommendations. Additionally, Mr. Timbario performs analysis of projects involving diesel emission reduction strategies, including technology-, fuel- and operational-based strategies.

Mr. Timbario also assists with activities that support National Renewable Energy Laboratory's Hydrogen Systems Integration Program for DOE's Hydrogen and Fuel Cells Program, including the Annual Progress Report. He assists in ATS' support to the DOE Vehicle Technologies Program through Oak Ridge National Laboratory, including technical analysis of the impact of high ethanol blends on vehicle operation and durability, and manages the preparation of the Advanced Combustion and Fuels Technologies Annual Reports.

Mr. Timbario is a Registered Professional Engineer in Maryland, received a B.S. in Mechanical Engineering from Lafayette College (1998), an M. Eng. in Mechanical Engineering from the University of Maryland (2000), and an A.A.S. Automotive Technology, Summa Cum Laude, from the Community College of Baltimore County, 2007. He is a member of the Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineers (ASME).

Rachel J. Davenport

Ms. Davenport has extensive experience preparing documents and communicating with people to convey and transform complex ideas and information into understandable terms for a variety of technical and professional purposes, including reports, instructional materials, websites, surveys, promotional material, and newsletters. She is an accomplished writer and editor with additional, complementary experience in graphic design and layout, publishing, and website design and maintenance.

Ms. Davenport has supported governmental clients with ATS since 2012. She has led the collection, review, and preparation of meeting presentations and annual report submissions; provided input to the design of meeting materials and signage; developed A/V and internet requirements for technical sessions; led the

identification, scheduling, and monitoring of auxiliary meetings; and supported many activities related to the venue and food and beverage functions. She serves as the Team Leader for the public meeting communications, logistics and meeting support functions for the U.S. DOE's Hydrogen and Fuel Cell Technical Advisory Committee. Through these activities, she has developed strong working relationships with many industry, university, and government stakeholders.

Ms. Davenport served her local municipality as an elected member of the town board for five years. In her capacity as trustee, Ms. Davenport worked with town staff, legal counsel, fellow trustees and mayor, and members of the public to develop and implement city ordinances and codes, annual budgets, growth and development plans, and community projects and partnerships. Ms. Davenport also represented her municipality in other boards and committees, including regional housing board, council of governments, and chamber of commerce. She is familiar with the dynamics of successful governance and support within an environment that incorporates municipal, county, state, federal, and tribal influences as well as balancing growth with respect to heritage and history.

Prior experience includes three years as a program assistant for the Fort Lewis College Counseling Center and Student Affairs Office, five years as the textbook manager for the Fort Lewis College Bookstore, two years as IT support with Bayfield Area Chamber of Commerce, and five years as the office manager and graphic designer for the Pine River Times newspaper. In these positions, Ms. Davenport maintained confidential records, prepared and analyzed data for annual and sales reports, collaborated in document preparation for a wide range of publications and written materials, designed and maintained websites, produced and edited articles and newsletters, prepared handbooks and official correspondence in printed and digital formats, developed templates to promote consistency between documents, tracked event registrations, coordinated communications with a variety of community and university stakeholders, developed websites and trained staff on web maintenance, prepared and tracked memberships and outreach materials, and coordinated acquisition and organization of educational materials.

Ms. Davenport earned a B.S. in Science and Technical Writing, with a broad scientific basis and specialization in writing technical material for a general (lay) audience, and a B.A. in Anthropology from Fort Lewis College (1997).

Stacey Justus Nordgren

Ms. Nordgren's current project portfolio focuses on improving long-range planning and policy instruments (e.g., comprehensive plans; hazard mitigation plans; regulatory codes and related development ordinances) that enable communities to understand and to anticipate future conditions, particularly as related to the impacts of global warming, in local decision-making.

As a natural resources policy professional she has expertise in the application of complex land use planning principles and practices. She is experienced in all phases of strategic land use planning, from project conception and grant writing through successful implementation of goals and objectives. She focuses on the development and implementation of strategies for protection of ecosystem services, climate change adaptation planning, natural hazard mitigation planning, and reasonable regulation of development to accommodate future conditions.

A hard-working program and project manager with significant collaborative project development experience involving cross-sector, multi-jurisdictional partnerships, her most recent application of her skills involves working with communities and local organizations to plan for the impacts of climate change and enable sustainable, climate resilient communities and ecosystems.

Ms. Nordgren earned a Masters of Arts in Environmental Policy and Planning from Tufts University and a B.A. in Political Science from the University of Vermont.

V. Task List and Level of Effort

A solid understanding of the technical fundamentals of emission sources and their formation, the equipment that generates those emissions, and the functions performed by the community is required to assure that a community's emission inventory is valid, accurate, and reliable, and that GHG reduction efforts yield the measurable and sustainable benefits desired. ATS principals and senior staff have this understanding, and they have been helping clients reduce energy use, emissions and operating costs for over

30 years. ATS's staff are very knowledgeable in the equipment, processes and functions that comprise the basis for establishing a community's GHG inventory, carbon footprint and developing an effective GHG reduction program, the attributes of which are reflected in the task descriptions which comprise the remainder of this proposal section.

Task A - Define Methodology

Emissions estimates are only as accurate and complete as the data used to calculate them. Thus, the key challenges in developing a snapshot of a community's GHG emissions are determining the boundaries of the analysis and obtaining accurate and complete data on the emission sources. The first step, then, is for the City (with input from its stakeholders, as required) to determine the boundaries of the analysis, including the base year to be used, the geographic boundaries of the analysis, the greenhouse gases to be included, and the emission sources to be included.

The choice of base year should correspond to either a calendar year or a fiscal year, depending on the time period most commonly used in City reporting, and depends highly on the City's discretion. The base year must be one for which energy use data is available. Seattle's inventory, released in August 2016, uses 2014 as the base year. Auburn's inventory, released in August 2010, uses 2008 as the base year. Tacoma's most recent inventory uses 2016 as the base year.

The island's perimeter is likely a convenient geographic boundary for the analysis. However, care must be applied in attributing emissions to the island. For example, the ferry service serves both Bainbridge Island and Seattle; therefore, the emissions should be shared in a practical manner between these two municipalities. Coordination with neighboring municipalities will ensure that emissions are not double-counted if inventories are compiled for the region. The ICLEI U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions provides a standard for reporting emissions for ferries and other modes of transportation that cross jurisdictional/geopolitical boundaries.

ICLEI, and in fact, all GHG inventory development protocols, specify that GHG emissions from Scope 1, Scope 2, and Scope 3 sources are to be identified and estimated to arrive at a total GHG emissions inventory for the functions to be addressed within the established boundary of operation. Recognizing that the most significant source of GHGs is from combustion of fossil fuels, a primary task of this project is to identify all combustion sources within the boundary that defines the City of Bainbridge Island. This boundary should be defined carefully and discussed with the City Project Team, with consideration given to the functions performed within it. For example, if the boundary includes any part of the waters surrounding Bainbridge Island, then the GHG emissions from marine vessel operations (including docking operations of the Seattle-Bainbridge Island Ferry, as well as other commercial marine vessel operations to-from SEATAC ports, and possibly U.S. Naval operations in the Bremerton area) may need to be considered.

Even if none of the waters surrounding the Island are not considered within the boundary, water-based functions may still have an impact on GHG emission sources within the land-based boundary. For example, the extended vehicle traffic build-up that occurs from daily cross-island rush hour traffic to-from points on the Olympic Peninsula via the Agate Pass Bridge to-from the Seattle-Bainbridge Island Ferry Terminal, and the resultant increase in idle emissions (creating additional CO₂ emissions than would normally be estimated using "plug" numbers from ICLEI).

ATS staff have developed an accurate methodology for calculating GHG and pollutant emissions for various forms of ship traffic operations, and for estimating emissions from various types and forms of vehicle traffic operations, and will apply those methods to this project, as needed.

Six gases are covered by the ICLEI Community Protocol: carbon dioxide (CO₂), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. ATS recommends including these six gases in the inventory. The City of Bainbridge Island may also consider including particulate matter (PM), unburned hydrocarbons (HC), and carbon monoxide (CO) if there is a desire to develop a complete carbon emissions inventory which impacts global warming. For example, it is important to understand that even though diesel PM emissions are not considered a GHG, the black carbon soot contained in them is the dominant absorber of visible solar radiation and holds in more solar energy than any other air pollutant besides CO₂. It has been estimated that soot and other forms of black carbon could have as much as 60% of the warming impact of CO₂. Thus, an estimate of diesel pollutant emissions and other forms of soot production are important to the consideration of any GHG inventory development effort. In addition, the City may consider including oxides of nitrogen (NO_x). Even though oxides of nitrogen (NO_x) emissions are not carbon-based, the

nitrous oxide component is a GHG and created mostly as a result of the combustion of carbonaceous fuels and are usually estimated as a separately identified part of the carbon emissions inventory. At the project initiation meeting, ATS will confirm with the City project staff whether a complete carbon emissions inventory is desired, or if the City is strictly interested in the gases covered in the ICLEI Community Protocol.

The Community Protocol requires cities to include five basic emissions generating activities in their GHG emissions inventories: use of electricity by the community, use of fuel in residential and commercial stationary combustion equipment, on-road passenger and freight motor vehicle travel, use of energy in potable water and wastewater treatment and distribution, and generation of solid waste by the community. As noted in the RFP, the City of Bainbridge Island is also interested in including municipal operations, analyzed by major end use (e.g., school facilities, city fleet vehicles, etc.); ATS strongly encourages the inclusion of municipal operations in the inventory. Additional activities that Bainbridge Island should consider including in the inventory are the ferry operation; community-wide consumption of household goods, food, and services; agriculture, forestry, and other land use activities; air travel; construction; community-wide use of electric appliances and devices, and any emissions-producing manufacturing operations that may be located on the island.

Factors to consider in determining which sources to include in a particular City's inventory include the city's level of control over a given emissions source, time and budget constraints, and the intended purpose/uses of the inventory. The level of detail used in developing the inventory, as well as the level of documentation and quality of presentation of the results, will greatly affect the utility of the inventory in the City's GHG reduction and mitigation planning efforts. While a high-level accounting of the City's and community's energy use and corresponding GHG emissions is useful in identifying the need for low-carbon and renewable energy sources, it does not help in the identification of the need for, nor opportunities for, efficiency improvements, policies, and other potential low-cost strategies for reducing GHG emissions. In a community such as Bainbridge Island, where renewable energy is already a large part of the electricity portfolio, the highest-impact and least-cost options for reducing GHG emissions, especially in the near term, may be programs and policies that reduce use of energy, rather than renewable energy projects. The City will need to trade off the cost of a more detailed data collection and analysis effort (both for the initial inventory development and subsequent updating and maintenance) against the benefits of such detail in identifying and planning GHG emission reduction efforts. ATS will present this tradeoff in detail and solicit input from the City on its planning needs during the project kickoff meeting.

Task B - Data Collection

In many respects, Bainbridge Island is a somewhat unique island environment. Since it is a "protected island" within the Puget Sound region, it is not exposed to the same ocean environment as islands which are completely surrounded by open ocean waters (e.g., the Caribbean Islands), but is exposed to a measurable level of marine vessel traffic to and from SEATAC ports and other points in the Puget Sound region. In addition, the Island does not contain any "heavy industry" (e.g., steel mills, auto manufacturing, etc.), but rather reflects an environment composed of some light manufacturing in an industrial park area, and many cottage businesses/home offices that employ a large portion of the work force. The Island also includes significant small-scale farming operations (which create GHGs, and at the same time, can also be beneficial to reducing GHG emissions). There are various processes that ATS can use to collect/estimate accurate GHG data from these sources.

ATS will develop templates for collecting energy use and emissions data based on the level of detail to be addressed in the inventory, as agreed between ATS and the City Project Staff. The templates will be created in Microsoft Excel and will be constructed as simply as possible to allow for easy inputs by the City's constituents. At a minimum, ATS will plan to collect the following:

- Fuel use data for each vehicle owned/leased by the City (if not available, we can use mileage data along with other information on vehicle characteristics to estimate fuel consumption)
- Fuel use data for business use of each personal vehicle of employees of the City (if not available, we can use mileage data along with other information on vehicle characteristics to estimate fuel consumption)
- Fuel use data for municipal building heating/cooling (for each building/facility)

- Locations, construction characteristics, and age of each municipal building; degree-day data for each location; data on fuel type and characteristics for each location
- Current land use and zoning data; projected/planned development
- Data on current open space and tree canopy/acreage of public and private forest
- Utility data (amount of electricity supplied to the Bainbridge Island community, by generation source)
- Location and capacity of renewable and non-renewable energy systems located on City property
- Location, capacity, and fuel use data for waste treatment facility(ies)
- Fuel use data for municipal waste collection vehicles (if not available, we can use mileage data along with other information on vehicle characteristics to estimate fuel consumption)
- Population (current and forecasted)

To the extent that it is available, ATS will also collect the following:

- Number, square footage, and age of all residential buildings
- Number, square footage, and age of all commercial buildings
- Fuel type and use for residential and commercial building heating/cooling (for each building)
- Locations, construction characteristics, and age of each residential and commercial building

For the most accurate, complete, and useful inventory, data is also needed on the following:

- Acreage and productivity of agricultural land
- Fuel use data for agricultural vehicles and machines (if not available, we can use mileage data along with other information on vehicle/machine characteristics to estimate fuel consumption)
- Fuel use data for ferry service (if not available, we can use mileage and schedule data along with other information on ferry characteristics to estimate fuel consumption)
- Fuel use data for construction vehicles (if not available, we can use mileage data along with other information on vehicle characteristics to estimate fuel consumption)
- Purchase and consumption of household goods, food, and services by the City and its businesses and residents
- Number, make and model, and age of appliances, electronic devices, machines, and other fuel/electricity-consuming items used by the City and its businesses and residents
- Number of vehicles used by Bainbridge Island City's businesses and residents, and fuel use data for each (if fuel use data is not available, any data available on mileage and vehicle characteristics can be used to estimate fuel use)
- Number of residents that commute to work, commuting distance, and modes of commuting (e.g., personal vehicle, bus, rail, bike, etc.)
- Data on the air travel of Bainbridge Island's municipal employees, residents, businesses, and visitors (number of trips, distance of trips)

In addition, ATS will identify and review any energy and/or GHG analysis conducted by entities that have a footprint within Bainbridge Island City boundary to be considered. Our team member, Stacey Nordgren, a Bainbridge resident will assist us as needed with local data collection and provide local coordination with City Project Staff.

Some of the needed data will be relatively easy to secure from utilities, the City, Kitsap County, State of Washington, the University of Washington Climate Impacts Group, and businesses. Other data, such as data on appliances, devices, and machines used in residential and commercial buildings, likely does not yet exist and will require significant effort to develop. Surveys can be effective tools for collecting this data, if sufficient response rates can be achieved. Online tools are widely available for efficient development, collection, and analysis of surveys, for very low cost, and ATS has extensive experience conducting such surveys using these tools.

Crowdsourcing and "citizen science" have recently been used in certain fields of science to collect data and, sometimes, insight, from laymen. Developing a mobile app or a website for Bainbridge Island stakeholders to enter data about their energy use, commuting habits or food purchases may be a low-cost

means of collecting data for use in the inventory and would be useful for tracking future habits in order to update the inventory. However, a critical mass of data would need to be collected for the data to be considered representative, and the app or website would have to be carefully crafted to ensure that the data collected is verifiable.

Any actions the City may implement subsequently to reduce GHG emissions should include a data collection element so that reductions can be tracked and verified. For example, the City could consider rebates for high-efficiency automobiles or low-E windows. When residents or businesses submit an application for a rebate, they can be asked to provide specific data on the item being replaced and the new item, from which a very accurate emission reduction can be calculated.

Task C - Data Analysis

There is a range of methods that can be used to determine the City's GHG emissions "inventory," and the methods to be used are a function of the type, quality and extent of data that are available, and how the results are to be used. To the extent possible and practical, ATS will follow the guidelines outlined in the ICLEI Community Protocol. ICLEI has an online software platform called ClearPath for completing GHG inventories, forecasts, climate action plans, and monitoring at the community-wide and government-operation scales. If the City prefers, it can pay the annual ICLEI registration fee (currently, \$600 per year for Bainbridge Island) to acquire the ClearPath software and have ATS assist with using it, or simply rely on ATS to provide the City with a simple spreadsheet version of the inventory data which can be subsequently used for updating on whatever schedule it chooses. ATS will ensure that the calculation methods and emissions factors used in its analysis are consistent with those used by ICLEI. Whenever possible, ATS will obtain measured/recorded emissions data for the emission sources that fall within the boundary to be used for the analysis. When such direct data are not available, ATS will estimate the emissions using available energy use data. In some cases, sufficient energy use data may not be available; in such cases, ATS will identify comparable operations for which emissions data are available, or, if necessary, will apply more general emission factors for the appropriate type of operation, such as those developed by the U.S. EPA, U.S. Energy Information Administration, or as available from the ICLEI Community-Scale protocol.

Projections of future energy use and emissions will be made from various sources, including population projections, City plans, and utility plans.

Task D - GHG Emissions Report

In consultation with the City, ATS will recommend frameworks for presenting and reporting GHG emissions data in accordance with the Community Protocol. ATS will prepare a report that textually and graphically presents the GHG inventory and identifies emissions over which the City may have significant influence as well as additional community-wide emissions. When possible, ATS will incorporate content provided by the City, such as photographs and quotations. The report will identify top-priority sources of GHG emissions for which reduction strategies could be developed in later phases of Bainbridge Island's climate change planning process.

In addition to a report, ATS will help the City to develop graphics that can easily be viewed on its website and on mobile devices to display, in an easy-to-understand and visually pleasing format, the results of the inventory and, if so desired, emission reductions over time. If it is determined to be practical to use crowdsourcing, "citizen science," or surveys to collect data, providing the results on the City's website or on a mobile app will show stakeholders the impact of their participation and will motivate some stakeholders to participate that might not otherwise. The ATS staff proposed for this project have all the skills needed to create thoughtful and understandable visual representations of the inventory for the GHG emissions inventory report and for any media the City may choose to use. Examples of data displays from reports prepared by the project team members are provided in the remainder of this proposal section.

Table 1 – Estimate of Greenhouse Gases from Selected Operations

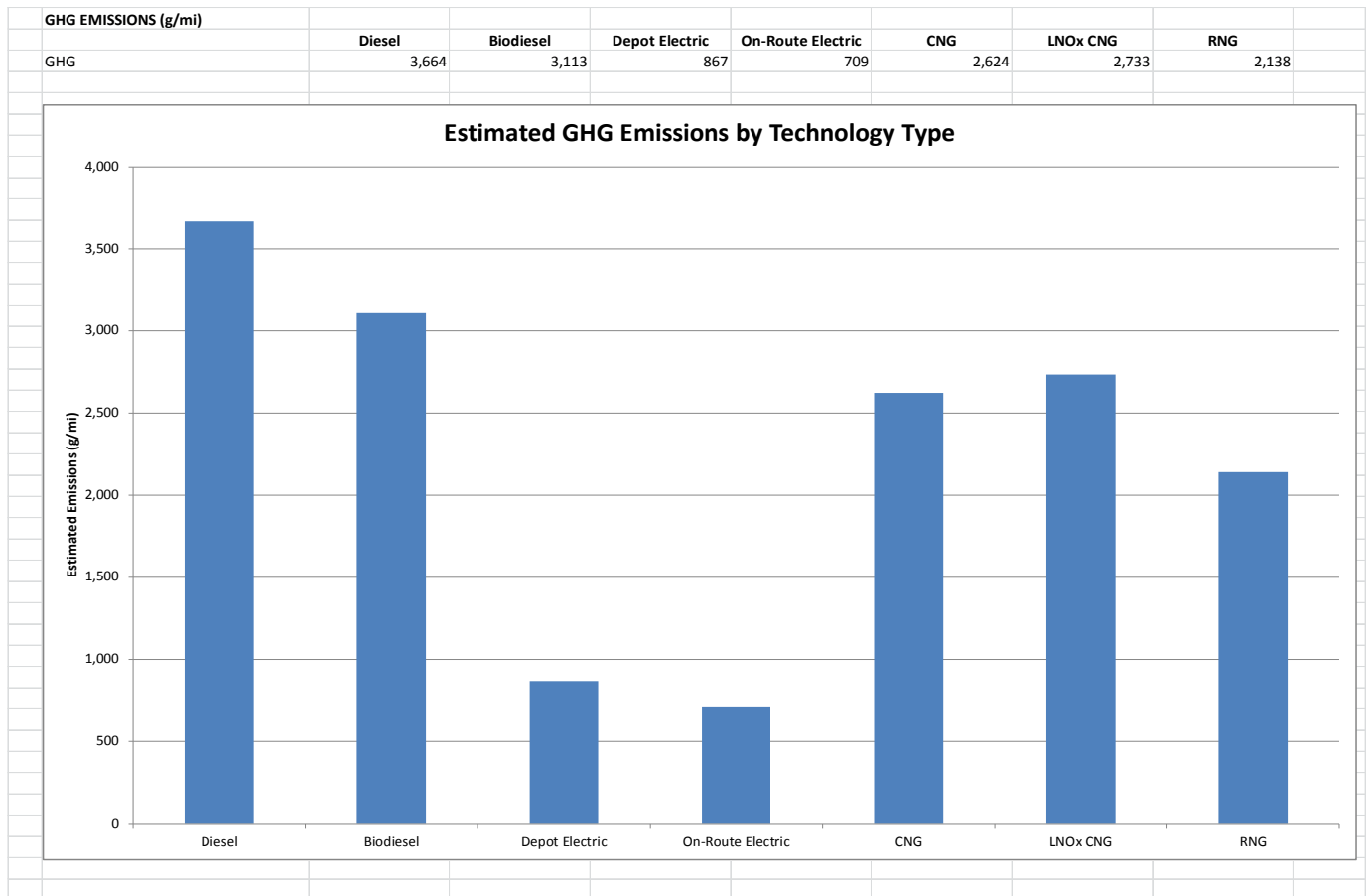
Location/Building	Number of Measurement Units		2007 Fuel/Energy Cost	2007 Greenhouse Gas Emissions (Tons)
ATLANTA				
Plaza Building	569,469	Square Feet	\$963,222	3,900
Garden Office Building	583,514	Square Feet	\$552,180	2,342
Data Center	67,198	Square Feet	\$1,509,850	6,460
Corporate Vehicles	15,108	Gasoline Gallons	\$40,338	146
Employee Commuting	821,810	Gasoline Gallons		8,613
ATLANTA TOTALS				21,461
NASHVILLE				
Operations Center	156,000	Square Feet	\$385,900	1,230
Corporate Vehicles	9,265	Gasoline Gallons	\$24,830	90
Employee Commuting	303,456	Gasoline Gallons		2,937
NASHVILLE TOTALS				4,257
DURHAM				
Data Center	122,000	Square Feet	\$373,990	1,793
Corporate Vehicles	8,446	Gasoline Gallons	\$23,311	81
Employee Commuting	63,052	Gasoline Gallons		611
DURHAM TOTALS				2,485
RICHMOND				
Riverview Building	392,457	Square Feet	\$751,999	2,590
STM Headquarters	116,518	Square Feet	\$304,672	1,145
Operations Center	205,849	Square Feet	\$395,092	2,160
Main Headquarters	305,954	Square Feet	\$634,295	2,921
Corporate Vehicles	5,190	Gasoline Gallons	\$13,702	50
Employee Commuting	1,583,568	Gasoline Gallons		15,467
RICHMOND TOTALS				24,333
ORLANDO				
Orlando Operations Center	330,829	Square Feet	\$827,389	2,109
South Orange Ave. Building	128,539	Square Feet	\$190,415	652
Corporate Vehicles	14,946	Gasoline Gallons	\$40,803	128
Employee Commuting	748,254	Gasoline Gallons		7,254
ORLANDO TOTALS				10,143
FT. LAUDERDALE				
SunTrust Ft. Lauderdale	77,419	Square Feet	\$173,020	320
Corporate Vehicles	154	Gasoline Gallons	\$433	1
Employee Commuting	22,661	Gasoline Gallons		219
FT. LAUDERDALE TOTALS				540
BUILDING TOTALS	3,055,746	Square Feet	\$7,062,024	27,622
Percent of Total				44%
CORPORATE VEHICLE TOTALS	53,109	Gasoline Gallons	\$143,416	496
Percent of Total				1%
EMPLOYEE COMMUTING TOTALS	3,542,801	Gasoline Gallons		35,101
Percent of Total				56%
GRAND TOTAL			\$7,205,440	63,219

Table 3 – Candidate GHG Emission Reduction Options

GHG Emission Source	Conservation Policy/ Processes/Procedures	Efficiency Improvements	Advanced Technologies
<i>Corporate Vehicles</i>	- Combined Trip Policy - Driving Reduction Program - Idle Reduction Policy - Speed Limit Policy	- Hybrids - Diesel - Smaller/Lighter Vehicles - Smaller Displacement Engines - Vehicle Maintenance Program	Plug-in HEV
<i>Employee Vehicles</i>	- Ride Share Program - Public Transportation Incentives Program - Work-At-Home Program (Telecommuting) - Alt. Work Schedule Program - Encourage Idle/Speed Reduction	- Hybrid Incentive - Diesel Incentive - Vehicle Maintenance Program - Increased Fuel Economy Vehicle Incentive	Plug-in HEV Incentive
<i>Building Management and Construction</i>	- Energy Service/Power Purchase Agreements - Establish Recycling Program and Use Recycled Materials	- LEED Certification - Additional Insulation - High Solar Reflectance Roof - Vestibules - Revolving Doors - Require Idle Limits for Construction Equip. - Biodiesel Use in Back-Up Generators	- Low U-Factor/ SHGC Windows - Low-E Windows - Low-loss Doors - Require Emission Reduction Products for Construction Equip. - Roof Misting/Sprinkling System
<i>HVAC</i>	- Revise Set-back Policy - Auto Set-back/Turn-off Thermostats Refrigerant Loss Monitoring	- High-Efficiency HVAC Units (Boilers, etc.) - HVAC Reduction with Lighting - Low Pressure Drop Filters - Increase Duct Sealing	- Solar Energy Systems - Ground-coupled Heat Pumps - Ice Storage A/C Units - Replace Refrigerants - Fuel Cell Back-up Power
<i>Data Center Equipment</i>	- Network/Server Scaling for Off-Peak Need Matching - Best Practices Cooling Management	- EnergyStar Equipment - Segregated/ Optimized Cooling - High Efficiency Power Supplies	- Off-grid Data Center Power Supply - Waste Heat Recovery - Fuel Cell Demonstration
<i>Office Equipment</i>	- Switch-off Policy - Use Power Management Software/Features	- EnergyStar Equipment - Automatic Power Management	Thin Client Equipment
<i>Lighting</i>	- Automated Lighting Systems (e.g., bathrooms and closets) - Switch-off Policy	- High-Efficiency Fixtures/Ballasts - Compact Fluorescent Light Bulbs - Natural Lighting/Light Pipes	LCD Lighting
<i>Water Use, Heating and Cooling</i>	Water Conservation Policy	- High-Efficiency Hot Water Heaters - Hot Water Pipe Insulation - EnergyStar Water Coolers - Tankless Water Heaters	Solar Water Heaters
<i>Customers</i>	- Idling Limits - Customer Education – Vehicle Fuel Saving - Incentives for Not Using Drive-in Banking - Incentives for Green Lending and Investments	Improved Drive-in Banking Access	- Fax Deposits - Expanded Online Banking Services

Table 5 – Results of GHG Emission Reduction Examples Analysis

Emission Reduction Option Class	Building (Tons CO2)	Corp Vehicle (Tons CO2)	Employee Commuting (Tons CO2)	Estimated Annual Savings (\$/Yr)	Estimated SunTrust Cost (\$)	Payback Time (Yrs)
Business As Usual GHG generated (2007 Baseline)	320	1.5	219	-----	-----	-----
Emission Reductions from:						
Conservation Policies	7	0.2	33	\$4,168	\$0	0
Efficiency Improvements	6	0.2	4	\$3,543	\$25,752	7
Advanced Technologies	18	0	8	\$10,380	\$339,030	33



Task E - Training and Tracking Hand-off

ATS will work with designated City staff/stakeholders to illustrate how GHG data are collected, and will carefully document the data sources, assumptions, and methodology so that the inventory can be updated by ATS before the project end, and by City Project Staff as desired in the future. City staff/stakeholders expected to be responsible for updating the inventory, if identified prior to the start of the project, will be involved in the decisions affecting the collection and analysis of data and will be given opportunities to interact with the data and any tools used in the analysis throughout the project. ATS will hold two training sessions, one in person and one by webinar, after the completion of the inventory, during which ATS will train City staff/stakeholders on updating the inventory. ATS has extensive experience preparing educational content and informative presentations and is able to convey all necessary information in terms that can be understood by persons with a non-technical background.

Task F - Project Management

ATS will update the City Project Staff on the project status in accordance with the Project Management tasks shown on the Project Schedule in Section VI. As shown in the Project Schedule, at the beginning of the project, the ATS Project Manager and Ms. Nordgren will meet in person with City Project Staff to discuss the project approach, the analysis methodology, and data needs. Subsequently, project status meetings will be held via conference call or webinar at key project points to inform the City Project Staff on the project's status and to collect input and feedback on data collection, assumptions, data gaps, and issues. An in-person meeting will be scheduled with City staff upon completion of the inventory to review the results and to initiate the training of City Project Staff on the use of the data and tools used in developing the inventory. After the

City Project Staff have had about a month to work with the data and tools, an additional training session will be held by webinar to address any difficulties or questions.

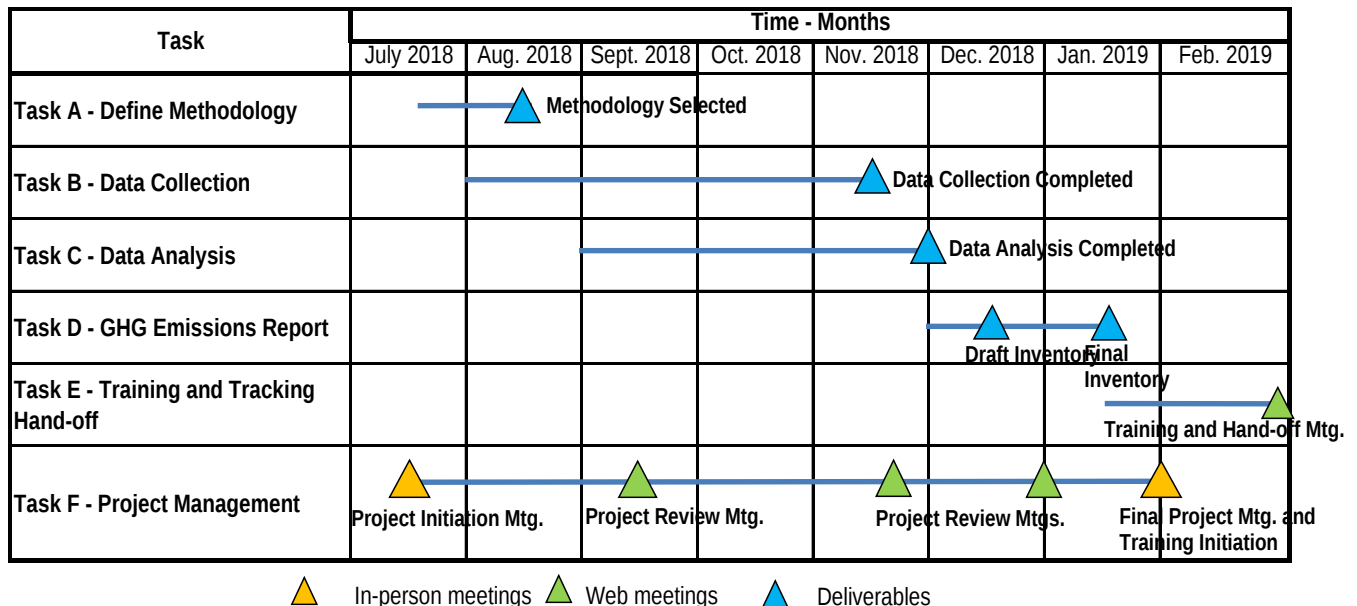
In addition to the formal meetings outlined in the project schedule, ATS Project Staff will be available on an as-needed basis by telephone to answer any questions of City staff or the Climate Change Advisory Committee. Our project team member, Stacey Justus Nordgren, is located in Bainbridge Island and will interact in person with the City staff and various stakeholders as needed. During the course of the project, she will assist with data collection and analysis as well as communication with City Project Staff and stakeholders; she will become intimately familiar with the methodology used in developing the inventory and, as a community member, will be a resource to assist the community in future updates.

Our estimated level of effort required to complete all of the above required project tasks is provided in the table below.

ESTIMATED TASK LEVEL OF EFFORT - Hours						TASK TOTALS
A - Define Methodology	B - Data Collection	C - Data Analysis	D - GHG Emissions Report	E - Training and Tracking Hand-off	F - Project Management	
54	146	136	164	56	74	630

VI. Project Task Schedule and Deliverables

Our schedule for project task performance, deliverables and project management meetings is shown in the figure below.



VII. Approach to Managing and Completing the Project

The ATS Officer-In-Charge and Project Director is responsible for assuring that the project's technical staffing needs are met, corporate resources are made available to support the project, quality control functions are in place and implemented in a timely fashion consistent with project schedule needs, and that project milestones/deliverables are met.

The ATS approach to project management focuses on assuring that a high quality work product is produced, as a function of the specifics of the tasks being performed. ATS takes pride in providing work products and related analyses of the highest quality and conformity with industry best practices. The ATS Quality Control Process has been developed and improved over the years as work processes have evolved

and changed. Quality is ensured at ATS through careful documentation of project communications, multiple reviews of all intermediate and final work products, and continuous feedback loops.

ATS work products are reviewed at various stages of development by both senior and junior staff. Diverse, cross-disciplinary perspectives are sought as appropriate, and work products are evaluated not only for accuracy and correctness, but also for contribution to the client's needs and goals. Often, the process is iterative; a project coordinator requests that team members provide an initial review, the comments are compiled and incorporated, and a second draft is provided to the project team for further refinement and to ensure that all necessary changes were made.

VIII. Approach to Client Communications

ATS communicates both internally and with clients and their stakeholders through emails, telephone calls, teleconferences, website announcements, interactive website interfaces, and face to face meetings, as appropriate. As appropriate, agendas are prepared and distributed to all participants in advance of the communication to guide the conversation and ensure efficient use of time. Depending on the nature of the communications, they may be documented formally such as in meeting or teleconference minutes, or informally in notes or memos. When formal documentation is produced, it is provided to all participants in the communication to ensure accuracy and correct interpretation. Participants are given an opportunity to review the documentation and provide clarifications or corrections as needed, thus avoiding or mitigating misunderstandings and incorrect interpretations.

As with ATS's internal work product review process, continuous feedback loops are incorporated when deliverables are provided to the client. Frequently, the client is provided with intermediate work products and draft deliverables as appropriate and is given an opportunity to review and comment. Regular communications with the client are established, enabling ATS to stay apprised of developments that may affect the project. In this way, ATS can quickly and efficiently implement changes to the project's scope or direction; thus, ATS provides valuable and high-quality work products in a dynamic working environment.

ATS has developed project status reports for various clients and project types. These reports can be provided to the City, if desired. Project status reports state concisely the accomplishments achieved over the reporting period, any issues that have been encountered or barriers to progress, and next steps with an expected timeline for completion. In addition to project status reports, ATS documents all project communications, including email, phone conversations, teleconferences, and meetings. Depending on the nature of the communications, they may be documented formally, such as in meeting or teleconference minutes, or informally in notes or memos.

IX. Additional Information

This proposal section contains additional background information and examples of relevant projects performed by the ATS.

In 2007, ATS created its Carbon Management Boot CampSM www.carbonmanagementbootcamp.com) which has been presented to dozens of attendees at various locations throughout the U.S. The ATS Carbon Management Boot Camp is a workshop series designed for organizations of all types that would like to learn more about the generation of greenhouse gas emissions resulting from their operations and to initiate the evaluation, planning and implementation process needed for developing an effective carbon management program. The workshop program is structured into two parts: **Part 1** provides an excellent understanding of climate change concerns and worldwide initiatives, the basics of greenhouse gas emission formation and sources, methods for their determination, opportunities for reductions, requirements for taking emission reduction credits to the credit trading market, and elements needed to develop an effective carbon management program. **Part 2** describes specific emission reduction opportunities and carbon management program implementation strategies tailored to major categories of organizations, including government agencies, building owners and tenants, product manufacturers and industrial process organizations, retail sales organizations, supply chain service providers, and mobile source vehicle/equipment operators. This part focuses on approaches to greenhouse gas emission inventory development and emission reduction strategies.



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ADVANCING A BETTER ENVIRONMENT



CARBON MANAGEMENT BOOT CAMP™ TRAINING PROGRAM

Understanding, Measuring and Reducing Your Carbon Footprint

Examples of ATS carbon/energy management and GHG analysis projects include the following:

Carbon/Energy Management Project Examples – Buildings and Facilities

- Created a GHG emission inventory for a large regional bank in the southeastern United States, and assessed GHG emission reduction options. The inventory included eleven of the bank's largest buildings and related operations in six cities. The analysis addressed the GHG emissions from building energy consumption, equipment energy use, corporate vehicle operations, employee commuting and supply chain functions. The GHG emissions of the bank's buildings were compared to those of other banks. A wide range of emission reduction options was identified and analyzed. Potential reduction opportunities included energy conservation policies, processes, and procedures (e.g., revise set point temperatures); efficiency improvements (e.g., install compact fluorescent light bulbs); and advanced technologies (e.g., install solar energy systems). For each potential reduction opportunity, the analysis determined:
 - Extent of GHG reduction that could be achieved.
 - Estimated annual savings in operating cost that would accrue to the bank.
 - Estimated cost to the bank to implement the option.
 - Payback period that would be needed to recover the implantation cost.Results were compared to a baseline, "business as usual" scenario.
- Developed energy-conscious design guidelines for small office buildings, under sponsorship of the U.S. DOE Pacific Northwest Laboratory. Project defined the process for evaluating building energy use and analysis of energy-saving options, and characterizing capital costs and savings attributable to each energy-saving option.
- Analyzed energy use and GHG emission generation from the operations of a major eastern regional bank in the U.S. Analysis addressed energy usage and greenhouse gas emissions from over 1800 buildings comprising over 17 million square feet of floor space, office equipment, employee functions, supply chain, and customers. Developed carbon management plan to reduce GHG emissions and operating costs.
- Performed energy audits and analyzed energy-saving opportunities for 20 school buildings in the Baltimore City school system. Scope of energy audits included examination of building envelopes, heating and cooling equipment, boilers, lighting systems, piping and building insulation, and the potential for applications of energy management control systems and solar energy systems.

- Performed feasibility assessment of various fuel (including several renewable fuels) alternatives for a suburban Washington DC community consisting of 1,600 cooperatively owned housing units. Considered were 22 alternatives to conventional heating oil and improvements that would reduce fuel consumption (and fuel costs). Analyses addressed equipment requirements, economics, fuel supply issues, and environmental considerations.
- Modeled the energy-saving performance of ten commercial buildings in the Pacific Northwest constructed with a number of energy-conserving and renewable energy features. Project quantified the energy savings achieved by the buildings, compared to the energy consumption levels that would have occurred if the buildings were constructed without the energy-saving and renewable energy features.
- Assessed the feasibility of incorporating cogeneration at a U.S. Air Force base on the East Coast. Fuel and electricity usage was examined as well as a range of site-specific factors to determine the technical and economic feasibility of installing a cogeneration energy supply system at the Air Force base.
- Analyzed pollutant and GHG emission reduction options for electrical power production equipment in Native Alaskan villages. An expected follow-on phase to this work will address emission reduction options for marine vessels serving Alaskan coastal areas.
- Analyzed emission reduction options for diesel-powered generators used for back-up power at a prominent golf course-resort facility in the mid-west, and developed program recommendations to achieve emission reductions.
- Developed methodologies and computer analysis tools to evaluate the performance of advanced day-lighting technologies for typical office building lighting applications, and their impacts on space heating and cooling loads and building electrical demand, and energy cost savings.

Carbon/Energy Management Project Examples – Industrial Processes

- Identified manufacturing processes that could benefit from the application of advanced industrial sensors, to enable energy and operational cost savings, and reductions in GHGs.
- Analyzed energy use and GHG generation from a \$1 billion per year international producer of petrochemical intermediates. Assessed opportunities for reductions in energy use, operating costs and GHGs. Analysis also addressed GHG emissions associated with raw materials suppliers and transportation/distribution of manufactured end products.
- Designed industrial process and facility energy conservation analysis techniques and practices for the rubber, plastics, textile and metal fabrication industries for a major U.S. engineering trade association. Identified opportunities for energy savings in these industries, performed site visits, developed case studies, and developed and published training materials.
- Assessed the use of landfill gas, municipal sewer gas, and municipal solid waste as energy sources for ethanol production plants, to minimize the use of conventional energy sources and GHGs in the ethanol production process.
- Performed engineering feasibility study for retrofitting industrial-sized boilers to operate on refuse-derived fuel from municipal solid wastes. Analysis addressed fuel resource availability, fuel handling requirements, boiler modifications, environmental issues, licensing and permitting requirements, costs, and fuel supply logistics.
- Performed energy improvement and pollution minimization feasibility analyses for manufacturing processes for soaps and personal care products.
- Performed economic and engineering feasibility assessment for using waste materials as an energy source, and recycling wastes to minimize energy use and GHGs at a large U.S. Air Force base. Focus of the assessment was on use of systems and technologies (including heat recovery, refuse-derived fuel, and selective recycling) to minimize the current practice of landfilling of waste materials.
- Analyzed the performance and cost of various combustion modifications to control GHGs from coal-fired utility plants.
- Assisted a major West Coast utility company in providing energy conservation assistance to its industrial customers. Assessed a wide range of energy-saving and GHG-reducing opportunities (including flexible manufacturing systems, membrane separation, pressure swing absorption,

impingement drying, regenerative combustors, and electro-lag processing) for application to the company's customers.

- Assessed regional impacts of GHG emissions from a large cement production facility and addressed various options for reducing those emissions in the cement production process.
- Analyzed advanced concepts in high temperature combustion systems for improving fuel combustion efficiency in reducing pollutant and GHG emissions in industrial process furnaces.
- Assessed potential for retrofitting coal-fired industrial- and utility-size boilers for co-firing with biomass materials. Determined impact on pollutant emissions, GHGs, combustion efficiency, system costs, and resource supply costs.
- Analyzed energy use and GHG emission generation for a 20 million gallon per year biodiesel production facility. Identified opportunities for reducing energy use, operation cost and GHGs.

Carbon/Energy Management Project Examples – Fuels and Mobility Systems

- Developed estimates of cost of ownership, criteria pollutant emissions, and GHG emissions of various transit bus propulsion/fuel technologies to enable transit bus fleet managers and operators in the Pacific Northwest region of the United States to compare the cost effectiveness of emission reduction options, particularly for GHGs. Specific results were developed for King County Metro Transit. Costs included in the analysis include:

• Bus procurement cost • Mid-life overhaul costs • Annual bus maintenance and fuel costs • Fueling/charging station capital cost	• Maintenance facility modification costs • Annual operating and maintenance costs for depots (a depot is a combined fueling/ recharging station and maintenance facility)
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Propulsion/fuel technologies included:

- o Diesel (powered by a compression ignition engine using ultra-low sulfur diesel fuel; baseline vehicle used to compare other propulsion/fuel technologies)
- o Biodiesel (powered by a compression ignition engine using a 20% biodiesel, 80% ultra-low sulfur diesel blend [B20])
- o Depot electric (powered by a battery pack that must be recharged at the depot overnight)
- o On-route electric (powered by a battery pack that uses an overhead charging station to recharge during the course of in-service route operation)
- o Compressed natural gas (CNG) (powered by a spark ignition engine using CNG fuel)
- o Low NOx (LNOx) CNG (powered by a LNOx calibrated CNG spark ignition engine using CNG fuel)
- o Renewable natural gas (RNG) (powered by a CNG spark ignition engine using RNG fuel)
- Analyzed types and quantities of GHGs that are produced from conventional and alternative fuels production and use in vehicles. Assessed studies performed by others for comparison of results and to develop a more current and accurate set of estimating factors for use in analytical efforts undertaken by the U.S. DOE. Project served as the basis for development of the GREET (Greenhouse gases, Regulated Emissions, and Energy for Transportation) "well-to-wheel" computer model by the U.S. DOE's Argonne National Laboratory.
- Assessed the resource-through-end-use energy efficiency and cost of conventional and alternative fuels for highway transportation. Project involved construction of an analytical method for estimating the end-use energy efficiencies and cost factors for resource extraction/collection, resource transport, processing, fuel delivery and end-use in vehicles.
- Determined pollutant and GHG emission inventory for a refuse collection fleet of over 1000 vehicles in Portland, and assessed options for reductions.
- Assessed a wide range of transit bus technologies for improving air quality and reducing GHGs in a major metropolitan area of the mid-Atlantic region. Performed impact analyses of technologies, costs, and operations, surveyed current transit property technology users and their experiences with low-emissions transit bus technologies, and developed emission inventory and emission reduction

comparisons for each technology.

- Developed vehicle emission factors and evaluated the air quality and GHG benefits to the metro Washington DC area that would result from the use of compressed natural gas in transit bus fleets operated in a major metropolitan area of the mid-Atlantic region.
- Determined the feasibility of near-term technology options that can be utilized to improve the pollutant and GHG emissions from transit buses and improve air quality in the metro Washington, DC area. Analysis focused on reducing NOx, VOC and GHG emissions from diesel transit buses. Results of the analysis identified several technology options for further consideration.
- Developed a unique and proprietary system of real-time monitoring and reporting of verified pollutant and GHG emission reductions (and their location) from virtually any internal combustion engine used in mobile systems applications. This addresses a critical unmet need for projects involving emissions reductions from in-use fleets of vehicles and off-road power equipment and should make it practicable for emissions credits to be generated from such projects.
- Analyzed diesel engine vehicle idle emissions reduction technologies and their potential for market acceptance. Assessed number, location and owners of truck stops operating throughout the state, developed estimates of trucks using truck stops, the idling emissions produced by them, and pollutant and GHG emission reductions that could be achieved through use of idle reduction technologies.
- Analyzed major categories and estimated quantities of pollutant and GHG emissions associated with ship and port operations at the Port of Baltimore. Compared emissions produced by transporting cargo on a commercial ship to the emissions that would be produced by transporting the same goods by truck and/or rail. Provided recommendations and analysis of emission reduction options and the benefits that could be achieved.
- Evaluated pollutant and GHG emission reduction benefits that could be achieved by adopting a Smart Growth Program using advanced transit bus emission reduction technologies. The results of this evaluation were used by the state transportation and environmental agencies for consideration to be included as part of the State Implementation Plan (SIP) for meeting air quality standards in the metro area of operation.
- Documented compressed natural gas vehicle pollutant and GHG emission characteristics, effects of variations in gas properties, effectiveness in emission control systems, and impacts on national air quality.
- Provided analysis and planning services for the Western Governors' Association, Western Regional Air Partnership (WRAP) program for developing diesel engine emission reduction projects for off-road vehicle/equipment applications. This program covers the states of Alaska, Arizona, California, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming.
- Analyzed pollutant and GHG emission reduction options for a fleet of diesel-powered fishing vessels.
- Provided analysis and recommendations for improving the processes, assumptions and calculation methods for assessing pollutant and GHG emission reduction opportunities for transporting solid waste to landfill sites along the Columbia River in the Pacific Northwest. Transport options included truck, rail, barge and combinations of those transport modes.



Greenhouse Gas Emissions Inventory

PROPOSAL TO THE CITY OF BAINBRIDGE ISLAND

MAY 25, 2018

CASCADIA CONSULTING GROUP, INC.



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www.cascadiaconsulting.com



May 25, 2018

City of Bainbridge Island
Office of the City Manager

Enclosed: Response to **RFP for Greenhouse Gas Emissions Inventory**

Dear Evaluation Team Members:

As a growing island community, the City of Bainbridge Island faces particular climate challenges. Residents depend on the state-run ferry for transportation to and from the Seattle area, and growing development pressures threaten existing forests that sequester carbon. The City and its residents have already demonstrated a strong commitment to environmental stewardship. This project will further these efforts by presenting a clear picture of baseline greenhouse gas (GHG) emissions on the island, setting the stage for future climate mitigation efforts.

Cascadia is eager to assist the City in this important work. Our approach centers on cost-effectively gathering and evaluating high-quality data, resulting in an inventory that is efficient and effective in laying the foundation for understanding—and reducing—emissions. Our approach brings the following advantages:

- ▶ **We make the most of limited resources by leveraging existing inventory data.** Having recently completed a communitywide GHG inventory for Kitsap County, we have already collected many data sources relevant to Bainbridge Island's inventory, including fuel use and emissions data for the Bainbridge-Seattle Washington State Ferries route and Kitsap Transit. Our ready access to the existing data allows us to dive more deeply into sources of particular interest to the City or to expand the inventory to include more sectors.
- ▶ **As a local firm working on these issues for 25 years, Cascadia has a deep understanding of regional climate issues, organizations, and context.** Our strong foundation of climate work in the Puget Sound basin and Pacific Northwest enables us to streamline the inventory process, bring best practices from other regional entities, and ensure the Bainbridge Island inventory aligns with regional and peer community inventories.
- ▶ **We are comfortable working with clients in a variety of capacities, including independently or as partners, and we will provide training and tools to prepare City staff to complete future updates.** Our clients range in their capacity and interest in conducting future greenhouse gas inventories in-house. We customize our approach to meet clients' needs and deliver effective products and tools—from working collaboratively to co-create an inventory to transferring a fully packaged and completed inventory at the end of the process. Our analyses and tools are built with an eye toward future needs and applications; we are prepared to equip City staff with the tools and knowledge needed to complete future updates for Bainbridge Island.

This proposal presents our Cascadia project team (we propose no subcontractors), knowledge and experience, proposed tasks and level of effort, and timeline. Please contact us with questions or for additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Christy Shelton", with a stylized, flowing script.

Christy Shelton, Co-Owner and Principal
Cascadia Consulting Group, 1109 1st Ave, Suite 400, Seattle, WA 98101
phone 206.449.1107 | fax (206) 343-9819 | christy@cascadiaconsulting.com

Project Understanding

With a long history of taking proactive steps toward sustainability, the City of Bainbridge Island has demonstrated a clear commitment to advancing local climate action and leadership. To meet its greenhouse gas (GHG) emissions reduction goals, the City will need to accurately and effectively assess and communicate its emission sources and trends. The creation of a baseline GHG inventory will provide transparency, accountability, and strategic insight into the City's emissions management progress, priorities, and needs.

Cascadia Consulting Group is pleased to submit this proposal to develop and present the City's baseline communitywide and municipal GHG inventories. Our team of seasoned greenhouse gas analysts and climate action planning experts specialize in supporting local government clients—in the Pacific Northwest and beyond—to achieve their climate and sustainability goals and translate complex technical information to guide actionable outcomes. Cascadia is deeply familiar with the approaches, latest knowledge, and key data sources in the GHG analysis field, including those specific to the Puget Sound region and Kitsap County. We can hit the ground running, and we have a reputation for delivering high-quality products that illuminate action-relevant steps forward. Core elements of our approach include the following:

- ▶ **Flexibility.** We understand that ideal data inputs for GHG inventories are not always available. This constraint is especially true for smaller municipalities. We scale and tailor our methodologies based on available data and associated formats, and we will happily work with the City to identify the most accurate and reasonable approach given data availability and limitations.
- ▶ **Targeted prioritization.** We scale our resources and efforts to fit GHG inventory attributes, so that sufficient attention is paid to those inventory sources that contribute the largest emissions or provide the greatest potential for reducing emissions. For example, we anticipate that electricity and transportation emissions contribute large portions of community emissions on Bainbridge Island. We will scale our efforts accordingly to ensure that emissions associated with those sectors are calculated in the most accurate way feasible.
- ▶ **Planning for the future.** We craft all our products with an eye toward the City's future needs and applications. The GHG inventory and associated products will be designed to facilitate future inventory updates and real-time data visualization and manipulation. Our customized Excel-based models are designed to be transparent, modular, flexible, and user-friendly.
- ▶ **Simplicity.** Greenhouse gas inventories can be complicated, but inventory summaries and reports should be simple and straightforward. We pride ourselves in distilling complex concepts into visually appealing, easy-to-understand narratives and graphics that answer key questions and tell a clear story.
- ▶ **Quality control reviews.** All Cascadia products undergo a rigorous quality control process—including review from our internal Editorial Board and Quality Assurance/Quality Control Team—before submittal to clients. These reviews ensure that our products are accurate, defensible, and well-written, giving our clients full confidence in the findings.

From this process, we will deliver products that clearly depict the current picture of greenhouse gas emissions for the City of Bainbridge Island and illuminate a possible future. Our team brings the right mix of technical skills, knowledge, local insights, and passion to deliver that outcome.

Project Team

Kendra White | Project Manager & Lead Analyst



Kendra manages and supports research, planning, and evaluation efforts across Cascadia's energy, climate, zero waste, and sustainability practices. Kendra has led analysis and strategic planning efforts for clients including Sound Transit, Shoreline, Auburn, the State of Hawaii, Seattle City Light, and King County, among others. She is currently leading a GHG analysis and climate action planning effort for the City of Auburn and leads renewable energy and GHG inventory analysis and planning for Sound Transit's sustainability team. She serves on the board of Spark Northwest and holds a B.A. in Economics from Colgate University. She has a B.A. in Economics from Colgate University.

Kendra will manage all aspects of the project, ensuring clear communication with the City of Bainbridge Island and delivery of high-quality deliverables on time and on budget. She will also oversee analytical work and provide technical review on the project, ensuring that all methodologies adhere to relevant protocols and all calculations undergo Cascadia's rigorous quality assurance/quality control process.

Christy Shelton | Principal-in-Charge



Christy brings 24 years of experience managing the development, analysis, and evaluation of effective plans and programs for climate action, sustainability, and resource conservation. She has conducted GHG inventories, sustainability planning, program evaluation, research, and facilitation projects for cities, counties, states, and other public agencies. As Principal, Christy provides strategic guidance, oversight, and review to ensure high-quality deliverables and project performance. She has led or advised climate action and sustainability projects for local cities including Shoreline, Seattle, Mountlake Terrace, Bellevue, Auburn, Renton, and Tacoma, plus others beyond the Puget Sound region. She manages a \$2.55-million on-call contract with Sound Transit to integrate sustainability measures into operations and capital projects, including an annual inventory of GHG emissions and resource use, sustainability plan updates, and a climate adaptation plan. She earned a B.A. (honors) from Stanford University and M.S. from Michigan's School for Environment and Sustainability.

Christy will provide high-level review and oversight of all deliverables.

Olivia Ashmoore | Analyst



Olivia supports climate mitigation and adaptation planning through research, analysis, and writing. As a member of Cascadia's Climate and Natural Resources Management team, she is involved in a range of environmental projects, from climate action planning to sustainability research. Olivia has conducted data collection, research, and analysis in support of multiple greenhouse gas inventories and citywide climate action plans, including for Flagstaff (AZ), Columbia (MO), and Piedmont (CA). She has experience creating greenhouse gas emissions inventories in compliance with international protocols, developing community climate action strategies, assessing the need for climate change adaptation, and coordinating public outreach. She specializes in use of the ClearPath software and has deep working familiarity with USCP and GPC protocols. Olivia holds a B.A. in Environmental Studies from Oberlin College.

Olivia will provide research, data collection and analysis, writing, and coordination in support of all tasks.

Additional Staff

Cascadia also offers a **deep bench** of over 40 dedicated consulting staff with extensive capabilities in **graphic design, research, analysis, report-writing, and editing**. These staff will support the project as needed and offer capabilities that complement the key personnel listed above. They include the following staff members:

- ▶ **Andrea Martin**, climate mitigation and adaptation planning and analysis.
- ▶ **Kirstin Hervin**, analytical modeling.
- ▶ **Emily Wright**, geographic information systems (GIS) analysis and mapping, research, and writing.
- ▶ **Shannon Saam**, consumption and waste.
- ▶ **Stephanie Thomas**, recycling and resource conservation.
- ▶ **Julie Stein**, graphic design.

Relevant Experience

Since its founding in 1993, Cascadia Consulting Group has worked with public, corporate, nonprofit, and tribal clients to advance projects that benefit their communities and the environment. Cascadia's expertise includes strategic planning, analysis, and management of climate change mitigation and adaptation, energy efficiency



and renewable energy, recycling and materials management, and resource conservation projects. Through effective research and analysis, decision-support tools, workshops, program evaluation, and reporting, we empower our clients to direct their own progress toward sustainability goals. Cascadia is a women-owned small business based in Seattle, with offices in Oakland and Austin.

Cascadia has performed over **70 greenhouse gas inventories** for a range of public and private-sector clients, including recent completion of community-scale GHG inventories for **Kitsap, Snohomish, King, and Pierce counties** in Washington State. In addition to our full GHG and sustainability inventory services, we also support clients in **keeping greenhouse gas inventories updated over time** through trainings and documentation. Other relevant experience in the Puget Sound region includes the following projects:

Local Clients	Communitywide Inventory	Municipal Inventory	Training for Future Updates	In-Depth Energy/GHG Analysis	Action Planning
City of Auburn	x	x			x
City of Bellevue	x		x	x	
City of Edmonds		x		x	x
City of Olympia	x			x	
City of Renton	x	x			x
City of Shoreline	x	x	x		x
King County	x	x		x	

Our team offers decades of experience researching, designing, conducting, and evaluating greenhouse gas inventories. Our work identifying, prioritizing, and implementing strategies to reduce emissions means we understand how to orient our emissions inventories to be as **relevant and actionable** as possible. Highlights of our team's relevant project experience appear below; work samples and additional project examples are available upon request.

Specifically, Cascadia brings the following advantages:

- ▶ **We know the protocols.** We have read, assessed, and applied major inventory protocols, including the U.S. Community Protocol and GPC. We have a strong understanding of protocol requirements and how they compare.
- ▶ **We go beyond the typical inventory boundaries.** Our clients are often interested in including sources beyond those seen in typical inventories, such as consumption-based emissions and emissions from agriculture and forestry. Cascadia recently produced a locally-specific analysis of carbon sequestration potential on Fort Collins lands, which will help the City find creative ways to help achieve its ambitious climate action goals while still following accepted offset protocols. We are also working with the

Midpeninsula Regional Open Space District in California to complete a GHG inventory and create a climate action plan for the District, which includes consideration of livestock grazing emissions and land carbon sequestration.

- ▶ **We ask the tough and applied questions.** In addition to conducting inventories, we have a demonstrated ability to take the data one step further to ask, is this the right approach? What could be driving these results? What do these results mean for City action moving forward? This is exemplified through our work conducting a third-party review of greenhouse gas calculation methodologies in the context of meeting a carbon neutrality goal for King County, as well as our current work deconstructing and analyzing inventory trends together with ICLEI and the U.S. Department of Energy.
- ▶ **We focus at multiple levels to meet the City's needs.** From the detailed quantitative level to higher-level policy and planning, we have assisted local governments in greenhouse gas accounting, analysis, and climate action planning. Examples of this include development of climate action strategies and plans for the cities of Ashland (OR), Flagstaff (AZ), and Columbia (MO)—all of which required conducting greenhouse gas analysis, forecasting, and modeling to arrive at clear and practical climate action goals and strategies.

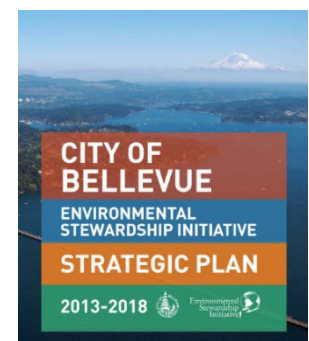
Selected examples of our projects are described below.

Puget Sound Multi-County GHG Inventory | Puget Sound Clean Air Agency | 2017

Cascadia updated the Puget Sound Clean Air Agency's four-county emissions inventory to provide 2015 emissions data for King, Kitsap, Pierce, and Snohomish counties. This update required compiling, standardizing, and streamlining data from multiple jurisdictions to create an accurate, standardized inventory. The inventory followed the U.S. Community Protocol and included emissions sources generated beyond the county's borders but related to activities within the county, such as resident air travel and electricity generated elsewhere that is used in the county. As part of this work, Cascadia reviewed the agency's past inventory methodology, collected and analyzed emissions data from a variety of public agencies and independent organizations, and produced a final inventory report with accompanying computational workbooks.

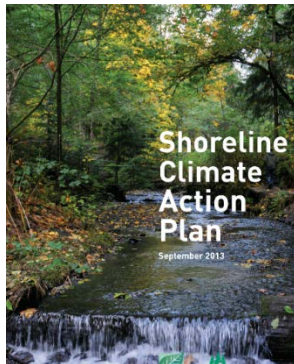
Environmental Stewardship Initiative Strategic Plan & Citywide Greenhouse Gas Emissions Analysis | City of Bellevue, WA | 2012 & 2017-Present

In 2012, Cascadia assisted the City of Bellevue in updating its Environmental Stewardship Initiative (ESI) Strategic Plan and reporting on successful outcomes of the Initiative to date. As part of this effort, Cascadia worked with the City to update its municipal and community-level greenhouse gas (GHG) emissions inventory and assisted in the development of a web-based platform for tracking other environmental indicators and outcomes. In addition, Cascadia collected and analyzed data on current programs and practices, used the results to identify and evaluate new opportunities for action, and drafted content for the updated Strategic Plan.



Currently, Cascadia is working with the City to analyze trends in the city's community-wide GHG emissions and develop recommendations for updated emissions reduction targets and strategies. As part of this work, which was funded by a regional Department of Energy grant, Cascadia reviewed and updated two emissions inventories for the City. Based on the results of the analysis, Cascadia will create a Climate Action Technical Report that includes updated emissions targets and emissions-reduction strategies for the transportation, land use, residential and commercial property, waste, and energy sectors—to inform the next update of their ESI strategic plan. As part of the current inventory work, Cascadia is also providing training and support to help City staff continue to update the inventory over time. As part of this project, Cascadia is also conducting contribution analyses for the cities of Ashland (OR), Durham (NC), Olympia (WA), and Shoreline (WA).

Climate Action Plan & Public Communications | City of Shoreline, WA | 2012-2013 & 2017-Present



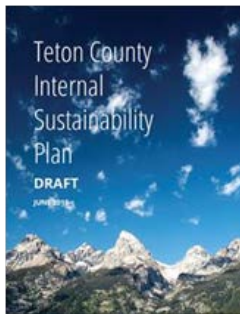
The City of Shoreline commissioned Cascadia in 2012 to assist council members, staff, and stakeholders in preparing a citywide greenhouse gas inventory and Climate Action Plan that lays out a strategic pathway to environmental, social, and economic sustainability. Cascadia led all aspects of the planning process, including stakeholder facilitation, public engagement, background research, and analysis and prioritization of strategies. The resulting plan identifies climate action objectives, major emissions sources, key reduction strategies, and the City's and community's role in taking action on climate change.

In 2017, the City asked Cascadia to update the City's public sustainability communications to reflect progress on the Climate Action Plan and other sustainability initiative, including its website. Cascadia updated and refined the City's sustainability metrics, goals, targets, and reporting and worked with the City to update its sustainability website, which includes compelling charts, case studies, and infographics that tell the story of sustainability in Shoreline and inspire behavior change in the community. Cascadia is now working with City staff to carefully organize, compile, and document all sustainability metrics—including the municipal and communitywide greenhouse gas inventory—to ensure that the City can successfully complete future updates.

GHG Inventory Update and Climate Action Plan | City of Auburn, WA | 2017-Present

Cascadia is currently working with Auburn to prepare updated municipal and community inventories based on 2015, comparing emissions to the 2008 baseline—a municipal and community greenhouse gas inventory also performed by Cascadia—and producing an updated emissions forecast based on key indicators, including population, economic growth, and energy demand. The inventory findings and forecasts are calculated and stored on ICLEI's online ClearPath software, allowing City staff to easily access and share results. Based on inventory findings and projections, Cascadia is working with the City to identify activities that the City and community can take to reduce emissions. Recommended strategies, along with successes to-date, will be presented in a Climate Action Plan.

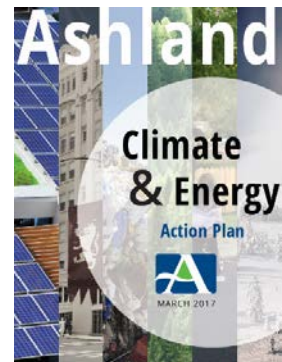
Internal Operations Sustainability Plan | Teton County, WY | 2016-2017



Cascadia led the development of Teton County's first internal sustainability plan. Focused on the County's internal operations, the planning process began by conducting staff interviews across multiple departments and a developing a baseline sustainability inventory that benchmarks sustainability progress in the County. The baseline includes a review of outcomes from the County's greenhouse gas inventory. Building on this baseline, Cascadia worked with stakeholders through a workshop process to identify and evaluate goals, strategies, and actions for inclusion in the sustainability plan. The final plan includes an implementation plan as well as a monitoring and evaluation strategy for tracking progress over time.

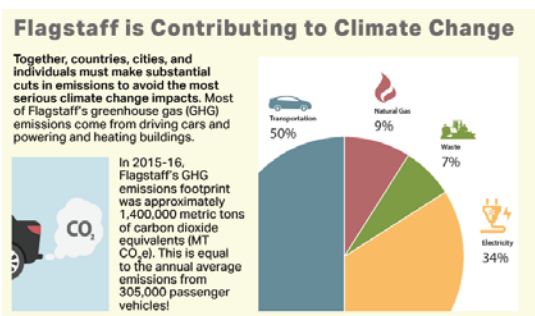
Climate & Energy Action Plan | City of Ashland, OR | 2016-2017

Cascadia recently supported the City of Ashland in developing its first Climate and Energy Action Plan. The plan sets forth a roadmap to reduce internal and community-wide greenhouse gas emissions and prepare the community for future climate changes. The climate mitigation element involved building on the City's recent GHG inventory and working with the City and stakeholders to model future emissions scenarios, clarify the mitigation goal, develop GHG reduction targets, and identify and evaluate potential actions. The climate adaptation element included conducting a localized climate risk and vulnerability assessment, developing a list of potential measures, and screening and prioritizing adaptation options. The process also included facilitating a citizen committee tasked with steering the plan.



Cascadia worked with the City and committee to identify over 180 potential actions and refine and prioritize a final set of 20 short-term and 40 mid-term actions. Cascadia produced a final Climate and Energy Action Plan that includes clear plans for implementation and for ongoing monitoring and evaluation.

GHG Inventory & Climate Action and Adaptation Plan | City of Flagstaff, AZ | 2017-Present



Cascadia is currently partnering with the City of Flagstaff to write a Climate Action and Adaptation Plan aimed at reducing community and municipal greenhouse gas emissions. To ensure compliance with the Global Covenant of Mayors reporting requirements, Cascadia has performed a methodological crosswalk between Flagstaff's 2015 inventory and international greenhouse gas accounting protocols. Cascadia has modeled 2050 "business as usual" greenhouse gas emissions as a basis for evaluating and

setting reduction targets. Cascadia is currently developing climate action strategies based on the emissions forecast that will ultimately be part of the final Climate Action and Adaptation plan.

GHG Inventory & Climate Action and Adaptation Plan | City of Columbia, MO | 2017-Present

Cascadia is currently working with the City of Columbia to create a Climate Action and Adaptation Plan. Cascadia has completed a methodological review of the existing community greenhouse gas inventory and has updated the City's ClearPath entries. Cascadia is producing a baseline municipal greenhouse gas inventory, which includes quantifying emissions from the City's power plant, airport, and wastewater treatment plant. Cascadia created a detailed guidance document to direct City staff's assembly of municipal activity data. Once data collection is complete, Cascadia will enter the municipal inventory into ClearPath, allowing City staff to share results and easily replicate in the future. Based on the inventory findings, Cascadia will work with the City to identify actions for reducing both community and municipal greenhouse gas emissions. Complete findings and reduction strategies will be presented in a final Climate Action and Adaptation Plan.

Annual Sustainability Inventory | Sound Transit | 2014-Present

For the past five years, as part of a broader On-Call Sustainability Services contract, Cascadia has prepared an annual inventory of Sound Transit's environmental impacts and resource use. This far-reaching report and accompanying tracking system quantifies and documents the footprint of all agency operations in terms of greenhouse gas emissions, air pollutants, water and energy use, and solid waste generation and diversion. Cascadia's carbon footprinting work formed the backbone of the project: we updated and vetted emissions factors and used them to calculate Scope 1, Scope 2, and Scope 3 emissions and Scope 1 criteria air pollutants. Overall findings from the Sustainability Inventory were presented to the agency's Board of Directors as part of its annual Sustainability Progress Report and will inform agency-wide planning and investment.

GHG Inventory Methodology Review | King County, WA | 2016

In 2016, Cascadia led a comprehensive review of King County Department of Natural Resources and Parks' greenhouse gas accounting methodology. The project began with a review of the department's current practices and the development of a draft report that recommended changes to the department's approaches and methodologies for measuring progress toward carbon neutrality, including recommendations for methodologies around carbon sequestration of County parks and managed lands. Building on this work, our team refined the draft report and conducted a focused investigation of the calculation of landfill gas emissions—an area identified as needing more in-depth study and analysis.

GHG Inventory & Climate Action Plan | Midpeninsula Regional Open Space District, CA | 2017-Present



Cascadia developed the Midpeninsula Regional Open Space District's first greenhouse gas inventory and is currently working with the district to create its first Climate Action Plan. The 2016 inventory included designing a template the district can use to track greenhouse gas emissions going forward. Cascadia is generating an emission forecast through 2045 based on projections of recent land acquisitions, projected employee growth, and long-term land management strategies. Based on inventory findings, Cascadia will advise the development of reduction targets. Climate action strategies will be written to align with the emission reduction goals and address the district's specific operational activities. Cascadia will produce a final Climate Action Plan that includes a timeline for implementing climate action strategies and monitoring progress.

Carbon Sequestration Study | Fort Collins, CO | 2016-2017

Cascadia worked with the City of Fort Collins to evaluate the carbon sequestration potential of managed Natural Areas and lands within the urban growth boundary of the City, to quantify the role of land management in meeting the City's GHG reduction goals. Outcomes from the project included a comprehensive, user-friendly Excel model accompanied by a visual-rich summary report targeted for both technical and lay audiences.

Proposed Approach

Cascadia's approach to this inventory of Bainbridge Island's municipal and community-wide greenhouse gas emissions is rooted in our extensive experience conducting GHG emissions analyses for local jurisdictions and demonstrated technical expertise around emissions analysis and climate action planning. Our approach centers on considering the inventory in the larger context of Bainbridge Island's climate and sustainability goals—optimizing the inventory to be more comprehensive and dynamic, while maintaining consistency with protocols and other regional inventories to allow for accurate tracking of progress over time. Our approach will help identify which community and municipal activities contribute the most to its emissions, and what those contributions mean for the community and City of Bainbridge Island as it moves toward its goals.

TASK A. KICK-OFF MEETING & DEFINE METHODOLOGY

We will convene an initial in-person **kick-off meeting** to help us understand the data available for the municipal and community greenhouse gas inventories and make key decisions regarding the methodology, scope, and boundaries of the project. We will also review and refine our data collection process—in cases where data availability may be limited, we will discuss alternative approaches and corresponding tradeoffs to arrive at the most defensible and informative analysis for the City.

As part of this initial meeting, we will discuss and confirm a base year and which greenhouse gases and sectors to include. Factors that may influence these decisions include guidance from accepted protocols, anticipated applications for climate action planning, data availability, budgetary constraints, and consistency with other governments in the region (e.g., Washington State GHG targets, Kitsap County inventory years, inventory and target years for other Puget Sound cities). At a minimum, we anticipate including the most common sources of greenhouse gas emissions: carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄).

Once these parameters are set, we anticipate using the remaining time at the kick-off meeting to begin identification and sharing of relevant activity data and sources available to the City, such as for energy consumption, transportation activities, and waste disposal. We will also discuss the project's ultimate goals and outcomes, including how the City plans to use the final inventory data and associated materials, and how this project can most effectively support future climate action implementation and evaluation. Outcomes from the kick-off meeting will include a final project **work plan and schedule**.

Deliverables: Kick-off meeting, finalized and approved project work plan and schedule

TASK B. DATA COLLECTION

Cascadia will develop a comprehensive **data collection checklist** for the community and municipal inventories. The checklist, which will be based in Excel or Google Sheets depending on the City's preferences, will outline specific data items needed for the inventory along with a brief description of the item, source for the information, and point of contact for data collection. This checklist will allow the City to monitor data collection at any point in the project, including which data are collected, which are outstanding, and who is responsible for delivering those data. The checklist will be built around the requirements and organization of the U.S. Community Protocol, corresponding ClearPath tool, and if desired by the City, the GPC BASIC + reporting

CITY OF BAINBRIDGE ISLAND GREENHOUSE GAS EMISSIONS INVENTORY

level—including scopes, sectors, and sub-sectors. This organization will facilitate easy transfer of data into ClearPath and the GPC reporting spreadsheets.

With the checklist established, Cascadia will lead **data collection** efforts for the community and municipal inventories. The checklist will outline specific data items needed for the inventory along with a brief description of the item, source for the information, and point person for data collection. We anticipate that the City will provide assistance in locating and transcribing data owned by the City and providing contact information for outside data sources, where available.

The data collection phase will include solicitation of two types of data: 1) **activity data**, such as kilowatt-hours and vehicle miles traveled, and 2) **emission factors**, such as utility-specific emissions profiles or regional eGRID values. We will seek to collect the most locally specific data available (e.g., utility-specific emission factors), and will work closely with the City to clearly discuss and document instances in which more regional or national averages or assumptions are used. We will also coordinate closely with internal and external agencies such as local utilities and government organizations to obtain the most granular and up-to-date data possible for a robust and informative inventory. Where possible, we will bundle data requests to minimize the administrative burden of source data entities.

Having completed Kitsap County’s greenhouse gas inventory for the Puget Sound Clean Air Agency, we are deeply familiar with local data sources, including transportation data from the Puget Sound Regional Council, utility data from Puget Sound Energy, and solid waste data from local haulers. If sufficient local data are not available for those sectors, we will use regional or national estimations, as stipulated by the selected protocol. Examples of potential data sources for the community inventory are provided below.

Emissions Source	Data Collection Source
Electricity consumption	Activity Data: Puget Sound Energy (PSE)
	Emissions Factors: PSE Fuel Mix Disclosure Report and/or US EPA eGRID
Heating fuel consumption	Activity Data: Propane Northwest, Inc.; other vendors as applicable
	Emissions Factors: U.S. Community Protocol default fuel emission factors
On-road vehicle travel: <i>passenger and commercial</i>	Activity Data: Puget Sound Regional Council community VMT estimates
	Emissions Factors: Puget Sound Regional Council execution of EPA MOVES model
Solid waste disposal	Activity Data: Bainbridge Disposal
	Emissions Factors: Washington Statewide Waste Characterization Study; U.S. Community Protocol default landfill assumptions
Wastewater treatment	Total Emissions: Either emissions data from Fort Ward Wastewater Treatment Plant or U.S. Community Protocol’s population-based emissions models
Public transit: <i>Kitsap Transit</i>	Activity Data: Kitsap Transit or APTA’s NTD Data Tables (most recent year)
	Emissions Factors: EPA Climate Leadership Emissions Factors
Public transit: <i>WA State Ferry</i>	Activity Data: Washington State Ferries (route statements)
	Emission Factors: Washington State Ferries (fuel usage)
Air travel	Activity Data: SeaTac Airport
	Emission Factors: IPCC & US EPA Inventory of U.S. GHG Emissions and Sinks
Other maritime emissions	Total Emissions: 2016 Puget Sound Maritime Emissions Inventory
Non-road equipment	Total Emissions: EPA MOVES NONROAD model
Agriculture	Activity Data: USDA Agriculture Census
	Emissions Factors: US EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks

We understand that gathering activity data for some sectors, such as on-road transportation may require additional coordination and analysis. We are prepared to either 1) work closely with a third party to obtain those data or 2) develop and implement a methodology for modeling activity within those sectors. We are comfortable working with third-party models for these purposes—for example, we have worked with the EPA MOVES model, EPA WARM model, and economic input-output IMPLAN model to quantify transportation, solid waste, and consumption-based emissions, respectively.

All inventory data will be organized transparently in electronic file folders and summarized in a single **comprehensive Excel workbook** that will ultimately be delivered to the City. The workbook will be thoroughly reviewed for quality control, clearly organized for ease of use, and carefully documented for transparency and replicability. For example, we typically begin each of our Excel workbooks with a hyperlinked table of contents to facilitate navigation and understanding of individual inventory components and datasets. Our goal will be to provide the City with all the information needed to conduct subsequent inventories accurately and efficiently.

Deliverables: Data collection checklist; populated Excel workbook and corresponding data file folders

TASK C. DATA ANALYSIS

With available data collected and organized, Cascadia will work with City staff to conduct **sector-based municipal and communitywide greenhouse gas inventories** for the chosen base year.

Where available, we will seek to collect *measured* activity data, such as measured kilowatt-hours or therms used for building energy. In some cases, measured activity data are not available, such as community passenger vehicle transportation emissions. In those cases, we will collect *modeled* data outputs or perform modeling of available data. In all cases, we will closely document all inventory sources and methodologies for arriving at emissions estimates. An estimate of measured versus modeled emissions for selected sectors are summarized below (note that these are estimates; actual methodologies will depend on data availability).

Sector	Measured Subsectors	Modeled Subsectors
Residential Energy	Utility-derived electricity, natural gas, and propane energy usage	Fugitive emissions from natural gas systems
Commercial Energy	Utility-derived electricity, natural gas, and propane energy use	Fugitive emissions from natural gas systems
Transportation	- On-road transit - Passenger ferry	- Non-transit on-road and off-road vehicles - Air travel
Solid Waste	- Solid waste disposal - Biological treatment of waste	
Wastewater	Treatment of wastewater generated in city	
Agriculture & Forestry		- Livestock grazing - Forest carbon sequestration
Consumption		Household goods, food, and services

We recommend compiling and summarizing all activity data in an Excel data management workbook and uploading the data into ICLEI's **ClearPath tool** for analysis. We have found this arrangement to work best for local government clients, as it allows for customized and transparent data collection, while also ensuring that the inventory is housed in a platform that allows for easy updates and comparisons for future inventories. The ClearPath tool has many advantages, including user-friendliness, available technical support, assisted compliance with the U.S. Community Protocol, and ability to benchmark against other jurisdictions. It is also an online tool, which means that multiple City users can access the data if desired without worry of version control issues or conflicted local copies. Use of the ClearPath tool will also ensure that the City of Bainbridge Island's inventory stays up-to-date as protocol requirements change over time. Tracking and analyzing the data in Excel prior to uploading to ClearPath supports transparency and record-keeping over time.

Cascadia has a robust **quality control (QC) team** that will review all quantitative products. We create Excel models that have built-in QC checks and dynamic referencing to accommodate changes (e.g., retroactive changes in emissions factors during inventory updates). Our model will include real-time, interactive capabilities for data visualization so that customized graphs can be easily created and modified to meet user needs and highlight different elements of the GHG inventory story. For example, we envision creating both higher-level summary charts for the public and decision-makers, as well as detailed charts aimed at technical experts and City staff.

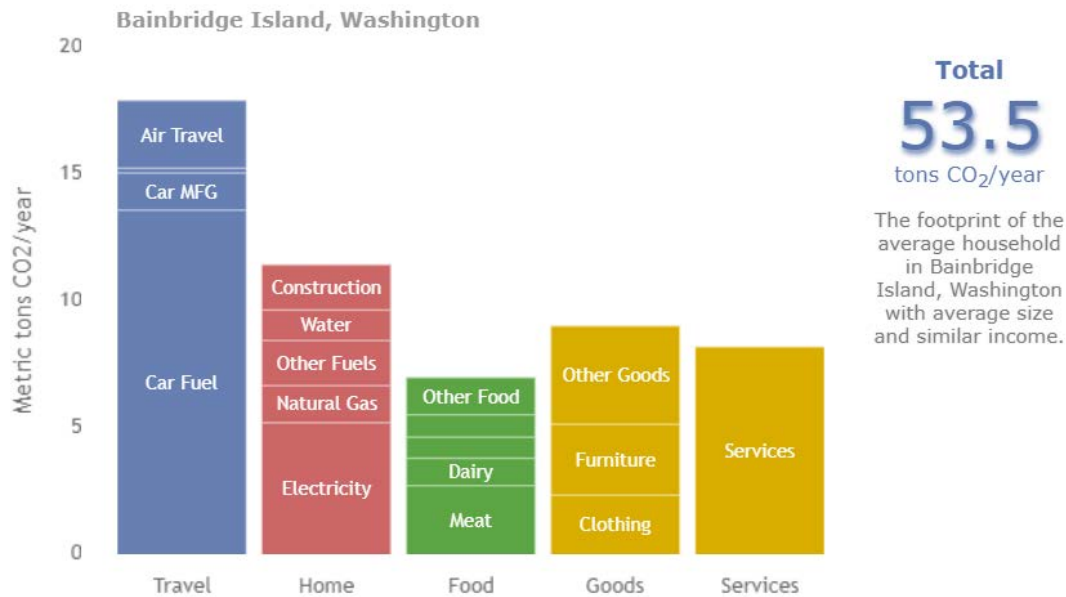
Consumption-Based Inventory

Estimated level of effort: 8 to 24 hours (\$1,000 to \$3,000), depending on chosen methodology

We will also work closely with the City to assess the value of conducting a local **consumption-based inventory**. Cascadia brings a long history of conducting and applying consumption-based inventories for climate action planning, including working with King County and SEI in 2012 to pioneer a new methodology for quantifying consumption-based emissions at the local scale. Because consumption-based inventories are inevitably coarse in scale compared to other inventory sectors, we recommend that the City of Bainbridge Island use readily available sources to estimate its consumption-based emissions, such as using UC Berkeley's CoolClimate Calculator (see figure below) or extrapolating from King County's recent 2015 consumption-based inventory, which was completed as part of a recent contract with Cascadia. The CoolClimate Calculator employs the Economic Input-Output Life Cycle Assessment model (EIO-LCA), designed by Carnegie Mellon University, and the Comprehensive Environmental Database Archive to calculate consumption-based emissions, which uses an economy-wide model of cradle-to-grave emissions of all major greenhouse gases for over 400 economic sectors of the economy.

CITY OF BAINBRIDGE ISLAND GREENHOUSE GAS EMISSIONS INVENTORY

Figure 1. Estimated consumption-based GHG emissions for Bainbridge Island, using [UC Berkeley's CoolClimate Calculator](#).



Land Carbon Changes

Estimated level of effort: 8 hours (\$1,000)

We will also coordinate with the City to define a potential methodology for quantifying the **land carbon changes** associated with clearing of land for development. We could implement an approach similar to that taken by King County for its 2015 GHG inventory, which involved using County Assessor data to quantify acres of land cleared for development and multiplying that acreage by an estimate of carbon stock losses, as quantified by a regional study conducted by scientists at the University of Washington.

Business-as-Usual Forecasting

Leveraging the ClearPath tool's customizable forecasting module, we will then forecast a "business as usual" (BAU) scenario for community-level emissions. We will build the **BAU scenario** from expected changes in energy supply, building energy efficiency, transportation, and waste (and consumption, if included). We anticipate that the BAU forecast will calculate sector-specific emissions using at least the following variables:

- ▶ **Population growth** projections.
- ▶ Projected **electricity emissions factors**.
- ▶ Anticipated federal vehicle fuel efficiency **standards** (e.g., CAFE).
- ▶ Committed **state laws** including renewable portfolio standards and building code.

Expected changes will be based on available information, including 1) outputs from existing models, such as regional transportation models, 2) external factors, such as utility Integrated Resource Plans and state and federal policies (e.g., CAFE standards), and 3) forecasted changes in demographics. This basic forecast would also include automated visualization capacities that would allow jurisdictions to enter their GHG reduction target and identify remaining local emission reductions needed to meet that goal. To facilitate future updates, we recommend uploading the forecasting assumptions into ClearPath to model and visualize the BAU forecast.

Deliverables: Sector-based community-wide GHG inventory and forecast, in spreadsheet form and uploaded to ICLEI's online ClearPath tool

TASK D. INVENTORY REPORT

Cascadia will prepare a **Greenhouse Gas Inventory Report** that summarizes the methodology and findings of the community and municipal inventories. While we expect to finalize the report's structure with the client team, we anticipate it will include the elements below.

- ▶ **Brief executive summary**, including key takeaways and graphics. We anticipate designing this summary to function as a standalone communications piece that accompanies the report and can be used to communicate key findings to City leadership and the broader Bainbridge Island community.
- ▶ **Introduction and methodology**, including a discussion of the context and value of the inventory, an overview of the methods used to conduct the inventories and contribution analysis, and other brief considerations such as data gaps and assumptions.
- ▶ **Inventory results and implications**, including a discussion of major emissions sources over which the City may have influence and priority areas for focus in a mitigation planning process.

We pride ourselves on creating final products that are not only accurate and actionable but attractive and engaging too. To that end, we envision producing an accessible, user-friendly report with concise text and a focus on graphs and other visual aids. The goal will be to provide a clear, high-level snapshot of methodologies and the importance of tracking and reducing emissions—and to serve as a baseline for setting goals and monitoring progress.

Cascadia has an in-house design team that crafts visually appealing products that are scaled to the needs of each client. We offer Word- and Adobe-based document design and production services, infographic development, and compelling data displays, should the City desire such elements in the final report. Our standards are upheld with rigorous quality control processes that involve editorial board review and senior-level oversight of all written work products and deliverables.

Deliverables: Draft and final Greenhouse Gas Inventory Report, with freestanding executive summary

TASK E. TRAINING & TRACKING HAND-OFF

To make progress toward GHG emission reduction goals, it is imperative that cities have the ability to accurately measure and track GHG emission progress over time. Cascadia is prepared to thoroughly equip the City with the tools, methodologies, and training needed to update the GHG inventory on an ongoing basis. We are currently assisting the cities of Shoreline and Bellevue in this process, and we will incorporate lessons learned from those experiences into our work with the City of Bainbridge Island. Specifically, we suggest the following approach to ensure a smooth transition:

- ▶ **Complete file packaging:** We will package all relevant documents into one organized place so that City staff have intuitive, transparent, and streamlined access to all data sources and analysis files. We will include in those documents files that provide step-by-step guidance for conducting the inventory, such as PowerPoint slides with screenshots for each step.
- ▶ **Detailed documentation:** We will create a single comprehensive Excel workbook that contains all the information needed to update the inventory, including contact information for data sources, step-by-step methodologies, listed underlying assumptions, and transparent computations. This file will also

provide placeholders for future years so that future data collection and entry is straightforward. We find that housing this information in Excel, rather than in a Word document, makes the underlying data and methodologies easier to understand, reference, and update in the future. We will also populate ClearPath with underlying assumptions and data documentation, and we will walk through the ClearPath tool with City staff to ensure that information is accessible and understandable to future users. If desired, we can also create a brief summary memorandum that outlines key methodology decisions and steps.

- ▶ **Training sessions:** We will sit down with City staff to go through each step of the inventory process. We find that the best way to do this is to run through a mock update scenario for a year other than the base year that was analyzed (e.g., a past year). We anticipate at least two sessions—one session to review the materials and the methodology for the base year inventory that was completed and another session to test update capacity using a mock year scenario. We recommend conducting the training with at least two City staff members to ensure redundancy should future role or staffing changes occur. These trainings sessions will be critical for ensuring that all documentation provides the necessary information for updating the inventory over time; we anticipate needing to update guidance documentation in an iterative manner as the trainings are conducted.

Deliverables: Electronic file package with all underlying data and computations; comprehensive Excel workbook with methodology documentation and accompanying high-level summary memorandum; at least two in-person training sessions.

TASK F. PROJECT MANAGEMENT

Throughout the project, Cascadia will continue to coordinate with the client team, including participating in **biweekly check-in calls** with the client. (We are happy to adjust the frequency of our check-ins to meet the City's needs.) We will also invoice for work on a monthly basis and provide monthly activity reports. Cascadia will use its Deltek Vision project management software to provide real-time budget updates and regular detailed reports and invoices, and we will provide monthly progress reports that cover budget, timeline, and deliverables. Our project manager, Kendra White, will be available for three meetings with the City's Climate Change Advisory Committee and the City Council, to provide project updates and address technical questions.

Deliverables: Monthly administrative reporting and biweekly check-ins throughout the project

Schedule

We estimate that this project will take approximately four months. The schedule below assumes prompt City Council approval and expedient contracting, with the kick-off meeting being held no later than July 15, 2018, as administrative delays would extend the project's timeline.

Task	2018							
	July		August		September		October	
A. Kick-off Meeting & Define Methodology								
B. Data Collection								
C. Data Analysis								
D. Inventory Report								
E. Training & Tracking Hand-off								
F. Project Management								



Kendra White

SENIOR ASSOCIATE

EXPERTISE

- Quantitative and qualitative analysis
- Greenhouse gas inventorying
Climate change mitigation
- Renewable energy analysis
- Economics
- Market research; field interviews
- Decision support
- Strategic planning
- Data visualization

CREDENTIALS

- B.A., Economics; Colgate University
- Fellow, Institute for Philosophy, Politics, and Economics
- Board Member, Northwest SEED

Kendra manages and supports projects pursuing ambitious environmental goals, including renewable energy adoption, carbon neutrality, and zero waste. She excels at digging deep to uncover trends, assessing the impacts of different policies and strategies, and bringing together a wide range of complex technical data to solve problems. A proficient modeler, Kendra has also conducted emissions inventories and created a variety of databases and Excel-based tools, including a customer-tracking database for a local utility program and a financial calculator for estimating consumer costs for installing residential solar power. While Kendra's focus is on energy policy, she offers additional expertise in recycling, waste, and materials management.

SELECTED PROJECT EXPERIENCE

2016-2017 King County and Puget Sound Clean Air Agency (WA). GHG Methodology Validation & Inventory Services

Lead Analyst. Directed the review and validation of the County's greenhouse gas (GHG) inventory approach and methodology, including incorporation of renewable energy and forestry offsets to achieve carbon neutrality. Led development of the County and Puget Sound Clean Air Agency's 2015 GHG inventory.

2017-Present City of Bellevue (WA). GHG Planning Services

Lead Analyst. Reviewed and updated the City's GHG inventory, supported development of an emissions forecast and scenario analysis, and modified inventory workbooks to streamline and facilitate future updates.

2017-Present City of Auburn (WA). GHG Inventory & Climate Action Plan

Project Manager. Managing an update of the City's 2008 GHG inventory—also conducted by Cascadia—including municipal and community emissions. Results of the inventory will feed into a climate action plan that sets GHG reduction goals and strategies.

2014-2018 Sound Transit (WA). Annual GHG Inventory

Task Manager. Has led Sound Transit's annual operational GHG inventory for multiple years. Includes quantification of emissions from building, vehicle, and equipment energy consumption.

2016-Present Hawaii State Energy Office. Energy Innovation Strategic Plan

Project Manager. Managed a four-firm team to assist the Hawaii State Energy Office with its five-year strategic plan for energy innovation to support growth of the energy sector of the economy and the State's 100 percent renewable portfolio requirement. Conducted interviews with energy sector stakeholders, including company CEOs and agency directors.

2015-Present Seattle City Light (WA). Renewables Marketing Program

Lead Researcher. Supporting on-call contract to improve and manage the marketing of three voluntary renewable energy programs: customer generation, Green Up, and Community Solar. Facilitated customer working groups to understand market pressure regarding performance-based rates and incentives.





Christy Shelton

PRINCIPAL

EXPERTISE

- Sustainability and resource conservation strategy and plans
- Sustainability tools and toolkits
- Sustainability metrics and reports
- Materials management and recycling
- Project management

CREDENTIALS

- M.S., University of Michigan, School of Natural Resources & Environment, Resource Policy & Administration, 1997
- B.A. (Honors), Stanford University, American Studies (environmental policy focus), 1992
- Global Reporting Initiative (GRI) G4 training
- Xi Sigma Pi (natural resources)

Christy Shelton, Principal, brings 20+ years of experience managing the design, analysis, evaluation, and performance of effective plans and programs for sustainability and resource conservation. She has conducted strategic planning, program evaluation, surveys, focus groups, and facilitation projects for cities, ports, counties, states, and other public agencies. Christy is experienced in both quantitative and qualitative analyses, and she is skilled in distilling complex challenges into effective approaches and user-friendly tools. As Principal, she provides strategic guidance, oversight, and review to ensure high-quality deliverables and project performance.

PROJECT HIGHLIGHTS

2017-present City of Bellevue (WA). GHG Analysis Services

Principal-in Charge. Overseeing update of the City's community-level greenhouse gas (GHG) emissions inventory and analysis of GHG trends, including development of a business-as-usual GHG emissions forecast and scenario analysis.

2017-present City of Shoreline (WA). Sustainability Communications

Principal-in Charge. Overseeing update of the City's sustainability website, including quantification of sustainability metrics. Currently overseeing the development of guidance materials for ensuring City staff can update inventory in the future.

2014-present Sound Transit (WA). On-Call Sustainability Consulting

Project Manager. Lead team of 17 subcontractors to support sustainability planning and programs, including annual sustainability inventories and progress reports, sustainability assessments of proposed system expansion and capital projects, electric bus research, total cost of ownership analyses, agency Sustainability Plan updates, renewable energy strategy, and sustainability and efficiency fund planning.

2017-present Countywide Sustainability Reporting, Los Angeles County Metropolitan Transportation Authority (CA)

Project Manager (subcontractor). Leading the development of countywide metrics for measuring and reporting progress on sustainable transportation in LA County.

2017-Present City of Auburn (WA). GHG Inventory & Climate Action Plan

Principal-in Charge. Overseeing an update of the City's 2008 GHG inventory—also conducted by Cascadia—including municipal and community emissions. Results will feed into a climate action plan that sets GHG reduction goals and strategies.

2016-2017 County Operations Sustainability Plan, Teton County (WY)

Principal-in Charge. Oversaw development of Teton County's first sustainability plan, including completion of its first sustainability inventory.

2014-2015 City of Bellevue (WA). Environmental Stewardship Plan

Principal-in Charge. Oversaw update of the City's municipal and community-level GHG emissions inventory and development of a web-based platform for tracking other environmental indicators and outcomes.

2012 Salt Lake City (UT). Sustainability Action Plan

Project Manager. Drafted and managed design of city sustainability action plan, including vision, goals, strategies, and future targets for 12 sustainability areas.





Olivia Ashmoore

PROJECT ASSISTANT

Olivia supports climate mitigation and adaptation planning through research, analysis, and writing. As a member of Cascadia's Climate and Natural Resources Management team, she is involved in a wide range of environmental projects, from climate action planning to sustainability research. She has experience creating greenhouse gas emissions inventories in compliance with international protocols, developing community climate action strategies, assessing the need for climate change adaptation, and coordinating public outreach.

EXPERTISE

- Municipal and community climate action planning
- Emissions analysis and reporting
- Sustainability research, analysis, and reporting

CREDENTIALS

- B.A., Environmental Studies; Oberlin College

SELECTED PROJECT EXPERIENCE

2017-Present City of Flagstaff (AZ) Climate Action Plan.

Supported Flagstaff's greenhouse gas emissions inventory and verified consistency with international protocols. Currently providing research and writing support for climate action marketing strategy.

2017-Present King County (WA) GHG Inventory Update

Supports King County's community greenhouse gas inventory through analysis of emissions data.

2017-Present Midpeninsula Open Space District (CA) Climate Action Plan

Provides support for the District's Climate Action Plan development. Creating a GHG inventory of District operations. Researching climate action strategies for public land.

2016-2017 City of Piedmont (CA). Climate Action Plan

Completed municipal and community GHG inventories. Drafted a Climate Action Plan and managed a public task force.

PREVIOUS WORK EXPERIENCE

2016-2017 City of Piedmont

Developed a Climate Action Plan to reduce community and municipal greenhouse gas emissions and recommend climate adaptation measures. Completed a cost-benefit analysis of recommended policies. Communicated the climate action strategy to the public through monthly public workshops. Presented greenhouse gas inventory updates to City Council and submitted inventories in compliance with the Global Covenant of Mayors.

2016 Project Drawdown

Researched and wrote for the book, Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming. Researched climate change strategies and green technologies and wrote extensive summaries of peer-reviewed literature.

2015 Climate Solutions

Analyzed King County cities' capacity to address climate change including economic resources, population demographics, and grassroots support. Assessed the potential for local renewable energy generation in King County through community-based solar projects.



May 24, 2018

City of Bainbridge Island
Bainbridge Island, WA 98110
Attention: City Manager

Subject: Letter of Interest – Request for Proposal Greenhouse Gas Emissions Inventory

Energetics is pleased to submit the included Proposal Submission supporting the Greenhouse Gas Emissions Inventory project for the City of Bainbridge Island. Below is our related contact information for our organization as requested:

Energetics
7075 Samuel Morse Drive
Suite 100
Columbia, MD 21046
Point of Contact: Jenna Harrison, Contracts Manager
Phone: (407)475-3804
Fax: (407)875-3640

At this time Energetics does not anticipate the need to utilize any subconsultants. Upon review of the Sample Agreement for Professional Services, Energetics would like to request the following considerations should award be issued:

- Number 3, Letter C, Request consideration of payment after thirty (30) days vice the included sixty (60).
- Attachment B, E Other Insurance Provision, removed and replaced with the following language: *"The Consultant's Commercial General Liability insurance policy will have the City listed as an additional insured and will respond on a primary basis. The Consultant's Automobile Liability insurance policy will have the City listed as an additional insured."*
- Attachment B, F Acceptability of Insurers, removed and replaced with the following language: *"Insurance is to be placed with insurers with a current A minus but not less than seven (A-VII)."*
- Attachment B, H Notice of Cancellation, removal of *"within two business days of their receipt of such notice"* and replacement with *"in accordance with policy requirements."*

Energetics looks forward to supporting the City on this project and appreciates the opportunity to submit an offer. Should you have additional questions please contact the undersigned.

Sincerely,

Energetics

Jenna Harrison, Contracts Manager
407-475-3804
jmharrison@akimeka.com

Greenhouse Gas Emissions Inventory for the City of Brainbridge Island



Submitted to:
City Manager
City of Brainbridge Island
Brainbridge Island, WA 98110

Submitted by:
Energetics
2950 Newmarket Place
Suite 101-156
Bellingham, WA 98226

Headquarters Office
Energetics
7075 Samuel Morse Drive
Suite 100
Columbia, MD 21046



Energetics' Proposal No. P3518

May 25, 2018



City of Bainbridge Island Greenhouse Gas Emissions Inventory - Energetics' Qualifications Statement

*Response to:
City of Bainbridge Island,
Greenhouse Gas Emissions Inventory RFP*

Submitted to:

City Manager
City of Bainbridge Island
Bainbridge Island, WA 98110

Submitted by:

Energetics
2950 Newmarket Place
Suite 101-156
Bellingham, WA 98226

Jonathan Rogers,
Project Manager and Designated Point of Contact
Phone: (203) 912-4664
Email: jrogers@energetics.com

Headquarters Office
7075 Samuel Morse Drive
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Contracts Manager
Phone: (407) 475-3804
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Harrison Schwartz, Energy Analyst.....	21

1. SUMMARY OF SCOPE OF SERVICES

Energetics Incorporated (Energetics) is a specialized energy and environmental management consultancy, with unique expertise in delivering impactful technical assessment and inventory analyses. We work with numerous Federal and state organizations who are looking to make the greatest impact with limited funds. Energetics has developed hundreds of energy and environmental technology assessment roadmaps and inventories over the past 38 years for energy end-use and supply sectors including energy-intensive heavy industries; buildings; transportation, agriculture and bioenergy; critical water delivery systems; grid modernization; combined heat and power; and renewable energy technologies. The findings that have been presented in our environmental inventory studies have resulted in valuable input for program planning, program funding, education and outreach efforts, and regulatory and incentive policies.

Our environmental assessment and inventory approach includes drawing on our subject matter expertise, conducting literature reviews and research, and interviewing key stakeholders to identify and collect all necessary data for a thorough greenhouse gas (GHG) emissions inventory. Our experience extends to identifying and evaluating GHG mitigation strategies. As such, any GHG inventory will be designed in consideration of the need to support GHG mitigation strategies for the City of Bainbridge Island (the City).

As depicted in Figure 1-1, Energetics understands the scope of services for this project. Energetics recognizes the importance of producing a clear and replicable approach for assessing and reporting GHG emissions for the City and community groups involved. The City, which was designated as the Green Power Community of the Year by the U.S. Environmental Protection Agency in 2017, will be able to use this inventory as a building block for future climate change planning efforts.

City of Bainbridge Island Greenhouse Gas Emissions Inventory		
Goals - Establish a GHG inventory to cover emissions from City municipal operations as well as emissions in the community, including the residential and commercial sectors - The GHG inventory will provide a baseline of energy usage in the City and community and future energy usage and GHG emissions projections		Future use by the City - The GHG inventory is expected to be the first phase in a multi-phase long-term climate change planning effort - This project does not include the development of GHG reduction strategies. However, Energetics has relevant experience to ensure that the GHG inventory enhances the ability to identify and implement future GHG mitigation strategies
Scope of Services		
Define Methodology (ICLEI Protocol) - Selection of the base year - Identify data sources, calculation methods, emissions factors - Confirm categories for GHG tracking and reporting	Data Collection Collect data from the City, Utility, and other entities including information on vehicles, buildings, residential and commercial customers, consumption statistics, renewables deployments, etc.	Data Analysis - Calculate baseline energy usage and emissions for municipal operations and the community - Conduct analysis across the emissions generating categories and in aggregate
GHG Emissions Report - Textually and graphically present the GHG emissions inventory in accordance with the ICLEI Community Protocol - Identify emissions sources for which reduction strategies could be developed	Training and Tracking Hand-off - Ensure the inventory can be updated - Provide the City with the information and materials necessary to replicate the GHG emissions calculations, track progress, and generate reports	Project Management - Work with the City Manager's Office to ensure all work is completed adequately - Provide regular status updates to the City's Climate Change Advisory Committee and the City Council

Figure 1-1. Project Services Summary for the City of Bainbridge Island Greenhouse Gas Emissions Inventory

2. PROJECT TEAM

2.1 ABOUT ENERGETICS: COMPANY BACKGROUND AND TECHNICAL CAPABILITIES

Energetics is an energy and management consulting firm with offices across the country serving public- and private-sector clients. Since the company's founding in 1979, Energetics has worked to develop and manage effective research, development, and information programs in the fields of energy, manufacturing, climate and environment, and infrastructure protection. Energetics has approximately 70 full-time employees and more than 30 subject matter experts for a wide range of energy and environmental technologies and systems. Energetics is a wholly-owned subsidiary of VSE Corporation, a \$650 million (annually) firm with offices and employees around the world. Energetics' headquarters is located in Columbia, MD, with offices and staff located across the nation. Energetics' Washington State office is in Bellingham, WA.

Energetics has strong technical capabilities and previous related work experience relevant to evaluating and quantifying emissions sources and energy consumption as described in the scope of work. Energetics work products also frequently include thoughtful information visualizations and graphics. Examples of our prior experience include evaluations of emissions mitigation strategies for the Bay Area Air Quality Management District, developing an inventory of greenhouse gas reducing technologies for the U.S. Climate Change Technology Program, and the development of Sankey diagrams to show energy, GHG, criteria pollutant, and carbon footprints for the U.S. DOE.

The staff proposed for this project have helped to conduct energy and emissions inventory and opportunity assessments, climate mitigation analyses, and technology opportunities studies for the DOE and State energy offices. Energetics engages stakeholders with a thoughtful, creative, and understandable reports. Our work products are intuitive and enable our clients to build upon the work and achieve their goals. Energetics is focused on delivering high-quality, cost effective solutions that will help the City fulfill their mission of developing a clear and replicable inventory of energy usage and GHG emissions.

There are no subcontractors included in this proposal.

2.2 PROJECT TEAM'S RELATED EXPERIENCE

2.2.1 BAY AREA AIR QUALITY MANAGEMENT DISTRICT

April 2018 – July 2018 (ongoing)

Jonathan Rogers – Project Manager

Chris Gillespie and Harrison Schwartz – Analysts

Client: Bay Area Air Quality Management District

Derrick Tang, 415-749-8726, dtang@baaqmd.gov

Manger for the Technology Implementation Office

Results not yet public

Energetics is conducting an assessment of opportunities to reduce GHG emissions at stationary sources of air pollution in the Bay Area. Our approach includes an extensive literature review and research and interviewing experts to identify relevant existing and emerging emissions mitigation measures. Mitigation measures include emissions control technologies, implementation of smart and connected process control systems, energy efficiency improvements, more effective utilization of waste resources, and more. From this base, we quantify key emissions, economic, and technical performance metrics and use a quantitative comparison matrix to evaluate and prioritize technology options. Our findings are presented through intuitive graphics and clearly written summaries.

2.2.2 INVENTORY OF GREENHOUSE-GAS-REDUCING TECHNOLOGIES AND STRATEGIES FOR DEPLOYMENT

Aug 2006 – Jan 2009

Matt Antes – Project Manager

Client: U.S. Climate Change Technology Program

Dr. Robert Marlay, (202) 586-3949, Robert.Marlay@hq.doe.gov

Resulting Publication:

Strategies for the Commercialization & Deployment of GHG Intensity-Reducing Technologies & Practices

energy.gov/sites/prod/files/CDStratCompleteReport11609%5B2%5D.pdf

Energetics identified and assessed commercial and near-commercial greenhouse gas reducing technologies for the U.S. Climate Change Technology Program. Through a series of facilitated workshops with subject matter experts in six technology areas (Energy End-Use, Energy Supply; Carbon Capture and Storage; Non-CO2 Emissions; Measurement and Monitoring; and Basic Science), Energetics gathered insights on potential impacts, costs, and barriers, and incorporated the findings into a Report to Congress. The technology categories in this report provide information regarding emissions reducing technologies and strategies for technology areas including refineries, natural gas power stations and cogeneration facilities, semi-conductor factories, and commercial and residential buildings.

2.2.3 DEVELOPMENT OF GHG EMISSIONS INVENTORIES AND PROJECTIONS DATABASE

April 1, 2014 – October 31, 2014

Matt Antes – Project Manager

Client: U.S. DOE, Office of Policy

Chris Gillespie – Lead Analyst

Elke Hodson, 202-586-3622, Elke.Hodson@hq.doe.gov

Resulting Publications:

Dataset for US DOE Internal use only

As part of Energetics' continuing support for DOE's climate change policy analysis, Energetics compiled, merged, and validated multiple economy-wide GHG emissions accounts and projections into a comprehensive dataset. The dataset includes both past and projected future emissions from multiple emissions inventories and model projections. Energetics reviewed the assumptions and methods for each inventory and projection and adjusted the emissions data so that all accounts could be directly compared to one another. The database helped guide agency leadership in evaluating proposed emissions reduction policies, informed the U.S. commitment to the U.N. Convention Framework on Climate Change, and will serve as a baseline for comparing future policies.

2.2.4 ENERGY, GREENHOUSE GAS, AND CRITERIA AIR POLLUTANT SANKEY DIAGRAMS

March 2017 – September 2017

Sabine Brueske – Project Manager

Client: U.S. DOE, Office of Policy

Elke Hodson, 202-586-3622, Elke.Hodson@hq.doe.gov

Resulting Publications:

Process Heating Greenhouse Gas Emissions (MMT CO2e) – U.S. Manufacturing 2010

As part of Energetics' continuing support for DOE's climate change policy analysis, Energetics developed a series of energy, greenhouse gas and criteria air pollutant flow diagrams to support high level program projections. The project scope included a series of energy and emission Sankey diagrams. Energy Information Administration, Environmental Protection Agency, and DOE Manufacturing Energy and Carbon footprint data was referenced to calculate the quantity of energy consumed, and greenhouse gas and criteria air pollutant emissions produced from process heating operations within the U.S. manufacturing sector.

2.2.5 ENERGY AND CARBON FOOTPRINTS FOR THE U.S. DOE ADVANCED MANUFACTURING OFFICE

January, 2000 – Ongoing

Sabine Brueske – Project Manager

Client: U.S. DOE, Advanced Manufacturing Office

Isaac Chan, (202) 586-6907, david.babson@ee.doe.gov

Resulting Publications:

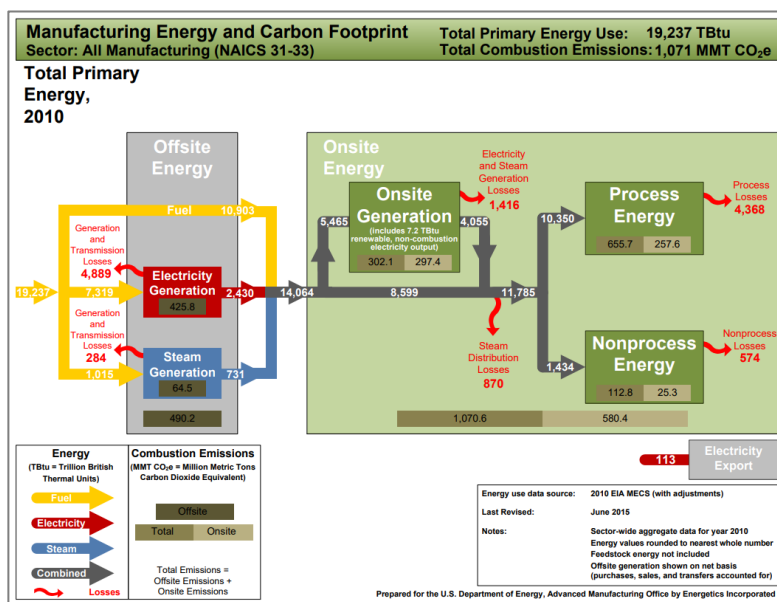
Manufacturing Energy and Carbon Footprints (1998, 2002, 2006, 2010 and 2014 currently under development for publication)

energy.gov/eere/amo/manufacturing-energy-and-carbon-footprints-2010-mecs

U.S. Manufacturing Energy Use and Greenhouse Gas Emissions

energy.gov/eere/amo/downloads/us-manufacturing-energy-use-and-greenhouse-gas-emissions-analysis

As part of Energetics' support for DOE's Advanced Manufacturing Office, Energetics has prepared a benchmark inventory of energy consumption and carbon emissions for the U.S. manufacturing sector. This highly referenced energy and carbon reporting analysis has been updated as new survey data becomes available every four years. Energy and carbon footprints map energy use and carbon emissions in manufacturing from energy supply to end use. The footprints show where energy is used and lost—and the associated greenhouse gases (GHGs) that are emitted. Each footprint visualizes the flow of energy (in the form of fuel, electricity, or steam) to major end uses in manufacturing, including boilers, power generators, process heaters, process coolers, machine-driven equipment, facility HVAC, and lighting.



Example, Manufacturing Energy and Carbon Footprint

2.2.6 CLIMATE CHANGE AND THE U.S. ENERGY SECTOR: REGIONAL VULNERABILITIES AND RESILIENCE SOLUTIONS

January 1, 2016 – September 31, 2016

Matt Antes – Project Manager

Client: U.S. DOE, Office of Energy Policy and Systems Analysis

Chris Gillespie – Lead Analyst

Craig Zamuda, 202-586-9038, Craig.Zamuda@hq.doe.gov

Resulting Publication:

Climate Change and the U.S. Energy Sector: Regional Vulnerabilities and Resilience Solutions

energy.gov/epsa/downloads/climate-change-and-us-energy-sector-regional-vulnerabilities-and-resilience-solutions

Energetics researched and authored a report that comprehensively addresses the challenges that climate change poses to the U.S. energy sector, and provides a detailed portfolio of measures that governments, utilities, and private stakeholders can take to reduce and mitigate the damage. The report addresses the effects of increasing temperatures on system performance and energy demand, the changes to precipitation and hydrology that threaten power plants and fuel producers, the effects of rising sea levels on refineries and major coastal energy infrastructure, and the growing risk of extreme weather events for power lines, among many others. Climate change impacts are addressed on a regional basis, so local variations in projections are relevant to the region's unique energy systems. The report also details the investments, planning, and operational measures that system operators can take to prepare, withstand, respond, and recover from climate impacts.

3. RELATED EXPERIENCE FOR KEY INDIVIDUALS

Energetics proposes a qualified team of experienced staff to undertake this project. If selected, the identified staff, with requisite qualifications and experience, will be available to complete this project.

Table 3-1. Team Member List and Project Roles

	Team Member	Project Role
Key Staff	Jonathan Rogers	Project Manager
	Matt Antes	Quality Assurance/Quality Control Manager
	Sabine Brueske	Senior Analyst and Subject Matter Expert
	Chris Gillespie	Climate Analyst
	Harrison Schwartz	Energy Analyst

JONATHAN ROGERS, MANAGER, ENERGY SYSTEMS ANALYSIS & INTEGRATION

Education

Master of Science, Chemical Engineering
Johns Hopkins University, 2013
B.S. Chemistry & Biomolecular Engineering
Johns Hopkins University, 2012

Location

Denver, CO

Employment

- Energetics Incorporated
- Tuscany Associates
- Synaptic Research LLC

Professional Certifications

- Project Management Professional, PMI ID: 4447020E2

Mr. Rogers manages the Energy Systems Analysis and Integration program at Energetics. Mr. Rogers has led numerous technical assessments, cost-benefit analyses, GHG emissions analyses, and industrial energy efficiency reports and has supported several technology roadmapping efforts. His work spans broadly across various sectors including advanced manufacturing, autonomous vehicles, bioenergy and biofuels, process intensification, smart grid development, technology transfer and commercialization, and waste-to-energy.

MATT ANTES, DIRECTOR, CLIMATE CHANGE AND SUSTAINABILITY

Accredited Institutions

M.S., Public Policy and Management
Carnegie Mellon University, 2005
B.S., Chemical Engineering
University of Missouri, 1998

Location

Columbia, MD

Employment

- Energetics Incorporated
- Center for Energy and Environmental Studies
- Environmental Resources Management (ERM), Inc.

Mr. Antes has more than fifteen years' experience as an analyst, policy specialist, and manager in the areas of climate change mitigation and adaptation, energy use, and energy supply. He has led numerous studies in climate change technology and policy, greenhouse gas emissions analysis, and cost-benefit analysis, and he is a trained meeting facilitator. Mr. Antes is an expert in the area of energy technology analysis across multiple sectors, evaluating their energy use, greenhouse gas emissions, and barriers to commercialization. He also has expertise in climate mitigation policies, climate resilience, and evaluating strategies that encourage deployment of climate change technologies and practices.

SABINE BRUESKE, DIRECTOR, INDUSTRIAL ANALYSIS PROGRAM**Accredited Institutions**

B.S., Chemical and Petroleum Refining
Engineering
Colorado School of Mines, 1994

Location

Bellingham, WA

Employment

- Energetics Incorporated
- Dames & Moore Engineering – Seattle, WA
- CH₂MHill – Denver, CO

Professional Certifications

Certified Energy Manager (CEM),
Association of Energy Engineers
Certified Measurement and Verification Professional
(CMVP), Association of Energy Engineers

Ms. Brueske has twenty-five years' experience as a program and project manager, energy analyst, and environmental consultant. Her primary area of management responsibility is industrial energy and environmental analysis. Her experience has branched from energy and environmental benchmarking for sector-wide and technology-specific accounting, to energy technology opportunity assessment, and programmatic benefits analysis.

CHRIS GILLESPIE, SENIOR CONSULTANT/CLIMATE ANALYST**Education**

M.S., Technology and Policy,
Massachusetts Institute of Technology
B.E., Mechanical Engineering,
Cooper Union

Location

Washington, D.C.

Employment

- Energetics Incorporated
- U.S. Environmental Protection Agency
- MIT Joint Program on the Science and Policy of Global Change

Mr. Gillespie's expertise includes energy systems and GHG emissions, technology development, environmental regulation, and economic analysis. Mr. Gillespie consults on a wide range of subjects including development and deployment of renewable and low-carbon electricity and energy technologies, government-industry collaboration on energy sector resilience to climate change impacts, and analyses of energy sector dynamics and response to price inputs.

HARRISON SCHWARTZ, ENERGY ANALYST**Education**

M.S.E. Chemical and Biomolecular
Engineering
Johns Hopkins University, 2014
B.S. Chemical and Biomolecular Engineering
Johns Hopkins University, 2013

Location

Columbia, MD

Employment

- Energetics Incorporated
- Baker Hughes
- Johns Hopkins University
- Quantum Semiconductor

In his current role, Mr. Schwartz performs technical and economic analysis for various energy-related projects. His current focus is on the assessment of greenhouse gas mitigation measures, development and implementation of waste-to-energy technologies, and providing support for transitioning advanced energy technology into the marketplace.

4. PROPOSED TASK LIST AND WORK PLAN

In this proposal Energetics will conduct six distinct tasks. As shown in Figure 4-1, tasks 1-5 flow into each other throughout the project. Task 6, Project Management, will occur throughout the duration of the project. Task activities are discussed in greater detail in the following subsections. The proposed level of effort is summarized in section 5 along with the project schedule.

City of Bainbridge Island Greenhouse Gas Emissions Inventory Work Plan					
Completion	Week 4	Week 10	Week 15	Week 18	Week 20
1. Define Methodology - GHG inventory developed in accordance with the ICLEI U.S. Community Protocol - Components include: - Base year selection; - Confirmation of data sources, calculation methods, emissions factors, context data, and analytical tools; - Confirmation of categories for GHG tracking and reporting	2. Data Collection - Collect data from the City, Utility, and other entities including information on: - Vehicles, - Buildings, - Residential and commercial customers, - Consumption statistics, - Renewables deployments, - and more.	3. Data Analysis Calculate baseline energy usage and emissions for municipal operations and the community. Analysis will be calculated and aggregated by: - Major sectors - Municipal operations - Additional activities - Net emissions and/or sequestration from agriculture, forestry, and other land use	4. GHG Emissions Report - Prepare a report that textually and graphically presents the GHG inventory. The report will specifically identify: - Emissions over which the City may have significant influence - Community-wide emissions. - Prioritized sources of GHG emissions by reduction potential	5. Training and Tracking Hand-off Enable the city to replicate the calculations used for the base year GHG inventory, track progress, and generate reports: - Provide the City with an electronic version of the base year analysis. - Hold two or more training sessions for City staff	
Task 6 occurs throughout the duration of the project. Three meetings with CCAC and City Council to be scheduled at regular intervals.					
6. Project Management - Effective project management and communication will occur throughout the duration of the project - Work with the City Manager's Office throughout the project and engage in regular, weekly check-ins - Participate in approximately three meetings to provide project status updates to and answer questions from the City's Climate Change Advisory Committee (CCAC) and the City Council					

Figure 4-1. GHG Emissions Inventory Work Plan

4.1 DEFINE METHODOLOGY

Energetics will work with the city to develop an ICLEI U.S. Community Protocol Compliant GHG inventory. The inventory will be transparent, replicable year-over-year and allow for future benchmarking to regional and other municipal inventories.

The Protocol addresses the six internationally recognized GHG regulated under the Kyoto Protocol:

- Carbon dioxide (CO₂);
- Methane (CH₄);
- Nitrous oxide (N₂O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulfur hexafluoride (SF₆).



Energetics will work in accordance with the ICLEI U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions.

Five Basic Emissions Generating Activities must be included in all Protocol Compliant inventories:

1. Use of Electricity by the Community
2. Use of Fuel in Residential and Commercial Stationary Combustion Equipment
3. On-Road Passenger and Freight Motor Vehicle Travel
4. Use of Energy in Potable Water and Wastewater Treatment and Distribution
5. Generation of Solid Waste by the Community

Energetics will work with the City to identify additional Community GHG Sources and Activities.

For more information visit, icleiusa.org/ghg-protocols/

As described in section 2.2, Energetics experience extends to assessing sources of the aforementioned GHG emissions and evaluating mitigation strategies for them. While, the development of mitigation strategies is outside the scope of this project, the GHG inventory will take future planning efforts into consideration to provide recommendations to the City regarding which non-CO₂ GHGs, from which sources, should be included in the GHG inventory.

In addition to the five basic emissions generating activities that must be included in the Community Protocol, Energetics will work with the city to recommend a process for selecting which additional sources and activities to include.¹ The Community Protocol recommends several reporting frameworks to consider, including: Local Government Significant Influence, Community-Wide Activities, Household Consumption, and more. As indicated the RFP, Energetics will first consider municipal operations, which may include:

- Emissions from community ferry and air travel;
- Community-wide consumption-based emissions (including upstream GHG emissions associated with consumption of household goods, food, and services);
- Net emissions and/or sequestration from agriculture, forestry, and other land use activities. This shall include an island-wide carbon inventory of existing forested lands (public and private) and accompanying estimates of the aggregated CO₂ sequestration rate.

Considerations in Selecting GHG Emissions Sources and Activities

- Community Interest
- Magnitude of Emissions
- Accuracy of Emissions Estimation
- Reproducibility of Data and Estimation Methods
- Level of Effort Required to Obtain the Data and Perform Calculations
- Reflection of Progress towards GHG Reduction Goals

Energetics will work with the City to determine the data sources, calculation methods, emissions factors, context data, and analytical tools needed to successfully complete the emissions inventory.

4.2 DATA COLLECTION

Energetics will develop a framework for identifying and categorizing emissions across the Basic Emissions Generation Activities and additional activities agreed upon in task 1. Data for these categories is expected to be reasonably available from the City, Puget Sound Energy, or other entities that have a footprint in Bainbridge Island. Energetics will follow ICLEI guidance to:

- Identify data needs and estimation methods;
- Engage data providers to obtain data;
- Perform calculations; and
- Consider issues such as double counting potential.

¹ Activities refers to a community use activity (or activities), which is defined as the use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions either directly (e.g., use of household furnaces and vehicles with internal combustion engines) or indirectly (e.g., use of electricity created through combustion of fossil fuels at a power plant, consumption of goods and services whose production, transport and/or disposal resulted in creation of GHG emissions directly or indirectly).

Sources refers to any physical process or activity that releases GHG emissions into the atmosphere (e.g., vehicle exhaust from combustion of gasoline, furnace exhaust from the combustion of natural gas, power plant exhaust from combustion of coal for the production of electricity).

ICLEI provides detailed sector guidance to assist in measuring or estimating GHG emissions associated with community activities and sources. Energetics will follow Protocol accounting methods to ensure that the City emissions inventory is protocol-compliant. The Protocol offers multiple accounting methods that can be adhered to based on factors such as data availability.

Table 4-1 provides a brief summary of the available ICLEI data accounting protocols. Energetics will work with the city to select accounting methods that are most appropriate to the particular emissions source or activity.

Table 4-1. Data Accounting Guidance by ICLEI Category of GHG emissions activities

GHG Emissions Activity	Data Accounting Guidance Summary
Built Environment Emission Activities and Sources <i>ICLEI Appendix C</i>	Generally, recommended methods for measuring emissions from energy used in buildings rely on activity data for fuels combusted, electricity used, or use of other forms of energy. These data are multiplied by emissions factors for each energy source. Third-party verified utility-specific emissions factors are recommended. Appendix C provides detailed accounting guidance for energy-related emissions, emission from refrigerants and fire suppressants, and industrial process and product emissions.
Transportation and Other Mobile Emission Activities and Sources <i>ICLEI Appendix D</i>	Passenger vehicle emissions are most commonly accounted for in emissions inventories. The recommended method for passenger vehicles requires modeling of travel demand (vehicle miles travelled) induced by land uses in the community, assigning trips to the community when their origin or destination is located inside the jurisdictional boundaries, even if the trip extends outside the boundaries. Accounting methods are provided in Appendix D for emissions from passenger vehicles, freight rail, transit, aviation, marine vessels, and off-road equipment.
Solid Waste Emission Activities and Sources <i>ICLEI Appendix E</i>	Accounting methods address both emissions arising from solid waste generated by a community (regardless of where it is disposed of) as well as emissions arising from solid waste disposed of inside a community's boundaries (regardless of where it was generated). Appendix E provides accounting methods for solid waste activities including combustion of fuel used to transport and process waste, combustion of solid waste in incinerators or waste-to-energy facilities, decomposition of biologic solid waste in landfills.
Wastewater and Water Emission Activities and Sources <i>ICLEI Appendix F</i>	Wastewater treatment can create a unique set of process, stationary, and fugitive GHG emissions including methane (CH₄), nitrous oxide (N₂O), and carbon dioxide (CO₂). On-site emissions monitoring provides the best representation of emissions from wastewater activities, however generic emissions factors can be used if on-site monitoring data is unavailable. Appendix F provides calculation-based methodologies for wastewater treatment processes including conventional treatment, nitrification and denitrification, lagoons, septic tanks, community-generated wastewater, and energy-related emissions associated with water delivery and treatment.
Agricultural Livestock Emission Activities and Sources <i>ICLEI Appendix G</i>	Appendix G contains detailed accounting guidance for agricultural livestock emission sources including enteric fermentation and manure management. Quantification methods and emission factors were taken from the US EPA.
Emissions Associated with the Community's Use of Materials and Services <i>ICLEI Appendix H</i>	Appendix H outlines a "Trans-boundary Community-Wide Supply-Chain" approach for estimating upstream emissions from the use of individual commodities by all users in the community. It focuses on upstream emissions from food and cement, but also includes emissions factors for other materials, drawn from the EPA WARM model.
Consumption-Based Emission Activities and Sources <i>ICLEI Appendix H</i>	Appendix I offers broad considerations around a "Consumption-Based Analysis" for all materials and services consumed by specific segments of the community, namely households and governments. The consumption-based approach is limited to the "final consumption" of goods in the community—that is, all upstream emissions associated with a particular commodity are attributed to the final consumer in the community.

4.3 DATA ANALYSIS

Energetics will follow the ICLEI Protocol as described in the previous section. The accounting guidance described in Table 4-1 includes quantification of emissions associated with those sources and activities. Energetics will calculate baseline energy usage and emissions for municipal operations and the community. These calculations will be aggregated by major sectors, municipal operations, additional activities, and net emissions and/or sequestration from agriculture, forestry, and other land use as agreed upon between Energetics and the City. All analysis will be completed using non-proprietary methods and all assumptions, calculations, data sources, and key contacts will be made available to the City.

ICLEI provides recommendations to avoid potential overlap and result in double counting. Emissions associated with either sources or activities alone can generally be summed, but emissions from sources and activities should generally not be added together due to potential for double counting within a total. Great care will be taken to differentiate emissions sources and activities and when aggregating data to avoid double counting.

4.4 GHG EMISSIONS REPORT

After selecting GHG emissions sources and activities to include, gathering data, and quantifying emissions associated with those sources and activities, Energetics will complete an emissions inventory report for the City. Energetics will follow requirements to ensure that the report is ICLEI compliant. Additionally, Energetics will customize the report using agreed upon reporting frameworks (discussed in section 4.1). City GHG emissions may be presented through multiple reporting frameworks in the inventory report. Some sources and activities may be reported under more than one framework. Each framework may provide a different perspective on emissions generated in and by the City, and together they will produce a more complete picture.

Information will be structured textually and graphically to present the GHG inventory and identify emissions over which the City may have significant influence as well as additional community-wide emissions. Energetics will incorporate photographs and quotations provided by the City when available and appropriate.

The report will identify top-priority sources of GHG emissions for which reduction strategies could be developed in later phases of Bainbridge Island's climate change planning process.

Requirement for Protocol-Compliant Emissions Inventory Reports

- Emissions Report Summary Table that illustrates emissions included and excluded from the inventory and presents emissions in CO₂e
- Include quantified estimates of emissions associated with the five Basic Emissions Generating Activities
- Include data for each emissions source or activity on a line item basis, and for each include:
 - GHG emissions in metric tons of CO₂e
 - Activity data (e.g., kWh used, tons to landfill, etc.)
 - Emission factors used (state units and cite sources)
 - Accounting method used
- Include community context data at minimum:
 - total population and
 - households in the inventory year
- It is also best practice to include additional information such as:
 - notes on data sources,
 - confidence in data accuracy and
 - additional context data

4.5 TRAINING AND TRACKING HAND-OFF

Energetics takes great pride in ensuring the lasting impact and usefulness of our work products for our clients. Energetics will complete the GHG emissions inventory in a manner that is transparent, replicable, and intuitive. Energetics will provide the City with an electronic version of the base year analysis and hold two or more training sessions for city staff to ensure that the City can track progress and generate reports.

4.6 PROJECT MANAGEMENT

Energetics will work with the City Manager's office throughout the project and engage in regular, weekly check-ins. Energetics will participate in approximately three meetings to provide project status updates to and answer questions from the City's Climate Change Advisory Committee and the City Council.

The project manager, Mr. Rogers, is a Project Management Institute certified Project Management Professional and will apply best practices throughout the project. Please refer to section 6 for a more detailed discussion of Energetics project management approach.

4.7 NOTES ON ASSUMPTIONS, LIMITATIONS, DATA AVAILABILITY, AND OVERCOMING CHALLENGES

Energetics assumes that data relevant to the GHG emissions sources and activities will be reasonably available from the City, Puget Sound Energy, or other entities that have a footprint in Bainbridge Island. Energetics will adhere to the ICLEI U.S. Community Protocol for Accounting and Reporting of GHG Emissions to ensure the accuracy of emissions estimates. Accuracy should be sufficient to enable users to make decisions with reasonable assurance as to the integrity of the reported information. This analysis will rely primarily on Microsoft Excel or ICLEI tools. All assumptions and methods will be clearly explained in the report and any contributing models or analyses will be included as appendices.

5. PROJECT SCHEDULE AND LEVEL OF EFFORT BY TASK

Table 5-1 shows task-by-task schedule and level of effort covering a time period of 4.5 months (estimated as 20 weeks) from contract signature.

Table 5-1. City of Bainbridge Island, GHG Inventory Milestones Based on Scope of Work

Note: All timeframes shown are estimates and subject to change.

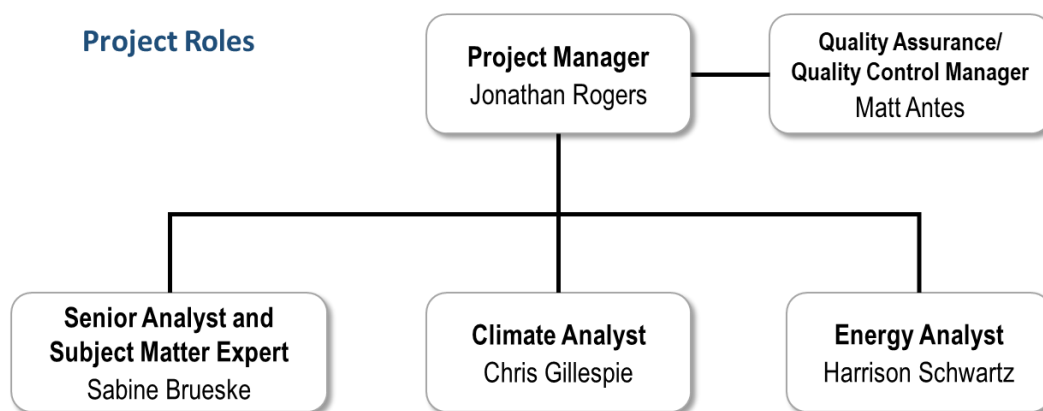
Task #	Task Name	Description of Services	Level of Effort (hours)	Completion (weeks from contract)
1	Define Methodology	- GHG inventory developed in accordance with the ICLEI U.S. Community Protocol - Components include, but are not limited, to: - Selection of the base year; - Confirmation of data sources, calculation methods, emissions factors, context data, and analytical tools; - Confirmation of categories for GHG tracking and reporting (e.g., major sectors and municipal operations)	64	4 weeks
2	Data Collection	- Identify and review any energy and/or GHG analysis conducted by entities that have a footprint in Bainbridge Island. - Implement data collection approaches, including: - Confer with the City to locate data owned by the city - Collect relevant data from utilities and other entities - Collect data to enable consumption-based emissions estimates	140	10 weeks
3	Data Analysis	- Calculate baseline energy usage and emissions for municipal operations and the community. Analysis should be calculated and aggregated by: - Major sectors (e.g., residential, commercial, industrial, transportation, waste) - Municipal operations by major end use (e.g., school facilities, fleet) - Additional activities (e.g., community ferry and air travel, community-wide consumption-based emissions, power generation/import) - Net emissions and/or sequestration from agriculture, forestry, and other land use activities	156	15 weeks
4	GHG Emissions Report	- Recommend frameworks for presenting and reporting GHG emissions data in accordance with the Community Protocol. - Prepare a report that textually and graphically presents the GHG inventory. The report will specifically identify: - Emissions over which the City may have significant influence - Additional community-wide emissions. - Top-priority sources of GHG emissions for which reduction strategies could be developed in later climate change planning processes.	84	18 weeks
5	Training and Tracking Hand-off	- Provide the City with the information and materials necessary to replicate the GHG emissions calculations used for the base year GHG inventory, track progress, and generate reports. - Provide the City with an electronic version of the base year analysis. - Hold no less than two training sessions for City staff to learn how to update the inventory.	22	20 weeks
6	Project Management	- Work with the City Manager's Office throughout the project and engage in regular, weekly check-ins - Participate in approximately three meetings to provide project status updates to and answer questions from the City's Climate Change Advisory Committee and the City Council	24	20 weeks (meetings spread throughout project schedule)
Total Level of Effort and Project Duration			490 hrs	20 weeks

6. APPROACH TO MANAGING AND COMPLETING THE PROJECT AND COMMUNICATING WITH THE CITY

6.1 ORGANIZATION OF THE ENGAGEMENT TEAM AND COMMUNICATIONS WITH THE CITY

Jonathan Rogers is the proposed Project Manager and will be the key point of contact for the City throughout the duration of the project. He will work with the City Manager's Office and engage in weekly check-ins to report on project progress and address any questions. Jonathan will be available via phone and email throughout the course of the project and will be available as needed in addition to scheduled meetings.

Jonathan will supervise project activity and apply project management principles and tools to ensure that final products are delivered within the agreed-upon scope, budget, and timeline.



6.2 MONITORING PROCEDURES, QUALITY ASSURANCE AND QUALITY CONTROL MANAGEMENT

The proposed Quality Assurance/Quality Control Manager for this effort, Matt Antes, is an Energetics' Program Director. Mr. Antes has more than fifteen years' experience as an analyst, policy specialist, and manager in the areas of climate change mitigation and adaptation, energy use, and energy supply. He will review content for accuracy and clarity to ensure that all final products are of high quality and maximum value to the City and its stakeholders. The project manager, Mr. Rogers, is a Project Management Institute certified Project Management Professional. They both have experience managing projects similar in scope and size to this effort as mentioned previously.

Energetics has worked with hundreds of clients on projects ranging from intensive, one-month engagements to multi-year partnerships designed to build and sustain momentum toward clients' objectives. We provide project management consulting services, working side-by-side with clients to facilitate vision and strategy expansion, and then turn those plans into action. Our approach to project management is based on proven methodologies rooted in PMI best practices; our products and services are implemented by a trained technical staff; and our track record is demonstrated through decades of successful federal and private sector contracting and consulting. With quality management tools and processes at our disposal, Energetics believes it is well poised to not only quickly address client needs as they arise, but proactively identify risks up front that could potentially manifest into issues during the project.

APPENDIX A. RESUMES

JONATHAN ROGERS, MANAGER, ENERGY SYSTEMS ANALYSIS & INTEGRATION

Education

Master of Science, Chemical Engineering
Johns Hopkins University, 2013
B.S. Chemistry & Biomolecular Engineering
Johns Hopkins University, 2012

Location

Denver, CO

Employment

- Energetics Incorporated
- Tuscany Associates
- Synaptic Research LLC

Professional Certifications

- Project Management Professional, PMI ID: 4447020E2

EXPERIENCE

Energetics Incorporated**7/2014-Present**

Mr. Rogers manages the Energy Systems Analysis and Integration program at Energetics. Mr. Rogers has led numerous technical assessments, cost-benefit analyses, GHG emissions analyses, and industrial energy efficiency reports and has supported several technology roadmapping efforts. His work spans broadly across various sectors including advanced manufacturing, autonomous vehicles, bioenergy and biofuels, process intensification, smart grid development, technology transfer and commercialization, and waste-to-energy.

Mr. Rogers provides extensive support to DOE/EERE program managers in the Advanced Manufacturing Office (AMO), Bioenergy Technologies Office (BETO), the Energy Information Administration (EIA), the Office of Energy Policy and Systems Analysis (EPSA), and the Office of Technology Transitions (OTT). Mr. Rogers also works with the Colorado Energy Office, Bay Area Air Quality Management District, and the California Energy Commission.

Program areas include:

- GHG-emissions analysis – Identifying and evaluating the greenhouse gas emissions mitigation measures by emissions abatement potential, technology readiness, economic feasibility, and susceptibility to market and policy barriers.
- Renewable Energy Integration – Developing a roadmap for California to increase the penetration of renewables on the electric grid
- Industrial Energy Efficiency – Identifying market opportunities and developing strategies to encourage investment in distributed generation and energy efficiency at industrial facilities
- Bioeconomy Development – Evaluating the economic and environmental impacts associated with an expansion of US biomass production and utilization to replace fossil-based fuels and chemicals
- Waste Resource Recovery – Analyzing organic waste resources and existing waste management infrastructures to catalyze a shift towards resource recovery and utilization
- Technology Transitions – Increasing understanding of the DOE National Laboratories' role in advancing technology development and innovation in the US and globally
- Autonomous Vehicles – Modeling the fuel consumption impacts of partial and full-automated vehicle technology deployment

MATT ANTES, DIRECTOR, CLIMATE CHANGE AND SUSTAINABILITY***Accredited Institutions***

M.S., Public Policy and Management
Carnegie Mellon University, 2005
B.S., Chemical Engineering
University of Missouri, 1998

Location

Columbia, MD

Employment

- Energetics Incorporated
- Center for Energy and Environmental Studies
- Environmental Resources Management (ERM), Inc.

EXPERIENCE**Energetics Incorporated, Columbia, Maryland****2005 - Present**

As Program Director, Mr. Antes manages and applies expert practices on numerous topics pertaining to energy and climate change, including energy efficiency, renewable power generation, climate adaptation, and benefit valuations of emerging technologies. He leads studies in clean energy technology and policy, greenhouse gas emissions analysis, and cost-benefit analysis, and he is a trained meeting facilitator. Mr. Antes primarily provides support to the U.S. Department of Energy.

Energy, Technology, and Market Analysis

Mr. Antes provides reviews and technology analyses for DOE's estimates of greenhouse gas emissions reduction. Working with DOE programs and the National Renewable Energy Laboratory (NREL), he has helped develop a more consistent, standard, and integrated set of estimates of the programs' potential to reduce GHG emissions. Mr. Antes has conducted numerous energy analysis studies for DOE programs in the areas of technology and trends analysis, portfolio assessment, and energy intensity baselining.

Program Evaluation and Performance Metrics

Mr. Antes participated in a strategic review of DOE's Climate Change Technology Program (CCTP) \$3 billion RD&D portfolio, seeking to maximize impacts from CCTP's investments and inform near- and long-term technology planning activities tied to specific climate change goals and objectives. He also applies his performance metrics capabilities in support of EERE's Office of Planning, Budget and Analysis (PBA). He has developed logic models for EERE's ten technology development programs with annual budgets totaling \$1.2 billion. The performance metrics help track programs' progress and provide input for decision-makers making funding recommendations.

Climate Change Technology and Policy

Mr. Antes is a subject matter expert in energy sector climate resilience. He has coordinated and co-authored three major reports for the U.S. Department of Energy on climate change vulnerabilities to the energy sector and resilience solutions. He also developed a series of white papers that examine key barriers to greater deployment of climate resilience measures in the energy sector and discuss technology, policy, and institutional opportunities and roles for addressing the barriers. He has also provided input and analysis on climate resilience for DOE's Quadrennial Energy Review.

Center for Energy and Environmental Studies, Carnegie Mellon, Pittsburgh, Pennsylvania**2003-2005****Environmental Resources Management (ERM), Inc., Columbus, Ohio****1999-2003**

SABINE BRUESKE, DIRECTOR, INDUSTRIAL ANALYSIS PROGRAM**Accredited Institutions**

B.S., Chemical and Petroleum
Refining Engineering
Colorado School of Mines, 1994

Location

Bellingham, WA

Employment

- Energetics Incorporated
- Dames & Moore Engineering – Seattle, WA
- CH₂MHill – Denver, CO

Professional Certifications

Certified Energy Manager (CEM), Association of Energy Engineers
Certified Measurement and Verification Professional (CMVP),
Association of Energy Engineers

EXPERIENCE**Energetics, Bellingham, Washington****Program Director, Industrial Analysis Program**

2000–Present

Since joining Energetics in 2000, Ms. Brueske has worked extensively in industrial energy use analysis, conducting both large-scale and process-specific engineering analyses. For the U.S. DOE Office of Energy Efficiency and Renewable Energy, she has led many near-term best practices projects and longer-term R&D efforts. Her other current clients include the Energy Information Administration, DOE Office of Fossil Energy, DOE national laboratories, and California Energy Commission (CEC).

One of Ms. Brueske's most notable accomplishments is managing the creation and publication of the widely referenced [Manufacturing Energy and Carbon Footprints](#), the second-most downloaded pdf on the DOE Advanced Manufacturing Office website. A comprehensive analysis effort produced concise energy balance data for major process and non-process energy end uses, detailing energy use, loss, and associated carbon emissions. In 2015, Ms. Brueske managed an effort to visualize the footprint data by designing an interactive software tool, referred to as the [Dynamic Manufacturing Energy Sankey Tool](#).

Another of Ms. Brueske's notable and highly referenced analyses products are the [energy bandwidth studies](#) for DOE. These studies identify energy intensity and consumption for key manufacturing processes, for subsectors and the sector as a whole. In total, fifteen bandwidth reports have been finalized; these serve as foundational guides for determining which manufacturing sectors and processes are the most energy-intensive and offer the greatest energy savings opportunities from technology advances. The energy bandwidths and savings opportunities identified in these studies are intended to provide a framework for prioritizing investment in manufacturing energy efficiency and will also serve as a basis for subsequent economic/market characterization and energy–water nexus evaluation. The first energy–water bandwidth study, focused on seawater desalination, was finalized in 2017.

Ms. Brueske has managed and supported multiple projects for the CEC. She led the planning and facilitation of a number of technology roadmapping workshops and strategic reports. These workshops focused on energy efficiency opportunities for petroleum refining, food and beverage manufacturing, and industrial natural gas use efficiency. Follow-on work to the natural gas workshop included development of a five-year RD&D technology development plan for the CEC Public Interest Energy Research (PIER) program. Ms. Brueske is currently the project manager for a CEC industrial, agricultural, and water (IAW) Electric Program Investment Charge (EPIC) roadmap project, *Research Roadmap for Advancing Technologies in California's Industrial, Agricultural, and Water Sectors*. The scope of this 16-month project involves conducting a technical assessment for 28 industrial, agricultural, bioenergy, and water and wastewater technology areas. Energetics is managing a team of consultants to compile this research information and is now rolling out a series of topic-centered virtual roadmapping webinars to convene stakeholder engagement.

CHRIS GILLESPIE, SENIOR CONSULTANT/CLIMATE ANALYST**Education**

M.S., Technology and Policy,
Massachusetts Institute of Technology
B.E., Mechanical Engineering,
Cooper Union

Location

Washington, D.C.

Employment

- Energetics Incorporated
- U.S. Environmental Protection Agency
- MIT Joint Program on the Science and Policy of Global Change

EXPERIENCE**Energetics Incorporated, Washington, DC****2013–Present***Senior Consultant/Climate Analyst*

Mr. Gillespie's expertise includes climate change impacts and adaptation, energy systems, technology development, environmental regulation, and economic analysis. Mr. Gillespie consults on a wide range of subjects including development and deployment of renewable and low-carbon electricity and energy technologies, government-industry collaboration on energy sector resilience to climate change impacts, and analyses of energy sector growth and response to price inputs. Mr. Gillespie has led the development of and contributed to high-impact DOE reports, internal whitepapers, policy memos, databases, and insightful analyses that help guide public and agency responses to challenges at the core of energy policy. Mr. Gillespie has also led and contributed to projects supporting a wide variety of clients including federal and state agencies, industry associations, utilities, and international governments.

Several highlights of Mr. Gillespie's work at Energetics include integration and synthesis of technical stakeholder inputs from private and nongovernmental experts on policy matters such as the social cost of carbon, emissions and economic analyses of Clean Power Plan impacts and implementation pathways, modeling energy efficiency policy impacts in Oman, technical analyses in support of the Quadrennial Energy Review, and efforts to encourage investments in resilience and adaptation among energy sector asset owners and operators.

U.S. Environmental Protection Agency, Washington, DC**Office of Air and Radiation, Climate Change Division****2012***ORISE Fellow*

Mr. Gillespie assisted the Climate Change Division in the production of several products, including the development of a draft endangerment finding on the climate impacts of aviation emissions. Mr. Gillespie leveraged his familiarity with the aviation sector to comprehensively research and summarize the up-to-date scientific knowledge of non-CO₂ aviation emissions and their effects on global radiative forcing. This research informed EPA's recent finding determining the extent of new action on aviation under the Clean Air Act.

MIT Joint Program on the Science and Policy of Global Change, Cambridge, MA**2009-2011***Research Assistant*

As a graduate research assistant, Mr. Gillespie developed a modification of the MIT Emissions Prediction and Policy Analysis (EPPA) model to examine the impacts of domestic and global GHG mitigation policies on the aviation sector. Mr. Gillespie's model and emissions scenarios are still being used by the U.S. Federal Aviation Administration and MIT Joint Program for further studies.

HARRISON SCHWARTZ, ENERGY ANALYST**Education**

M.S.E. Chemical and Biomolecular

Engineering

Johns Hopkins University, 2014

B.S. Chemical and Biomolecular Engineering

Johns Hopkins University, 2013

Employment

- Energetics Incorporated
- Baker Hughes
- Johns Hopkins University
- Quantum Semiconductor

Location

Columbia, MD

EXPERIENCE**Energetics Incorporated, Columbia, Maryland****April 2016 – Present**

In his current role, Mr. Schwartz performs technical and economic analysis for various energy-related projects. His current focus is on the assessment of greenhouse gas mitigation measures, development and implementation of waste-to-energy technologies, and providing support for transitioning advanced energy technology into the marketplace.

Baker Hughes, Clarksburg, West Virginia**June 2014 – April 2016**

Mr. Schwartz served as a Field Engineer at Baker Hughes and was lead cement engineer responsible for managing all of the district's jobs, each of which was a project with its own time, technical specifications, and cost considerations. He worked with customers to establish initial designs, discussed changes, and analyzed post job data. Mr. Schwartz coordinated with operations, supply chain, and sales to execute an average of five jobs a week. Additionally, Mr. Schwartz won several service contracts based on his designs and cost proposals, monitored onsite performance for over 20 cementing jobs, and trained a co-worker to be a cement engineer.

Johns Hopkins University, Baltimore, Maryland**September 2013 – May 2014**

During his graduate school tenure, Mr. Schwartz conducted numerous technical analysis studies. Mr. Schwartz conducted a feasibility study for a large-scale (1,000 barrel/day) algal biodiesel plant. He calculated the payback period for a hypothetical 480 MW floating wind farm off the coast of Turkey. Mr. Schwartz also modified a linear program calculating seasonal power plant usage to account for rising global temperatures. He also researched and presented combinations of nuclear, solar, wave, and pumped hydro power that could be used to replace 323 MW of petroleum-generated electricity on the U.S. Virgin Islands.

Quantum Semiconductor, San Jose, California**July 2013 – August 2013**

As an Intern, Mr. Schwartz developed C program code to facilitate discovery of over 1,000 possible superlattice structures for a start-up semiconductor company.

May 25, 2018

City Manager's Office
City of Bainbridge Island
via email, cityadmin@bainbridgewa.gov

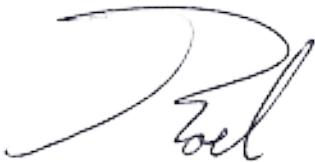
Dear staff and advisors to the City of Bainbridge Island:

Please find attached Hammerschlag & Co. LLC's submission in response to your request for proposals *Greenhouse Gas Emissions Inventory* issued on April 30, 2018.

As a local firm with deep experience and interest in greenhouse gas management, Hammerschlag & Co. LLC is enthusiastic to offer our approach for compiling the City of Bainbridge Island's community and government operations greenhouse gas inventories. Hammerschlag & Co. LLC is offering to complete this project without the use of subconsultants.

If you have any questions or concerns regarding this proposal, please contact Roel Hammerschlag according to the contact information appearing below the signature.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Roel', with a large, sweeping flourish above it.

Roel Hammerschlag
Principal

Hammerschlag & Co. LLC
2609 Karen Frazier Rd SE
Olympia, WA 98501

tel. 360-352-6866
email roel@hammerschlag.org

encl: Proposal

Proposal:

Greenhouse Gas Emissions Inventories

Prepared for: City of Bainbridge Island

Submitted on: 25 May 2018

Hammerschlag & Co. LLC document no.: P018-07(a)

Questions? Please contact:

Roel Hammerschlag

Hammerschlag & Co. LLC

tel. 360-352-6866

roel@hammerschlag.org

<http://hammerschlag.org>

Introduction and Table of Contents

This proposal responds to the Request for Proposals *Greenhouse Gas Emissions Inventory* (RFP) as published by the City of Bainbridge Island (the City) on April 30, 2018. It describes the approach proposed by Hammerschlag & Co. LLC (HLLC) to compile and deliver greenhouse gas (GHG) emissions inventories fulfilling the requirements stated in the RFP. The contents of this proposal are as follows:

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Proposed Scope of Services

Definition and Data Collection

The RFP describes the assembly and reporting of two simultaneous inventories: a community inventory and a government operations inventory. The government operations inventory is not necessarily a subset of the community inventory and requires substantially different datasets. HLLC's proposed services compile the two inventories for the same year; but all other parameters, including the underlying protocols, will be determined separately for the two inventories.

HLLC will begin by organizing an in-person kickoff meeting with relevant City and Climate Change Advisory Committee members. The purpose of the kickoff meeting will be to:

1. **Identify all key components planned for the final report.** The final report defines the outcomes of the project, so its intended content needs to be well understood at the outset. Without that understanding, one risks wasting a lot of time and money re-doing data collection and GHG computations that do not match reporting needs.
2. **Understand the City's intentions for future GHG management efforts.** The content of a GHG inventory can and should be governed in part by its intended use. The City has several options available for setting future GHG emissions targets and navigating reduction pathways. Future releases of the GHG inventories will presumably be used to track progress to any such targets, so setting appropriate definitions of the first community inventory and government operations inventory is important. Furthermore, the City must have the ability to disaggregate the inventories in ways that meet its needs for communicating details about emissions, and in the future their reduction, with its population and other stakeholders.
3. **Determine the most appropriate inventory year.** Some approaches to target-setting invoke a standard baseline year, for example Washington State's legislated targets refer to baseline year 2005. As a rule the accuracy of datasets decreases as one reaches further in the past, so there is pressure to begin recording emissions with a relatively recent year. Some datasets are updated once every 2, 5 or 10 years, which can put further pressure on baseline year choice if such a dataset relates to a key priority of the City. Seasonal weather affects municipal GHG inventories strongly, so choosing a baseline year with typical weather can be important too.
4. **Define operational boundaries.** Operational boundaries represent "what's in and what's out" of the GHG inventory. The minimum operational boundary of the community inventory will consist of the five "Basic Emissions Generating Activities" required by the ICLEI USA U.S. *Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* ("Community Protocol"). At the kickoff meeting HLLC and the City will determine what additional emissions generating activities may be included, for example carbon

sequestration through urban forest management. The operational boundary of the government operations inventory will be determined with reference to the ICLEI Local Government Operations Protocol and the World Business Council for Sustainable Development/World Resources Institute *GHG Protocol*.

5. **Identify the most cost-efficient pathways for gathering data.** Some datasets will be specific to the City, while others may come from state or federal sources more familiar to HLLC. The kickoff meeting is an opportunity to identify which City staff may be able to streamline completion of the inventory with their knowledge, experience, and unique access to datasets relevant to the City.

After the kickoff meeting data collection will begin immediately. HLLC will schedule data collection and inventory computation activities such that each of HLLC's data requests to the City allows approximately two weeks for a response before inducing any project schedule delay.

Inventory, Review and Adjustment

As data collection draws to a close HLLC will enter all relevant data into two inventory workbooks, one each for the community and government operations inventories. The workbooks will be assembled in Microsoft Excel 2016, following *Best Practice Spreadsheet Modeling Standards* version 7.1 as issued by the Spreadsheet Standards Review Board (Spreadsheet Standards). The Spreadsheet Standards ensure transparency and tractability, enabling easy informal audits when these are called for.

Every datum in the inventory workbooks will be cross-referenced to its original source, without exception. The inventory workbooks will include bibliographies, and final delivery will include the packaged library of all source documents for which HLLC is able to secure a legal, unlicensed copy.

Following the Spreadsheet Standards, every cell in the inventory workbooks will be designated through formatting conventions to be a numeric source, a calculation, a label, or explanatory text. Numeric sources and calculations will never be mixed in the same cell.

Each workbook will contain several tabs detailing separable components of the respective inventory, and a table of contents with hyperlinks to each tab. A summary tab will feature a simple table summarizing the entire inventory per the City's needs as determined in the kickoff meeting, and an accompanying pie chart showing distribution of emissions among the components. If the City has identified a need to enter inventory data into a third party tool such as ICLEI's *ClearPath*, then the summary table will be structured identically to the data entry needs of the identified tool.

As soon as the inventory workbooks are 90% complete or more, HLLC will organize a review meeting with City staff and Climate Change Advisory Committee. At the review, attendees will:

-) Review preliminary results and their implications for content of the final report;

-) Strategize overcoming any data shortfalls discovered; and
-) Discuss any required changes or expansions to the operational boundaries that have become evident since the kickoff meeting.

After the inventory review meeting, City staff will be given two weeks for additional review and commentary on the draft workbooks before HLLC begins final adjustments to the workbooks in accordance with decisions made at the inventory review meeting.

Report Authorship, Review and Design

HLLC will begin authoring the final inventory report following the inventory review meeting. The report will describe both the community and government operations inventories in separate chapters. Simple, cogent data visualizations will illuminate characteristics of the inventory outcomes, and the underlying data used to compute them.

As soon as the final inventory report is 80% complete or more HLLC will provide a draft, in Microsoft Word format, to the City for review. Work on the report will be suspended during the review, and then resumed once the City indicates that it has provided all expected suggestions and edits to HLLC.

The final report will be completed approximately one to three weeks after HLLC receives results of the final review. The City may elect one of:

-) HLLC produces the report formatted as a publication of HLLC;
-) HLLC produces the report formatted as a publication of the City; or
-) HLLC provides raw text and graphics, and the City formats and publishes the report.

A report produced by HLLC according to the first or second option will be delivered in ISO 32000-1 consistent portable document format (PDF). If electing the second option, the City will be responsible for providing HLLC with the required graphics and formatting standards. If choosing the third option, HLLC will be able to review a pre-publication proof for consistency with the submitted text and graphics.

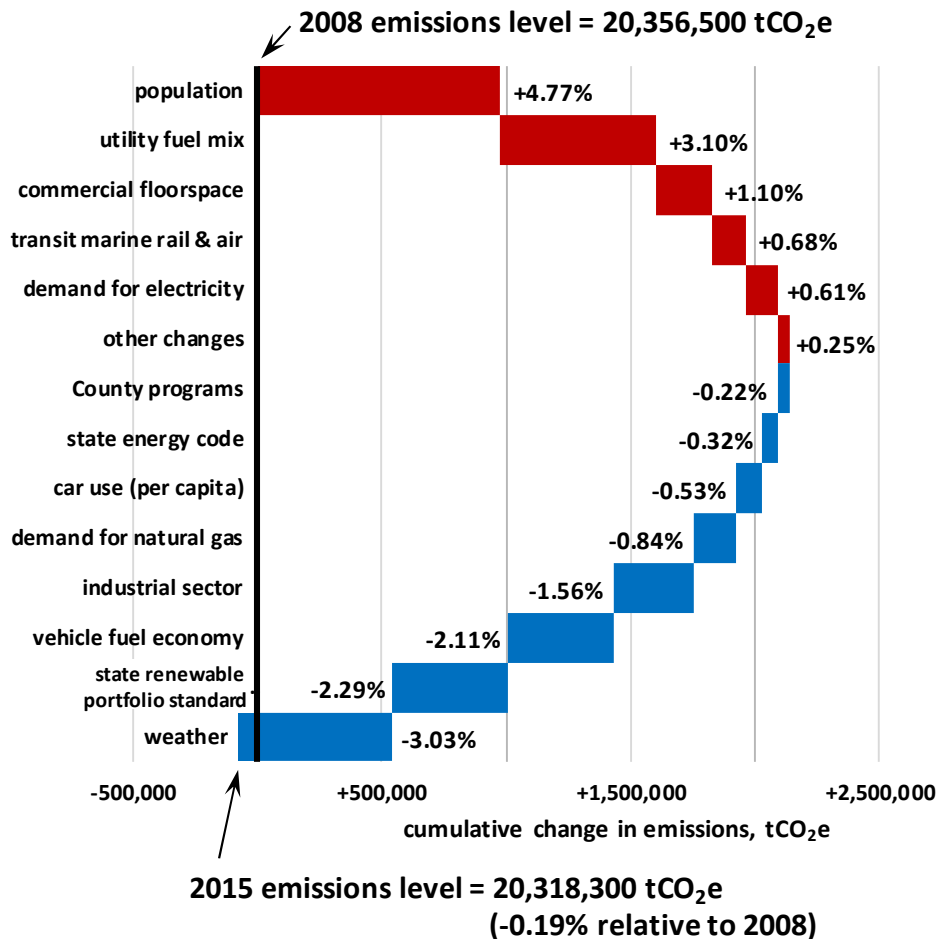
Optional Services

HLLC is offering two separable options to the primary Scope of Services above.

Contribution Analysis of Changes to the Community Inventory

GHG inventory contribution analysis is a groundbreaking, new analysis technique that HLLC has been working to develop as a consultant to ICLEI USA. Contribution analysis requires the compilation of two inventories for the same jurisdiction, separated in time. Data from the two inventories are combined with ancillary weather, demographic, and economic data to allow a

quantitative analysis of changes between the two, chosen inventory years. The contribution analysis identifies the primary drivers of change such as winter weather, growth in population, or changes in driving habits. Contribution analysis offers insights into the most appropriate and likely effective targets for GHG management.



Choosing the contribution analysis option requires selecting a baseline year sufficiently far in the past that a second, more recent year can be inventoried to be the comparator.

Consumption-Basis Estimate

In past work, HLLC has estimated consumption-basis GHG inventories for both government operations and the community of King County. Though a full consumption-basis inventory for any jurisdiction costs several tens of thousands of dollars to conduct, HLLC can offer a quick estimate of consumption-basis emissions for the City by scaling King County emissions factors according to consumer product spending by the community, the government, or both. Though such an estimate will not be precise enough to allow change tracking over the future, it is sufficient to provide a sense of the very large scale of emissions occurring outside the inventoried jurisdiction due to the manufacture and delivery of consumer products.

Project Team

Firm

HLLC is a boutique consultancy specializing in GHG management for large institutions and local governments. Focuses of work include inventory tool building, marginal abatement cost curves, contribution analysis, carbon balances from bioenergy and waste management, life-cycle analysis of fuels, forecasting, and long-term scenario planning. Recent clients have included the City of Bellevue, King County, the Port of Seattle, the University of Washington, the Natural Resources Defense Council, Recology CleanScapes, and Enwave Seattle.

HLLC was incorporated in Olympia, WA in February of 2013. The bulk of HLLC's work is conducted by principal Roel Hammerschlag, but on occasion HLLC provides its specialized GHG management services as a subcontractor to other firms, or subcontracts staff to fulfill the demands of larger jobs.

Team Qualifications

The entire project will be conducted by HLLC's principal Roel Hammerschlag. From 2010-2013, Mr. Hammerschlag served Washington State as the program manager for Washington's State Energy Strategy, and from 2007-2010 Stockholm Environment Institute engaged him in the role of Senior Scientist. In 2003 the MacArthur Foundation awarded Mr. Hammerschlag and Patrick Mazza a Grant for Research and Writing examining limits to hydrogen fuel.

Mr. Hammerschlag has been engaging with the various aspects of GHG management since 1999. He was an advisor to the development of the WRI/WBCSD *GHG Protocol* in 1999, an advisor to the City of Seattle's first GHG inventory in 2001, and compiled King County's first complete GHG inventory (for data year 2003).

Mr. Hammerschlag earned a Bachelor of Science in Physics from the Massachusetts Institute of Technology in 1988, and a Master of Public Administration at the University of Washington in 2007, supported by fellowships from the UW Program on Climate Change and the Henry M. Jackson Foundation.

Mr. Hammerschlag's resume appears as an Appendix to this proposal.



Tasks, Budget and Schedule

Tasks reflect the three headings appearing in *Proposed Scope of Services* above:

1. Definition and data collection;
2. Inventory, review and adjustment; and
3. Report authorship, review and design.

The estimated number of hours and cost to complete these tasks, as well as to conduct the optional tasks, are as follows:

task	minimum		maximum	
	hrs	\$	hrs	\$
City of Bainbridge Island GHG inventories				
1. Definition and data collection	20	2,800	24	3,360
2. Inventory, review, and adjustment	10	1,400	12	1,680
3. Report authorship, review, and design	30	4,200	35	4,900
SUBTOTALS	60	8,400	71	9,940
Options				
4. contribution analysis	35	4,900	40	5,600
5. consumption-basis estimate	20	2,800	30	4,200
GRAND TOTALS with all options	115	16,100	141	19,740

If the City chooses no options, the maximum estimated project cost is **\$9,940**. The anticipated schedule, without options, is:

		2018 week of:												
		July					August				September			
task		2	9	16	23	30	6	13	20	27	3	10	17	24
1. Definition and data collection														
2. Inventory, review, and adjustment														
3. Report authorship, review, and design														

Work would not begin until July 16 due to a scheduled absence of Principal, Roel Hammerschlag. Primary anticipated deliverables are:

-) Kickoff meeting, week of July 16;
-) Draft inventories, week of August 6;
-) Draft final report, week of August 20;
-) Final report, COB September 7;
-) Final inventories, COB September 7;
-) Packaged source files, COB September 7.

Management and Client Communications

HLLC will set a weekly or biweekly check-in call with the City's relevant project manager, unless the City prefers otherwise. At each check-in call, progress will be checked against the timeline and anticipated delivery dates as given above.

HLLC provides invoices on the first business day of each month, detailing charges during the prior calendar month. Each invoice includes detailed descriptions of activities occurring during each day of project work. Progress bars show passage of time since project launch, and depletion of the budget, by task. The detailed yet intuitive invoices double as an important tool for project management, and a solid reference for client communications.

Since the project will be conducted by Mr. Hammerschlag alone, the destination for inquiries regarding project progress or content is always self-evident, and the buck never gets passed. Mr. Hammerschlag is a skilled communicator, and though always happy to hammer out a subtle or complex question on the phone, he will utilize email to lay out options in carefully reasoned structures that make tough decisions easy, and that document the reasoning for future reference.



Appendix

Curriculum Vitae, Roel Hammerschlag

Roel Hammerschlag

tel. 360-352-6866
roel@hammerschlag.org

2609 Karen Frazier Rd SE
Olympia, WA 98501

Education

2007 MPA, Daniel J. Evans School of Public Affairs at the University of Washington

1988 BS, Physics, Massachusetts Institute of Technology

Awards and professional affiliations

2007 Pi Alpha Alpha, the National Honor Society for Public Affairs and Administration.

2005 Fellow, University of Washington Program on Climate Change.

2005 Fellow, Henry M. Jackson Foundation.

2003 MacArthur Foundation Grant for Research and Writing (shared with Patrick Mazza).

Employers

2013– Hammerschlag & Co. LLC, Olympia, WA
Principal

2010–2013 Washington Department of Commerce, Olympia, WA
Senior Energy Policy Specialist

2007–2010 Stockholm Environment Institute – U.S., Seattle, WA
Senior Scientist

2000-2005 Institute for Lifecycle Environmental Assessment, Seattle, WA
Founder and Executive Director

1997-1999 Electrokinetics, Inc., New York, NY
Project Manager

1995-1997 Digital Image Design, New York, NY
Project Manager

1990-1994 Boeing, Seattle, WA
Project Manager

1988-1990 University of Amsterdam Medical Center, Amsterdam, The Netherlands
Researcher

Projects, 1999-present

- 2016-2017 Oil-Free Washington support.** Assess home heating GHG reduction potentials in Washington counties. Build a calculator computing GHG reductions from residential heating conversion projects. Negotiate policy strategies with a stakeholders' coalition managed by Enhabit.
- 2015-2016 GHG emissions of waste management.** Help a major waste hauler inventory operational emissions, as well as life-cycle emissions associated with hauled waste. Design GHG reduction programs, and develop institutional knowledge to assist the hauler's customers with community waste GHG reduction programs.
- 2015 King County marginal abatement cost curves.** Estimate greenhouse gas reduction potentials and costs of proposed actions in King County's Strategic Climate Action Plan. Combine estimates to produce marginal abatement cost curves, one each for the King County community and for government operations.
- 2015 Carbon footprint of marine diesel oils.** Calculate an ISO 14067-compliant carbon footprint of marine diesel oil produced at a waste lubricating oil re-refinery.
- 2014 Green Energy Program design.** Provide a district heating utility with the energy and greenhouse gas accounting framework necessary to support a green energy program based on substituting bioenergy for fossil fuel combustion.
- 2013-2015 University of Washington Climate Action Plan Implementation.** Generate marginal abatement cost curve, and facilitate selection of proposed greenhouse gas reduction measures. Strengthen institutional greenhouse gas inventory process. Facilitate policy development around greenhouse gas targets, offset project development, and offset purchases.
- 2013-2014 Life-cycle assessment of wood pellet fuels.** Assess impacts to the climate and to forests in the U.S. Southeast, induced by demands for wood pellet fuel from Drax Power Station in England. Includes forest vegetation modeling. For Natural Resources Defense Council.
- 2012-2013 Greenhouse Gas Emissions Performance Standard.** Manage a stakeholder process and companion quantitative analysis to revise Washington State's greenhouse gas emissions performance standard applying to electric utilities.
- 2012 2013 Biennial Energy Report for Washington.** Survey energy statistics and policy issues for Washington State. Includes literature review on greenhouse gas balance and costs of using natural gas to displace other fossil fuels.
- 2010-2012 Washington State Energy Strategy.** Manage a stakeholder process and companion quantitative analysis to project energy resources and demands over a 30-year horizon, and recommend policies to minimize energy costs and greenhouse gases, and maximize green jobs in Washington State.
- 2009-2010 Consumption-based greenhouse gas emissions inventory for Oregon.** Direct and indirect greenhouse gas emissions estimates associated with products and services consumed by Oregon's citizens, businesses and institutions.

- 2009** **Life-cycle assessment of alternative fates for forestry waste.** Compare greenhouse gas and criteria air pollutant emissions from competing fates for slash resulting from Pacific Northwest logging operations. For U.S. EPA and Olympic Region Clean Air Agency.
- 2008** **World trade modeling for forestry products.** Apply global economic storylines to the GTAP trade model and scale down results to create scenarios for specific forests. In cooperation with Center for International Forestry Research (CIFOR).
- 2008** **City of Seattle greenhouse gas policy analysis.** Forecast impacts of existing and proposed policy instruments on the municipal greenhouse gas inventory.
- 2007** **Meta-analysis of global land use models.** Derive fundamental model parameters that determine forecasts of global capacity for biofuels.
- 2007** **Food, Feed & Fuels knowledge survey.** Surveyed published and institutional knowledge on food and fuels pressures on land use. In cooperation with Dutch NGO Hivos.
- 2007-2008** **Washington State greenhouse gas policy analysis.** Forecast impacts of existing and proposed policy instruments on the state greenhouse gas inventory. Includes significant work with U.S. EPA WARM model. For Center for Climate Strategies.
- 2006** **City of Seattle greenhouse gas inventory.**
- 2006** **University of Washington greenhouse gas inventory.**
- 2005** **Registries & verification for forestry offsets.** Chapter author for a manual on quantification of greenhouse gas sequestration in forests. For Environmental Resources Trust.
- 2004** **King County greenhouse gas inventory.**
- 2003-2005** **Energy efficiency and integrated resource planning.** Represented the Washington State Attorney General's office in proceedings relating to the integrated resource plans and energy efficiency programs of utilities regulated by the Washington Utilities and Transportation Commission.
- 2003-2004** **Critical analysis of the hydrogen economy.** Under a MacArthur Foundation Grant for Research and Writing.
- 2003** **Seattle City Light greenhouse gas inventory audit.**
- 2001-2005** **Electric generator environmental validation.** Validated environmental and energy specifications of renewable energy resources for the Bonneville Environmental Foundation.
- 2000-2002** **State Registries Collaborative.** Assisted the Natural Resources Defense Council (NRDC) and the U.S. EPA to convene the State Registries Collaborative, providing state governments that are establishing greenhouse gas registries with a forum for sharing methodologies and experiences.

2000-2001 Life-cycle impacts of biomass energy. With Antares Group Inc. and NRDC.

2000-2001 Tradable renewable certificates policy development. For Environmental Resources Trust in Washington, DC evaluated possible roles of tradable renewable certificates in open and closed greenhouse gas markets.

1999 Emissions associated with distributed generation. For NRDC.

1999 Transportation emissions modeling. For NRDC.

Refereed journal articles

Hammerschlag, R. Legislating the Highway Act of 1956: Lessons for Climate Change Regulation. *Environs: Environmental Law and Policy Journal* 31 (**2007**) 59-102.

Hammerschlag, R. Ethanol's Energy Return on Investment: A Survey of the Literature 1990-Present. *Environmental Science & Technology* 40 (**2006**) 1744-1750.

Hammerschlag, R. & Mazza, P. Questioning Hydrogen. *Energy Policy* 33 (**2005**) 2039-2043.

Pro, B.; Hammerschlag, R. & Mazza, P. Energy and Land Use Impacts of Sustainable Transportation Scenarios. *Journal of Cleaner Production* 13 (**2005**) 1309-1319.

Schaber, C.; Mazza, P. & Hammerschlag, R. Utility Scale Storage of Renewable Energy. *Electricity Journal* 17 (**2004**) 21-29.

Greene, N. & Hammerschlag, R. Small and Clean is Beautiful: Exploring the Emissions of Distributed Generation and Pollution Prevention Policies. *Electricity Journal* 13 (**2000**) 50-60.

Other publications

Stanton, E.A, Bueno, R., Ackerman, F., Erickson, P., Hammerschlag, R, and Cegan, J. *Greenhouse Gas Impacts of Oregon's Consumption: Technical Report*. Somerville, MA: Stockholm Environment Institute-U.S. **2011**.

Hammerschlag, R.; Johnson, F. X.; Lee, C.; Ziervogel, G.; Kemp-Benedict, E. & Kartha, S. *Food, Feed & Fuels: A Knowledge Survey and Framework*. The Hague: Humanist Institute for Cooperation with Developing Countries (Hivos) **2008**.

Hammerschlag, R. & Schaber, C. Energy Storage, Transmission and Distribution. In Kreith, F. & Goswami, Y, (eds.), *Handbook of Energy Efficiency and Renewable Energy*, CRC Press **2007** 18-1 – 18-20.

Hammerschlag, R. Choosing a "Green" Car. *Solar Today*, Nov/Dec **2005** 30-31.

Mazza, P. & Hammerschlag, R. *Carrying the Energy Future: Comparing Hydrogen and Electricity for Transmission, Storage and Transportation*. Seattle, WA: Institute for Lifecycle Environmental Assessment **2004**.

Greene, N.; Hammerschlag, R. & Martin, J. *From Plants to Power Plants: Cataloging the Environmental Impacts of Biopower*. New York, NY: Natural Resources Defense Council **2002**.

The background of the slide is a photograph of a dense forest of tall, thin evergreen trees. Sunlight filters through the canopy, creating a dappled light effect on the forest floor. The trees are mostly vertical, creating a strong sense of height and depth.

PAE Qualifications: City of Bainbridge Island Greenhouse Gas Emissions Inventory

May 25, 2018

pae-engineers.com

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Cover Letter

Dear Mr. Schulze,

Thank you for the opportunity to submit our qualifications for the **City of Bainbridge Island Greenhouse Gas Emissions Inventory**. PAE has a vision to help solve the world's energy and water problems. We work to help clients understand their climate impacts and show them ways to drawdown their greenhouse gas (GHG) emissions. Our team has experience measuring GHG inventories at many scales including buildings, campuses and global impacts. David Mead, our proposed project manager, implemented the Net Zero Building Fellowship for [Project Drawdown](#) which looked at the global GHG impacts of net zero buildings. A copy of Project Drawdown has been mailed to the City Manager's office as a reference to our qualifications.

It is commendable that the residents of Bainbridge Island take global warming seriously and want to better account for the impacts of the Island. As Terry Tempest Williams has stated "The eyes of the future are looking back at us and they are praying that we may see beyond our time."

It is our goal to help the community on Bainbridge understand the impact their lives are having on climate change. The first step in the process is measuring the GHG emissions from the community. We can't solve a problem that we don't understand and we must understand our emissions to understand our impact.

It would be an honor to collaborate with you on establishing a tool to quantify the GHG inventory of the Island community. In order to see clearly and beyond our time, we must measure our impact so together we can design a sustainable future.

Engaging PAE for this project provides the City of Bainbridge Island with many benefits:

- **A PAE-developed Greenhouse Gas Emissions Analysis Calculator.** As part of an internal research grant program, PAE staff developed a new tool to more accurately calculate greenhouse gas emissions based on location.
- **A deep understanding of the budget and schedule pressures that public agencies face.** PAE has worked with a variety of public agencies from the Port of Seattle and Port of Portland, to numerous cities and counties, to the King County Library System, and understands how to **meet aggressive schedules and remain on budget.**
- PAE is an industry thought leader and innovator. **Our early adoption of cutting edge technologies to further the boundaries of sustainable design** ranges from photovoltaic arrays, to potable rainwater reclamation, to composting toilet systems and Living Machines.
- Senior staff involvement in every phase of the project through construction completion.

As you'll learn from the following pages, PAE offers a combination of data-driven technical expertise, innovative thinking, a passion for sustainability and relevant experience, which will be a great asset to the City of Bainbridge Island.

Sincerely,



Allan Montpellier, PE
Principal
1501 E Madison Street, Suite 300
Seattle, WA 98122
P: 206.596.8615
F: 503.226.2930
allan.montpellier@pae-engineers.com

About PAE

We're all about people and nature. Engineers have a reputation for complicating things. But at PAE, we like to keep it simple: People and nature are our driving forces. Internally, we look out for each other and the spaces we occupy—inside and out. And the same applies to our work. We design high-performing buildings that keep people comfortable, healthy, and productive inside, while restoring the natural world outside.

PAE's projects range from entirely new buildings to tenant improvements and historic building renovations. Essentially, we work with any type of building at any point in its lifespan, even when it's still just an idea. We do all this while balancing the project's first cost/pro forma and long-term operational cost requirements along with comfort, water conservation and energy efficiency goals.

PAE at Work

Founded in 1967, PAE is a firm of more than 260 employees providing an array of services in mechanical and electrical engineering, building analysis, commissioning and technology system design. With offices in Portland, Eugene, Seattle and San Francisco, PAE serves public and private sector clients throughout the western United States and beyond.

Leaders In Sustainable Design

Sustainable design is a long-standing PAE focus. We have provided design and commissioning expertise for more than 160 LEED rated or registered projects. They are about more than a certification – PAE's sustainable projects bring lower operation costs to owners and tenants, and use fewer natural resources.

Our work for municipal clients – including libraries, visitor centers, parks and recreation spaces, and office buildings, among others – meets high level sustainability and LEED requirements while staying on budget and schedule. We have a long-standing history working in a variety of public and civic facilities, our services ranging from new construction, to renovations and additions, to tenant improvements and major system upgrades. Through this experience, we understand how to work with multiple agencies to successfully build a consensus and meet the needs of each stakeholder.

06

Living Buildings

17

Net Zero Energy
Buildings

36

LEED Platinum
Buildings

111

LEED Gold
Buildings

Project Approach: Overview + Methodology

Overview

Our team will work closely with the City of Bainbridge Island to create both an essential and holistic GHG inventory. The essentials will follow the ICLEI Protocol while the holistic inventory will follow principles set forth by Project Drawdown. Our project manager David Mead has access to the calculations and data for Project Drawdown through his experience as a Drawdown fellow. This creates the opportunity to measure more than just the essentials as we can use some of the most recent research on impacts beyond the standard ICLEI protocol.

We have also created our own Greenhouse Gas Emissions Analysis (GGEA) tool that correlates with the Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions methodology. As part of the project PAE will create a custom tool that builds on GGEA such that it meets the needs of the City for ongoing GHG inventory tracking.

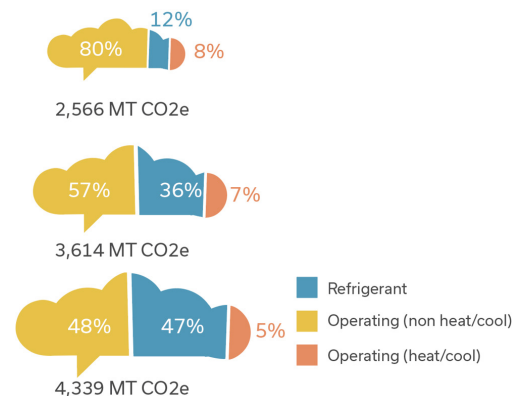
Methodology

PAE will create the essential portions of the GHG inventory by following the ICLEI Protocol including:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion equipment
- On-road passenger and freight motor vehicle travel
- Use of energy in potable water and wastewater treatment and distribution
- Generation of solid waste by the community

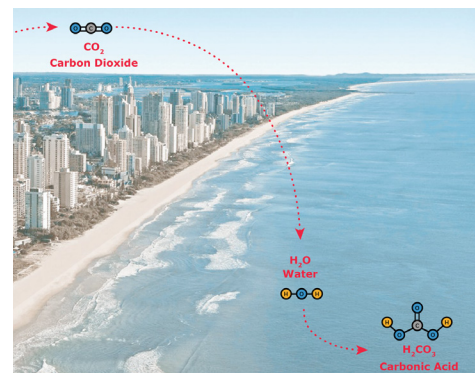
PAE can look at items beyond these by using calculations set forth by ICLEI and Project Drawdown that will allow for the City to understand impacts from the following:

- Refrigerant management
- Community consumption data for food
- Community travel data
- Net agriculture emissions
- Net forestry emissions
- Net forest sequestration



Holistic Emissions Analysis

Emissions by system



Holistic Emissions Analysis

Effects on surrounding environment

PAE will create a custom tool for the City of Bainbridge Island, building upon our own Greenhouse Gas Emissions Analysis, that will meet the City's needs for ongoing GHG tracking.

Project Approach: Emissions Sources



Utility Electricity Use

Electricity production generates the second largest share of greenhouse gas emissions. PAE will calculate utility-specific emissions based on the City's electricity use. PAE's Greenhouse Gas Emissions Analysis tool closely correlates with the Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions methodology.



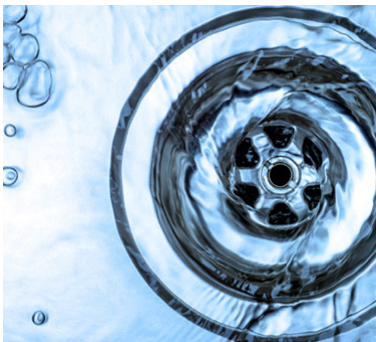
Fossil Fuel Combustion

Although the City of Bainbridge Island does not use natural gas for heating or electricity, PAE will work with local utility providers to quantify emissions from community oil and propane use.



Water Energy Nexus

PAE will calculate energy required for treating water to potable standard. We consider water as a resource that is directly connected to energy use. By finding ways to reduce potable water use, not only are we conserving fresh water, we are also reducing our energy, and often, our carbon footprint.



Wastewater

PAE will calculate methane emissions from wastewater systems. PAE has provided expertise and been part of multiple project teams that have designed rainwater reclamation, composting toilet systems, Living Machines, and many other sustainable and alternative wastewater processing systems.



Refrigerants

A central component in current HVAC system design, refrigerants can be used as energy-saving tools. However, many refrigerants have thousands of times the impact as CO₂. The recently published Project Drawdown (a comprehensive plan for reversing global warming), identified refrigerants as the number one path to combat global warming.



Transportation

Transportation can be the number one cause of greenhouse gas emissions. PAE is well ahead of the curve in tracking our own transportation. Company culture actively encourages public and non-fossil-fuel transportation methods, and purchases carbon offsets.



Consumption Based Emissions

PAE will track emissions based on household consumption of food, goods, and services, accounting for travel, import, and product disposal.



Carbon Sequestration

PAE will track net emissions from agriculture, forestry, and other land use activities.

Project Approach:

Data Collection

Data Collection

PAE will work closely with the City of Bainbridge Island to gather, calculate and quantify greenhouse gas emissions from the following primary sources.

- Local utility providers
- Municipal operations by end use
- Community car, bus, air, and ferry travel
- City building energy usage
- City building refrigerant charge

There will also need to be data collected from other sources that may be implemented through surveys, outreach, previous research and/or data analytics including:

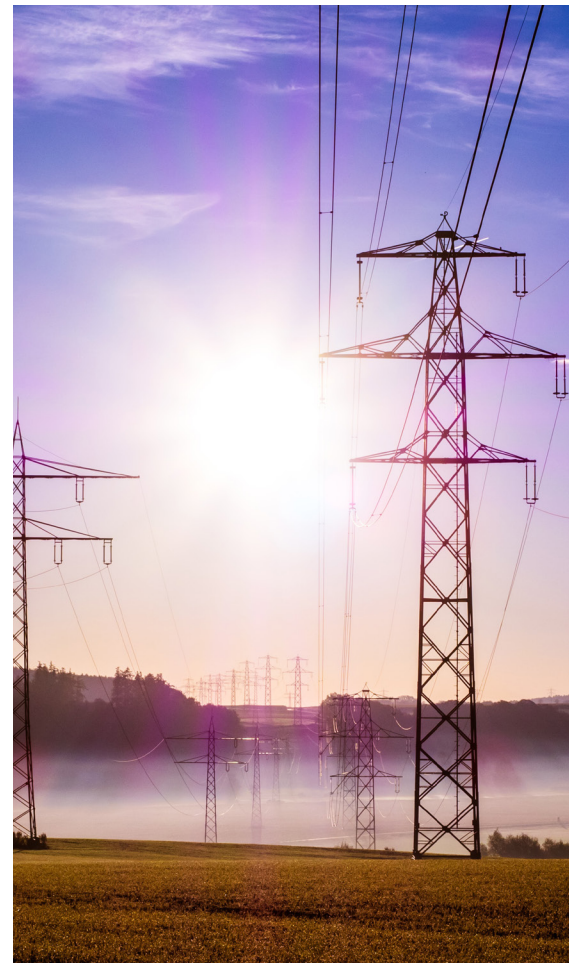
- Wood imports for residential heating
- Refrigerant charge of private residences
- Ferry maintenance yard operations
- Consumption patterns for shopping in Silverdale
- Miles traveled to buy less expensive gasoline off island
- Online shopping consumption patterns
- Emissions per capita and per square feet of residential area
- Emissions from fish farm operations
- Others as agreed to in early planning meetings with the City

Data Analysis

PAE will calculate the baseline energy and emissions for the municipal operations and the community. The analysis will be done in a Microsoft excel based tool that shows the assumptions, calculations and sources, and will allow for sorting the data by category.

Greenhouse Gas (GHG) Report

The GHG report will be in accordance to the Community Protocol. The report will outline the major sources of GHG emissions and highlight sections that will need focus during future drawdown solution phases.



Proposed Task List

Proposed Task List	Hours
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BUILT ENVIRONMENT	
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Use of fuel in residential and commercial stationary combustion equipment	24
Industrial stationary combustion sources	16
Power generation in the community	8
Use of electricity by the community	8
District heating/cooling facilities in the community	0
Use of district heating/cooling by the community	0
Industrial process emissions in the community	8
Refrigerant leakage in the community	40

TRANSPORTATION + OTHER MOBILE SOURCES	
--	--

On-road passenger vehicles operating within the community boundary	48
On-road passenger vehicle travel associated with community land uses	16
On-road freight and service vehicles operating within the community boundary	16
On-road freight and service vehicle travel associated with community land uses	16
On-road transit vehicles operating within the community boundary	8
Transit rail vehicles operating within the community boundary	0
Use of transit rail travel by the community	0
Inter-city passenger rail vehicles operating within the community boundary	0
Freight rail vehicles operating within the community boundary	0
Marine vessels operating within the community boundary	40
Use of ferries by the community	16
Off-road surface vehicles and other mobile equipment operating within the community boundary	8
Use of air travel by the community	40

Proposed Task List

Proposed Task List	Hours
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SOLID WASTE

Operation of solid waste disposal facilities in the community	40
Generation and disposal of solid waste by the community	24

WATER + WASTEWATER

Operation of water delivery facilities in the community	
Use of energy associated with use of potable water by the community	40
Use of energy associated with generation of wastewater by the community	40
Process emissions from operation of wastewater treatment facilities located in the community	40
Process emisisions associated with generation of wastewater by the community	40
Use of septic systems in the community	16
	24

AGRICULTURE

Domesticated animal production	24
Manure decomposition and treatment	8
Upstream Impacts of Community-Wide Activities	0
Upstream impacts of fuels used in stationary applications by the community	24
Upstream and transmission and distribution (T&D) impacts of purchased electricity used by the community	8
Upstream impacts of fuels used for transportation in trips associated with the community	16
Upstream impacts of fuels used by water and wastewater facilities for water used and wastewater generated within the community boundary	24
Upstream impacts of select materials (concrete, food, paper, carpets, etc.) used by	40

Proposed Task List

Proposed Task List	Hours
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INDEPENDENT CONSUMPTION-BASED ACCOUNTING	
---	--

Household Consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all households in the community)	56
Government Consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all governments in the community)	40
Life cycle emissions of community businesses (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all businesses in the community)	56

CO2 SEQUESTRATION	
--------------------------	--

Inventory of carbon sinks	40
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PROCESS	
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Meetings with the City	60
Survey Creation and Data Collection	40
Community Outreach	40

TOTAL ESTIMATED H OURS	1052
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Schedule

Concept Schedule

The following outlines a concept schedule for the project.

- Kickoff Meeting with the City
- Methodology collaboration and confirmation with the City
- Data collection from municipal sources
- Data collection from community sources
- Collecting and synthesizing data
- Creating a Microsoft Excel based tool for the City's use
- Reporting inventory to the City
- Education to the city on how to use the tool

The timeline and dates for key deliverables can be discussed with the City after PAE has a better understanding of the data sources and timeframe needs of the City.



Management Approach

PAE's Project Management Approach

Success on a project of this scope and magnitude requires clear vision and strong leadership from the mechanical and electrical engineering design team. Effective communication between the City and the engineers is essential.

At the core of our approach is a single point of contact for GHG Inventory services. All information entering or leaving PAE will be routed through the project manager. As the project progresses and becomes detailed, close relationships will develop between staff members of PAE and the City. Even as those relationships allow the close collaboration to occur, our Project Manager will be kept in the loop on all communications. Thus, our Project Manager will be available and informed on all project issues.

To ensure the high caliber of PAE's services, a firm principal will be involved in all phases of the project. The Project Manager, overseeing the project day by day and coordinating with other Project Managers so that our work remains on schedule, on budget, and of the highest quality.



Project Team

Allan Montpellier, PE, LEED AP

PRINCIPAL IN CHARGE

Allan is a mechanical engineer and a principal at PAE with more than 20 years of experience and a passion for high-performance buildings. Four of his projects have been awarded the AIA COTE award, ten of his projects have achieved LEED ratings, and seventeen are on the path to ratings from Silver to Platinum. He focuses on developing integrated systems through innovative alternatives that lean heavily on sustainable-design strategies. Allan measures success based on a building's actual performance and, most importantly, the relationships he forms along the way.



EXPERIENCE

Seattle Aquarium, Seattle, WA

- Ocean Pavilion
- Pier 59 Renovation (Pursuing LEED Gold)
- Expansion Conceptual Design*

Point Defiance Zoo & Aquarium, North Pacific Aquarium, Tacoma, WA

University of Washington, Population Health Facility, Seattle, WA*

Oregon State University, Forest Science Complex, Corvallis, OR*

EDUCATION

Bachelor of Science, Mechanical Engineering, University of Alberta, AB

REGISTRATIONS

Professional Engineer: OR, WA, CA, ID, MA, AZ, AK, AB, UT

US Green Building Council LEED Accredited Professional

David Mead, CPHC, AIA, LEED AP BD+C

PROJECT MANAGER

With over 15 years of experience as an architect and high performance building consultant, David works to integrate engineering and architectural solutions into unified, ecologically-inspired designs. He utilizes his unique holistic knowledge of the built environment to provide technical consulting services that assist in the design and implementation of highly sustainable solutions. A knowledgeable and committed advocate for net-positive buildings, David is passionate about advancing building performance to create a carbon neutral future. David contributed to Project Drawdown, a comprehensive guide to reverse global warming published in 2017, and recently presented on greenhouse gas emissions tracking at the 2018 Living Future Conference.



EXPERIENCE

Project Drawdown Fellowship, Net Zero Buildings

Seattle Aquarium Expansion Conceptual Design, Seattle, WA*

Capitol Hill Light Rail Mixed-Use Development, Seattle, WA*

University of Washington, Population Health Facility, Seattle, WA*

Oregon State University, Forest Science Complex, Corvallis, OR*

EDUCATION

Bachelor of Architecture, Iowa State University, IA

PHIUS - Certified Passive House Consultant Training

REGISTRATIONS

Certified Passive House Consultant

Licensed Architect: WA

US Green Building Council LEED Accredited Professional

*Denotes project included greenhouse gas emissions analysis

Project Team

Charles White, EIT

MECHANICAL ENGINEER, BAM SPECIALIST

Charles is a mechanical engineer with 5 years of experience in mechanical systems design, specializing in building analysis and modeling. A keen problem solver, Charles is driven by a passion for finding innovative design solutions that balance project budget with long-term sustainability goals. He believes each project is an opportunity to create a better future, and brings a big-picture approach to every project team. From energy-efficient design and careful building analysis to thoughtful product selection, Charles works collaboratively with the owner, architect, and design team to ensure a clear pathway to project success.



EXPERIENCE

Seattle Aquarium, Ocean Pavilion Expansion, Seattle, WA

University of Washington, Population Health Facility, Seattle, WA*

Point Defiance Zoo & Aquarium, North Pacific Aquarium, Tacoma, WA

Aegis Living Lake Union, Seattle, WA (Pursuing Seattle Living Building Pilot Program)

EDUCATION

Masters of Science, Civil Engineering, Stanford University, Stanford, CA

Bachelor of Science, Mechanical Engineering, Seattle University, Seattle, WA

REGISTRATIONS

Engineer in Training (EIT)

Jess Scanlon

BUILDING PERFORMANCE SPECIALIST

Jess is a talented building performance specialist with a passion for sustainable community development, emphasizing the larger roles that designers play on the environments they shape. Jess takes special interest in climate change and its effect on the built environment. As such, she creates energy-efficient, flexible designs concentrating on passive systems. Jess believes that a successful project relies on working closely with both creative and technical consultants, and treating each building as a dynamic ecosystem.



EXPERIENCE

University of Washington, Population Health Facility, Seattle, WA*

Aegis Living Lake Union, Seattle, WA (Pursuing Seattle Living Building Pilot Program)

The Sage School Living Building Master Plan, Hailey, ID (Pursuing Living Building Challenge)

EDUCATION

Masters of Science, Architectural Engineering, University of Colorado, CO

Bachelors of Science, Architectural Engineering, University of Colorado, CO

Engineering for Developing Communities Graduate Certificate, University of Colorado, CO

*Denotes project included greenhouse gas emissions analysis



Creating a better environment

Allan Montpellier PE, LEED AP

Principal

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206.596.8615

1501 East Madison Street, Suite 300
Seattle, WA 98122



REQUEST FOR PROPOSAL FOR

GREENHOUSE GAS EMISSIONS INVENTORY

SERVICE PROPOSAL



WSP USA
ONE PENN PLAZA
NEW YORK, NY 10119

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May 25, 2018

City of Bainbridge Island, WA
280 Madison Avenue North
Bainbridge Island, WA 98110

Dear Sir/Madam:

On behalf of WSP USA, I am pleased to submit our proposal in response to your request for a consultant to develop a comprehensive greenhouse gas emissions inventory for the City of Bainbridge Island. This document provides contextual information on WSP and outlines our team's proposed approach, our experience and capabilities related to the requested scope of work, and our proposed team, timeline, and cost. We are confident our team's expertise is ideally matched to the needs of the City of Bainbridge Island, and we welcome the opportunity to contribute to your climate change initiatives.

As an organization, WSP provides a broad array of services that transform the built environment and restore the natural environment. We are building systems engineers, transportation and infrastructure planners, environmental scientists, and strategic advisors on sustainability topics. Our 40,000 professionals, based in 40 countries and over 500 offices, provide services to all aspects of the global economy. We are proud of the breadth of WSP's geographic and technical coverage, as well as the depth of our expertise.

Should you have questions or require further information, please contact me at me at jonathan.dickinson@wsp.com or 212-465-5789, or our proposed project manager Jeremy Mohr, at jeremy.mohr@wsp.com or 503-417-9357. We are committed to the success of the City of Bainbridge Island in this important effort and look forward to discussing the opportunity further; we welcome feedback on all aspects of our proposal and can adjust this document as desired in subsequent discussions.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'J. Dickinson'.

Jonathan Dickinson
Practice Leader, Sustainability and Energy
WSP



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1 OVERVIEW OF WSP

WSP PROFILE

WSP is a global policy, planning, and design firm that provides sustainability consulting to transform the built environment and restore the natural environment. Our expertise lies at the intersection of the horizontal infrastructure and the skylines we have helped to shape from coast to coast. We are at our core, a design firm that promotes integrated approaches and solutions to complex projects. We work with municipal clients to transform urban spaces into healthful, vibrant gathering places that are woven into the larger community and the urban design context: sustainability, resiliency, placemaking, livability, walkability, green infrastructure, and the balance of nature within the urban environment.

WSP's Sustainability and Energy (S&E) team includes experts in the fields of supply chain engagement and goal setting, GHG accounting and science-based targets, sustainability and energy strategy, climate resiliency, and product sustainability. Team-wide, we hold key positions in these fields, including: serving on the technical advisory group of the Science Based Targets Initiative (SBTI), having served on the technical working group of the World Resources Institute / World Business Council for Sustainable Development GHG Protocol's Scope 2 and Scope 3 GHG accounting standards, serving as a voting member of the Green-e Renewable Energy Certification Advisory Board, having participated in a CDP panel focused on realizing ambitious supply chain goals at the 2015 CDP US Workshop, and we have supported multiple EPA programs since 2002, providing technical assistance such as updating EPA's tools and guidance documents related to Scope 1, 2, and 3 GHG accounting and management.

PROPOSED PROJECT TEAM

The WSP project team combines expertise in all facets of municipal sustainability planning, and greenhouse gas emissions inventory development and climate change mitigation planning. Our team has experience and expertise in the built environment, transportation, water, environment and energy sectors. We harness the practical knowledge of our engineers to better inform WSP's greenhouse gas emissions inventory and climate mitigation subject matter experts.

WSP's S&E practice was created specifically to provide services required by clients such as the City of Bainbridge Island, and our vast array of capabilities will be delivered through a single experienced Project Manager (PM), Jeremy Mohr, who will have the ability to pull resources from across the company to deliver the best possible results. The proposed project team for this includes S&E staff with deep domain expertise, including our proposed Project Director Jon Dickinson, who has completed ten greenhouse gas emissions inventories for the City of New York, and has provided technical assistance to 12 North American C40 Cities Climate Leadership Group cities in updating their greenhouse gas emissions inventories. This core project team will be supported by technical staff that bring additional expertise in greenhouse gas inventory development, and provide the depth to deliver the full scope of work on the timeline provided.

2 PROJECT UNDERSTANDING

BACKGROUND

The City of Bainbridge Island, Washington, has requested proposals from consultants to develop a baseline greenhouse gas emissions inventory for City and community emissions. The completion of a comprehensive greenhouse gas inventory will allow the City to take the first step toward a long-term climate change planning effort by identifying the sources and levels of greenhouse gas emissions from City government operations and community-wide activities. This will provide valuable information to the City and stakeholders in developing specific strategies to reduce greenhouse gas emissions.

WSP is pleased to present this proposal to support the City of Bainbridge Island's greenhouse gas development. WSP will work with the City's Climate Change Advisory Council and City Manager's Office to receive valuable input and guidance throughout the inventory development process.

WSP will work through this project with the following objectives:

1. Working with the City Manager's Office, define a methodology that allows for transparent, consistent, replicable inventory development process and best allows for future inventory updates.
2. In consultation with the City, determine the most appropriate boundaries and emissions sources for inventory inclusion.
3. Establish a data collection process and management plan to allow for the collection and use of robust, accurate activity data, emission factors, and other data elements, as required.
4. Complete a full greenhouse gas inventory for community-wide and municipal operations greenhouse gas emissions, following accepted and agreed upon protocols and methodologies, including the ICLEI's U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions and Local Government Operations Protocol, and, as applicable, the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories.
5. Develop a greenhouse gas emissions inventory report that best communicates the inventories findings to the City's stakeholders, while highlighting emissions sources best suited for greenhouse gas mitigation strategies.
6. Ensure that all information and materials are developed and managed with the end goal of being transferred to the City following project conclusion, allowing for future inventory updates by the City.

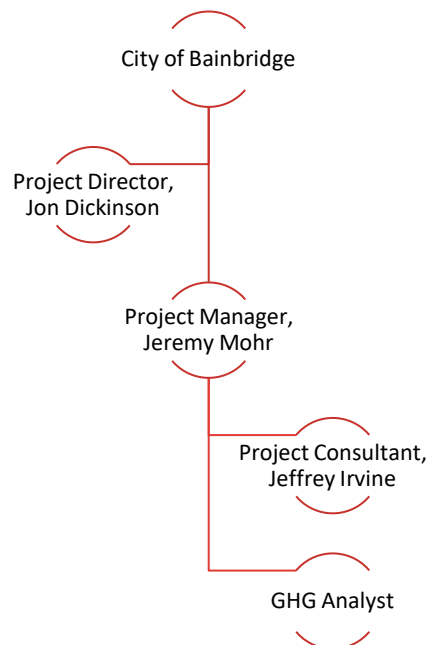
3 TEAM, MANAGEMENT APPROACH, AND RELATED EXPERIENCE

TEAM ORGANIZATION

The WSP team has been specifically compiled to address the task of completing the City of Bainbridge Island's greenhouse gas inventory. Our experts have decades of greenhouse gas inventory development, having completed similar projects for cities throughout the U.S. Our organizational structure provides access to experience and insight rarely collected under the umbrella of a single partner and trusted advisor. It also ensures that those capabilities can be seamlessly delivered to the City rapidly and with low transaction costs by our proposed project manager, who will also be responsible for schedule, budget, and quality performance.

One of the biggest strengths of our team is our personnel. We recognize that the staff we assign to a project will determine its success. With this in mind, we commit our top talent to perform the tasks required for this project. Our project manager will be supported by a project director, a project consultant, and an analyst, as needed. A team organizational chart is provided in **Figure 1** below, followed by brief bios for our team. Detailed resumes can be found in Appendix A.

Figure 1. WSP Organizational Chart



TEAM BIOS



Jon Dickinson | Project Director

Jon Dickinson, based out of WSP's New York City office, leads WSP's Sustainable Cities services. Jon has more than 17 years of experience developing and implementing sustainability plans and climate action plans for cities. He worked for 12 years as a climate change policy advisor to Mayor Michael Bloomberg in New York City, leading New York's greenhouse gas emissions measurement and reporting functions and supporting the city's climate change adaptation and mitigation planning efforts. Prior to joining WSP, Jon worked as a consultant, providing technical expertise in supporting C40's North American cities' revisions of their greenhouse gas (GHG) inventories, completing community-scale GHG inventories for several other U.S. cities, and supporting the development of New York's *Roadmap to 80 x 50* GHG mitigation plan, among other projects.



Jeremy Mohr | Project Manager

Jeremy Mohr is responsible for the firm's Energy Strategy offering in the United States, including enterprise energy strategy and renewable energy advisory. Throughout his career, Jeremy has provided leadership and delivered successful results on a wide variety of large, complex projects for private and public clients. For the last decade, he has focused his efforts on carbon, energy, and climate change giving him the opportunity to work with several multinational Fortune 500 clients on enterprise carbon and energy management solutions.

Jeremy has supported dozens of organizations in the areas of energy analytics, energy auditing, greenhouse gas (GHG) inventories, setting reduction goals, and publicly reporting their efforts through CDP (formerly, Carbon Disclosure Project) responses and sustainability reports.



Jeffrey Irvine | Project Consultant

Jeff Irvine is a Project Consultant on WSP's Sustainability and Energy team. He brings 12 years of professional experience implementing policy and program management solutions with expertise in renewable energy, energy efficiency, climate preparedness, and greenhouse gas (GHG) management. Jeff has extensive experience supporting city sustainability programs, including CDP reporting, greenhouse gas inventory development, climate hazard assessment, and clean energy program development.

For a recent public client, Jeff supported the city's compliance with the Global Covenant of Mayors by coordinating a climate hazard assessment and supporting a GPC community-wide greenhouse gas inventory. Jeff currently serves as the technical lead on a project for C40 to develop a tool that will identify synergies, trade-offs, and other interactions between climate adaptation and mitigation strategies. Prior to joining the firm, Jeff managed New York City's solar market development program leading to a tripling of NYC's solar capacity deployment.

MANAGEMENT APPROACH

Critical to the success of this project will be clear communication between our team and the City of Bainbridge Island. Our Project Manager will establish a regular communication process and schedule to provide project updates and to coordinated project developments as they occur. Jeremy will ensure that there is bidirectional information flow throughout this project through bi-weekly meetings with the city, coordinating and delivering communications from all members of the consultant team to the city, and ensuring that the city's communications are disseminated appropriately to the members of the consultant team. The meetings will be attended by both Jeremy and Jon Dickinson, our Project Director. Jeremy will be the City's direct liaison throughout the project, providing a single, direct line of communication from the city to the entire consultant team, while Jon will provide additional connection to the technical team. Both will be available as needed for regular project update meetings and to respond to the city as needed. Jeremy will coordinate all staff resources, working closely with Jon to ensure tasks are progressing on time, budget, and exceeding city expectations.

Beyond staff resources, the project manager has access to the full suite of WSP project management tools to help ensure that the project stays on budget and schedule. The toolbox, as shown in **Figure 2** below, provides tools for real time tracking of project charges and budgets, links to employee daily time charges for the project, training, project period end summaries, project lifecycle analysis and other resources to provide the project manager with complete transparency of all activity on the project across WSP geographic locations and organizational distinctions.

Our staff proposed for this project have worked on a wide array of climate action plans from small cities like Easton, Pennsylvania to midsize cities like Colorado Springs to the megalopolis, New York City. We have worked at the state level developing a Climate Action Plan for Maryland, and at the County level for Montgomery County, Maryland, Arlington County, Virginia, and Boulder County, Colorado. Our work in the above jurisdictions has included greenhouse gas (GHG) inventory development, GHG emissions forecasting, emissions reduction typology and modeling, vulnerability assessments, adaptation plans, green infrastructure, high performance buildings, integration of renewable energy, transit-oriented development, and community engagement focused on disinvested and marginalized communities.

Capacity building: Because of our experience in developing climate action plans, our staff are not only called upon to support development of these plans in jurisdictions like New York City and Boulder, Colorado, but we also play a significant role in the development of protocols to complete rigorous, transparent and actionable

plans, as well as provide training and advice to organizations and agencies across the globe about how to make these plans as useful and impactful as possible. Our proposed Project Director, Jon Dickinson, provided technical support and training to 12 North American C40 Cities Climate Leadership Group cities in updating their community-scale GHG inventories to meet the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) standards; and developed the curriculum for and delivered training for the World Bank Group's Urban GHG Inventory Specialist certification program, delivering training to 20 cities from World Bank client countries and staff from UN-Habitat, ICLEI-Local Governments for Sustainability, C40 Cities Climate Leadership Group, and CDP Cities.

Strategic partnerships: WSP is one of CDP's three North American Cities Consultancy Partners. We have completed CDP response checks for 15 cities, and members of our project team recently completed a webinar on behalf of CDP Cities titled, Implementing Climate Action Plans by Tracking Data. As discussed in this webinar, developing the right performance metrics, disseminated through transparent tools, and reviewed and updated regularly is critical to successful implementation. However, absent the right baselining and forecasting, particularly when it comes to GHG emissions, it is impossible to properly track progress. The following projects represent examples of our team's relevant experience.

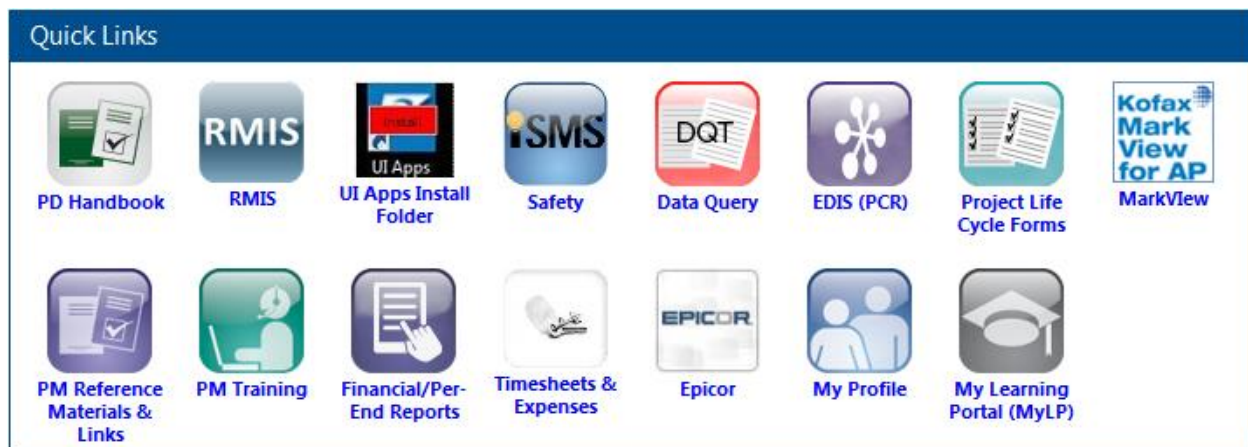
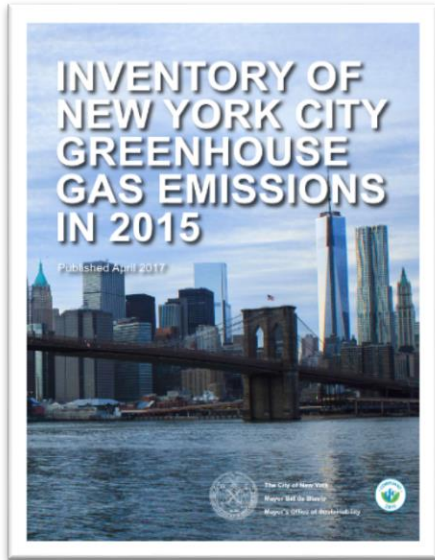


Figure 2. WSP project management toolkit resource list and links

RELEVANT FIRM AND PROJECT EXPERIENCE



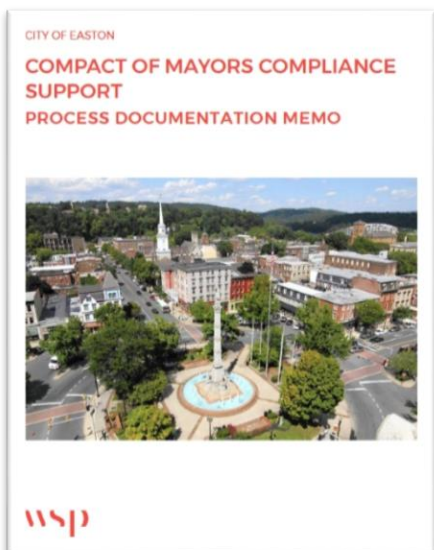
New York City Greenhouse Gas Emissions Inventories

A member of WSP's team led the development of 10 of the last 11 New York City annual greenhouse gas emissions inventories, reporting both government operations and community-wide GHG emissions, and establishing innovative calculation and reporting methods and practices that have been adopted by cities around the world. In 2015, New York City released its first community-wide GHG inventory compliant with the standards of the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), a protocol for which our team member was a contributing author.



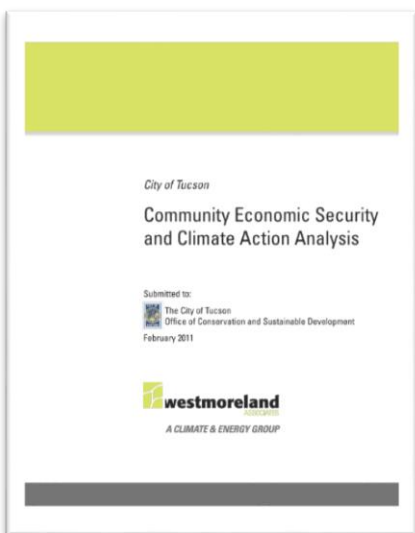
Arlington County, Virginia Greenhouse Gas Emissions Inventory

WSP is working with Arlington County, Virginia to develop a greenhouse gas (GHG) inventory for calendar year 2016 that will be used to evaluate progress toward the County's long-term emission targets and benchmark against other similar counties and cities. Each component of the inventory will be accompanied by a report summarizing the findings and documenting the process, data sources, factors, and methods used. WSP will also develop and provide inventory documentation to assist and support the County in verifying the inventory, to a desired level of assurance, through an independent third party. WSP is working closely with County staff on the inventory development process and the inventory tools so that these can be updated and maintained in future years with limited external support. WSP is educating County staff and providing updates to previously designed, non-proprietary, custom tools designed to manage data and calculate emissions in a way that is transparent and consistent with previous inventories and the GPC protocol. In addition to the inventory development and verification support, WSP is forecasting future years' emissions using growth factors and County planning data, demographic and economic trends, existing regulatory and policy drivers, and existing model forecast data. These forecasts will help identify an emissions pathway to goal achievement for the County, with WSP recommending annual or multi-year interval reduction percentages necessary for tracking progress against target achievement.



City of Easton, Pennsylvania, Greenhouse Gas Emissions Inventory

Members of WSP's team developed a GPC-compliant community-wide GHG inventory for the City of Easton, PA. This inventory was part of broader support that WSP provided to the City to meet its requirements for the Global Covenant of Mayors for Climate and Energy (Covenant). The 2016 inventory included CO₂, CH₄ and N₂O emissions from stationary energy and in-boundary travel, and it included a breakdown of emissions from municipal operations. Inventory calculations were compiled using the City Inventory Reporting and Information System (CIRIS, v2.0). WSP worked with City staff to collect and compile activity data, developed estimations for sources for which activity data was unavailable, gathered up-to-date emissions factors, and reviewed calculations in the CIRIS tool to complete the inventory. Following the completion of the inventory, WSP prepared a Covenant compliance report that documented the process and procedures for compiling the inventory so that city staff could complete future inventory updates.



Tucson, Arizona Greenhouse Gas Emissions Inventory

A member of WSP's team completed a comprehensive greenhouse gas emission inventory for the City of Tucson, Arizona in 2011, which included the analysis of regionally relevant greenhouse gas emission mitigation strategies, including implementation scenarios, participation rates, and quantification of emission reduction potentials; and the completion of econometric analysis, including capital costs, financial and energy returns, and equitability of identified measures.



Boulder County Greenhouse Gas Emissions Inventory

WSP played a central role in the sustainability management activities of Boulder County. Our team completed the GHG inventory of the emissions for the industrial, transportation, commercial and residential buildings, agriculture and solid waste sectors. We developed an Inventory Management System to track emissions on an annual basis and provided technical and financial analyses to assess a variety of GHG emissions reduction strategies within each economic sector. Our team led a stakeholder engagement process that included members of the public and staff from each of the 15 municipalities in the County. After the programs had operated for several years, we performed evaluations of impacts that had been achieved and recommended programmatic adjustments to yield further beneficial impacts. Five years after delivery of original plan, we updated the entire scope to reflect programmatic impacts and changes in macroeconomic drivers.

4 PROJECT SCOPE AND DELIVERY

TASK 1. PROJECT MANAGEMENT

The Bainbridge Island City Manager's Office will oversee WSP's work, and the Climate Change Advisory Committee will serve in an advisory capacity to coordinate the GHG inventory's support of the City's GHG mitigation targets. To ensure open communication and timely completion of project deliverables, WSP's project manager and other team members will be available for up to three meetings, including a project kickoff, with the City Manager's Office and members of the Climate Change Advisory Council, to provide project status updates and to answer technical questions from the City's Climate Change Advisory Committee and the City Council. To conserve project budget, WSP may suggest conducting these meetings remotely.

Deliverable: Project kickoff and project timeline Gantt

TASK 2. METHODOLOGY DEVELOPMENT

WSP will develop a GHG inventory for Bainbridge Island that encompasses community-wide GHG emissions, which accounts for all emissions within the geopolitical boundary of the City. Additionally, WSP proposes to complete a detailed inventory of the emissions from the City Government's operations (municipal inventory). While it is appropriate to think of these as unique and individual inventories, emissions from government operations are technically a subset of emissions in the community inventory. Individual estimates for each inventory component are needed, and much of the upfront data collection will be completed concurrently. Having a combined data collection effort will reduce the time required and help WSP efficiently complete the task.

At the commencement of the project, WSP will work with the City to define the GHG inventory’s methodology to allow for clear understanding and communication of inventory development process and content. The community GHG inventory will be developed following the guidance of the ICLEI *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions* (Community Protocol), while the municipal operations inventory will follow the guidance of ICLEI’s *Local Government Operations Protocol* (LGOP). WSP will collaborate with the City to determine its interest in also developing the community-wide inventory consistent with the requirements of the *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories* (GPC) BASIC level of reporting, and will develop its methodology according to the City’s interest. The GPC is the global counterpart to ICLEI’s U.S. Community Protocol. While the US Community Protocol provides more detailed methodology tailored to U.S. communities, consistency with the GPC is recommended for reporting to international registries.

The basic approach to conducting an inventory will be similar for both the government operations and community inventory components. WSP’s general approach is designed to achieve five major goals for Bainbridge Island’s inventory; relevance, completeness, transparency, consistency, and accuracy.

Figure 3: Standard GHG Inventory Process

WSP STANDARD GHG INVENTORY APPROACH



The methodology will define several requirements for both community-wide and municipal operations GHG inventories, as detailed in the **Tables 1-3** below:

Table 1: Inventory Parameters to be Defined Early in the Process

INVENTORY PARAMETER	WSP APPROACH
Inventory timeframe and base year	The U.S. Community Protocol and LGOP requires any continuous 12-month period, but WSP would recommend aligning this with the calendar year, rather than a fiscal year or other period, to increase transparency and consistency and to simplify the use of these data by the City. WSP would propose the City use the most recent year possible where high quality data are available, likely 2016 or 2017
Identification of data sources, calculation methods, emission factors, context data, analytical tools	WSP will work with the City to identify all data sources and to confirm calculation methods, emissions factors, and context data, and analytical tools to be used in inventory development.
Identification of GHG sources and activities for inventory inclusion	WSP will confirm all sources and activities to be included in the GHG inventory with the City, as detailed in Tables 2 and 3 below, consistent with guidance in the U.S. Community Protocol and LGOP.

GHGs for inclusion	The U.S. Community Protocol and LGOP both require the reporting of the following GHGs: carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF ₆), where applicable. WSP will recommend inclusion of specific GHGs through the development of its methodology. As minimum, the GHG inventory will report emissions from CO ₂ , CH ₄ , and N ₂ O, as well as report in units of carbon dioxide equivalent (CO ₂ e).
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Table 2: Community Emission Scopes and Sources

SCOPE	EMISSIONS SOURCE	EMISSIONS SOURCE DESCRIPTION AND ASSUMPTIONS
1	Stationary Energy	This source includes emissions from all stationary combustion of fossil fuels that occur at residential and commercial buildings and facilities within the City's boundary.
	Transportation	This source will include all emissions from the combustion of transportation fuels within the City boundary for on-road passenger vehicles and freight motor vehicle travel.
	Use of Energy in Potable Water and Wastewater Treatment and Distribution	Emissions associated with fossil fuel combustion used in the treatment and delivery of potable water used in the community and in the collection and treatment of wastewater used in the community, for infrastructure within the city's boundary.
	Generation of Solid Waste by the Community	This source includes emissions from waste disposal facilities located inside the City limits that receive waste generated within the City limits, or is imported from outside the City limits. WSP recommends the use of the methane commitment method, which estimates projected future methane emissions from solid waste generated in the analysis year and disposed in landfills.
2	Stationary (Grid Supplied) Energy	This source will include all emissions associated with grid supplied purchased energy (electricity, steam, heating/cooling) used at all buildings and facilities within the City boundary.
	Use of Energy in Potable Water and Wastewater Treatment and Distribution	Emissions associated with energy used in the treatment and delivery of potable water used in the community and in the collection and treatment of wastewater used in the community, for infrastructure within the city's boundary.
3	Generation of Solid Waste by the Community	This source includes emissions from waste disposal facilities located outside the City limits that receive waste generated within the City limits. WSP recommends the use of the methane commitment method, which estimates projected future methane emissions from solid waste generated in the analysis year and disposed in landfills.

Table 3: Bainbridge Island City Government Operations Emission Scopes and Sources

SCOPE	EMISSIONS SOURCE	EMISSIONS SOURCE DESCRIPTION AND ASSUMPTIONS
1	Stationary Combustion	This source will include all emissions from stationary combustion of fossil fuels that occur at facilities operated by the City government.

	Transportation	This source will include all emissions from the combustion of transportation fuels in government operated fleets (e.g., City bus fleets, City owned vehicles for employees and any City construction or maintenance trucks and equipment).
	Fugitive Emissions	This source includes leakage of GHGs from any facilities as refrigerant gases from HVAC equipment, chillers, or other equipment at facilities and in vehicles.
	Solid Waste	If the City Government owns/operates any waste disposal facilities, all direct process emissions, excluding energy use, associated with those facilities would be considered Scope 1.
2	Purchased Energy	This source will include all emissions from purchased energy consumed by government operated facilities and vehicles, including electricity, steam, and hot or chilled water.
3	Solid Waste	If the City does not operate any waste disposal facilities, then emissions associated with disposing of any waste generated by the County Government would be considered Scope 3.

As part of the methodology development, WSP will consult with the City to determine which sources and activities beyond the U.S. Community Protocol's Five Basic Emissions Generating Activities should be included in the community GHG inventory. Potential options are included in **Table 4** below. WSP will discuss time and costs associated with these optional emissions sources with the City should we be awarded this work.

Table 4: Optional Community Emission Scopes and Sources, Beyond ICLEI's Five Basic Emissions Generating Activities

SCOPE	EMISSIONS SOURCE	EMISSIONS SOURCE DESCRIPTION AND ASSUMPTIONS
1	Stationary Energy	This source includes emissions from all stationary combustion of fossil fuels that occur at non-residential and commercial buildings and facilities within the City's boundary (e.g., industrial and institutional buildings and facilities).
	Transportation	This source will include all emissions from the combustion of transportation fuels within the City boundary for vehicles other than on-road vehicle travel (e.g., ferry, air).
	Solid Waste Disposal	This source would include any process and fugitive emissions from waste disposal facilities located within the City boundary.
	Wastewater Treatment Facilities	This source would include any process and fugitive emissions from the City's wastewater treatment facilities located within the City boundary.
	Agriculture, Forestry, and Other Land Use (AFOLU)	This source would include net GHG emissions from agriculture, forestry, and other land use activities within the City boundary.
	Fugitive emissions from industrial processes and product use	This source would be emissions from any industrial processes within the City, such as electronics manufacturing, aluminum production, and chemical production, as well as use of industrial products, such as refrigerants or HFC foams.
2	Transportation	This source will capture emissions associated with grid supplied electricity used for transportation purposes.

3	Community-wide consumption-based GHG emissions	WSP will consult with the City to better determine their interest in calculating and reporting emissions from community-wide consumption of good and services. This is an optional reporting category, and numerous calculation reporting methods exist.
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Deliverable: Methodology description for City of Bainbridge Island review

TASK 3. DATA COLLECTION

An accurate, consistent activity data collection process is critical to the successful GHG inventory development, and the ability to repeat the inventory process in future years. As part of this task, WSP will lead all data collection for the community GHG inventory, and will work with the City to collect all data for the government operations GHG inventory. As part of the methodology development, WSP will propose all activity data sources to the city, to help develop appropriate contacts at utilities and other city departments, as needed.

Deliverable: Data collection templates for all community-wide and government operations activity data

TASK 4. DATA MANAGEMENT AND ANALYSIS

GHG DATA MANAGEMENT AND EMISSION CALCULATION TOOL

WSP will employ a Microsoft Excel-based tool to complete all inventory calculations due to the software's widespread market penetration and general ease of use. Through our previous experience with other counties and cities, WSP has found that developing an Excel-based tool allows for easy inventory customization and updates, simplifies the documentation process, increases transparency, and eases any future verification. The Excel tool will embody a centralized and automated annual inventory process that ensures inventory integrity and consistency. The tool will employ user-friendly data input forms that will feed into algorithms that automatically calculate emissions, saving City employees' time when working with the tool or developing future inventories. Furthermore, the presentation of the results with the tool can be customized to facilitate tracking of the City's progress towards future emissions goals.

WSP has a suite of Excel-based GHG emission calculation tools and templates that can be adapted and customized for Bainbridge Island. These tools have a proven track record through development and use with local governments, utilities, and commercial entities. Because the City government inventory is effectively a subset of the community-wide emissions inventory, both components can be calculated and managed in the same tool. Having the calculations for both components in a single tool makes it easier to archive and manage all the inventory data. Being able to aggregate across inventory components will also allow for more flexibility in using the reporting frameworks required by the U.S. Community Protocol and LGOP as well as any additional Bainbridge Island reporting needs in presenting results or creating metrics that can be used for benchmarking. Using a customized tool will also ensure that the data can be easily queried and aggregated in different ways needed to facilitate both the inventory forecasts and reduction measure impact analyses completed in the

subsequent tasks. Any tool provided by WSP will be owned by the City at the end of the project for use in future inventory efforts or sustainability plan updates.

There are also many publicly available tools, such as the City Inventory Reporting and Information System (CIRIS) from C40 Cities Climate Leadership Group and the ClearPath tool from ICLEI that are designed to help local governments compile and report protocol compliant inventories. The functionality of these tools varies, some operating more as calculators rather than data management or analysis tools, others offering basic forecasting or reduction estimation modules. WSP will work with the City to determine the best option for it but initially recommends using a customized tool based on the proven existing set of tools WSP had previously developed.

The GHG inventory's underlying activity data and resultant emissions will provide a solid foundation on which the City will be able to establish GHG emissions forecasts and develop GHG mitigation strategies, as components of future climate plan action development.

Deliverable: Microsoft Excel GHG inventory workbook with all GHG data and calculations

TASK 5. GHG EMISSIONS REPORT

WSP will summarize the results of the GHG inventory in a written report. This report will document the methodology, data sources, activity data, and GHG emissions results for community-wide and government operations GHG emissions. Included in the report will be clear identification of opportunities for GHG mitigation strategies, based on inventory results, for consideration as part of a future climate action planning process.

The GHG emissions report will include an Inventory Management Plan (IMP), which will document procedures and protocols for updating the inventory in the future. The IMP will serve as documentation of the inventory methodology and will:

- Enhance communication of inventory processes to internal stakeholders
- Serve as a record of inventory methodology updates over time
- Enable formal third-party inventory verification

Salient elements of the IMP are:

- Boundary Conditions: organizational and operational boundary definitions
- Source Identification: identify sources at each location within the organization boundary
- Quantification: quantification methodologies and emission factors
- Data Management: data sources, collection process, and quality assurance
- Historic Year Adjustments: historic year adjustments for structural and methodology changes
- Management Tools: roles and responsibilities, training, and file maintenance
- Auditing & Verification: auditing, management review, and corrective action

The report will be developed in collaboration with the City where the City can provide input and context on content development, including but not limited to photographs and quotations.

Deliverable: Written GHG inventory report

TASK 6. TRAINING AND TRACKING HAND-OFF

It is imperative that the City of Bainbridge Island can update their GHG inventory annually, to track progress they are making toward achieving their GHG mitigation goals. To facilitate this, WSP will provide two in-person training sessions on inventory development and inventory management tool operations and updates to appropriate City of Bainbridge Island staff, following the completion of the GHG inventory. These trainings, led by the project manager and attended by other WSP staff remotely, as needed, will give the City ability to update the inventory annually with new activity data and in response to evolving protocols and guidance over time.

Deliverable: Two training sessions on GHG inventory management tool, led by WSP project manager

5 PROJECT STRUCTURE, SCHEDULE & DELIVERABLES

WSP's proposed project structure, schedule, and deliverables are summarized in **Table 3: Proposed task and deliverable schedule**. This schedule is dependent on timely contract execution and data provision by the City and outside data providers.

Table 3: Proposed task and deliverable schedule

Task	Deliverable	Due Date
1	Project management plan	August 10, 2018
2	Methodology description	August 24, 2018
3	Data collection templates	September 21, 2018
4	GHG inventory workbook	October 12, 2018
5	GHG inventory report	October 26, 2018
6	Training sessions	November 9, 2018

6 FEE PROPOSAL

PROJECT BUDGET AND RATE SCHEDULE

WSP proposes to complete the greenhouse gas emissions inventory for the City of Bainbridge Island for a time and materials not to exceed budget of \$56,000. If a fixed fee contract is preferred by the City of Bainbridge Island, WSP is amenable to that structure as well.

Table 4 provides a breakdown of budget by task. The budget distribution reflects WSP’s current understanding of project scope, but we reserve the right to adjust allocations according to project demands and client expectations.

Our proposed price includes limited travel expenses for the WSP team. While we propose to work virtually for most of the project, we have included a travel budget of \$2,000 within the below fees for in-person meetings including the kickoff and final presentation. All travel will be approved in writing by the City in advance of booking

Table 4. Proposed project budget by task

Task	WSP Labor Hours	Labor Costs	Travel and Non-Labor Expenses	WSP Fee
1. Project management	21	USD \$4,000	-	USD \$4,000
2. Methodology development	36	USD \$7,000	-	USD \$7,000
3. Data collection	88	USD \$15,000	-	USD \$15,000
4. Data analysis	72	USD \$13,000	-	USD \$13,000
5. Inventory report	52	USD \$9,000	-	USD \$9,000
6. Training and tracking handoff	32	USD \$6,000	-	USD \$6,000
TOTAL	301	USD \$54,000	USD \$2,000	USD \$56,000

OPTIONAL COSTS

Should WSP be awarded this work, it will discuss options for inclusion of additional GHG emissions sources with the City, including from community-wide transportation sources (ferry and air travel), community-wide consumptions of goods and services, and agriculture, forestry, and other land use activities within the city boundary.

WSP will invoice this project monthly based on work completed, and according to the rate schedule in **Table 5**. WSP proposed rate schedule.

Table 5. WSP proposed rate schedule

Representative Staff	Hourly Rate	Daily Rate
Jeremy Mohr	\$198/hr	\$1,584
Jon Dickinson	\$216/hr	\$1,728
Jeff Irvine	\$149/hr	\$1,192

APPENDIX A – PROJECT TEAM RESUMES



JONATHAN DICKINSON

Practice Leader, Sustainability and Energy



Years experience

17

AREAS OF PRACTICE

Climate Change Mitigation and Adaptation Planning, Greenhouse Gas Measurement and Reporting, Sustainability Strategy

LANGUAGES

English

CAREER SUMMARY

Jonathan Dickinson is an experienced consultant in climate change mitigation and adaptation planning, greenhouse gas emissions measurement and reporting, and comprehensive sustainability plan development and implementation. Over the last 16 years, he has supported climate change mitigation and adaptation initiatives for New York City, completed community-scale greenhouse gas inventories for several U.S. cities, conducted third-party verification for corporate greenhouse gas inventories, and provided technical support for the development of city climate change mitigation plans. Additionally, Jonathan is a Lecturer at Columbia University's Master of Science in Sustainability Management program, where has taught nine semesters of a graduate course on greenhouse gas measurement and mitigation strategies.

EDUCATION

Master of Marine Affairs, University of Rhode Island, Kingston, Rhode Island	2001
B.A., English, Hobart College, Geneva, New York	1993

PROFESSIONAL EXPERIENCE

- **C40 Cities Climate Leadership Group Climate Adaptation and Mitigation Interaction Assessment Tool:** project manager for project to develop tool to assess interactions between current and proposed city climate adaptation and mitigation initiatives. Project involves four pilot cities: New York, Rio de Janeiro, Durban, and Melbourne.
- **City of New York Greenhouse Gas Emissions Inventories, New York, NY:** senior policy advisor and consultant, developed innovative methodology for measuring and reporting municipal energy use and greenhouse gas emissions, creating model replicated by cities worldwide. Directly responsible for completing all phases of New York City's annual community-scale and government operations greenhouse gas emissions inventories from 2007-2013, 2015-2016, provided technical assistance supporting completion of 2017 greenhouse gas inventory. Served as a technical advisor on steering committees developing numerous global greenhouse gas emissions inventory protocols. Responsible for developing methodology and technical procedures for local, regional, and worldwide municipal greenhouse gas emissions accounting and reporting.
- **City of New York 80x50 Action Plan:** consultant to New York City Mayor's Office of Sustainability, provided advisory services to the City of New York's 80x50 Action Plan development, managing the integration of greenhouse gas mitigation strategies across buildings, power, transportation, and waste sectors. Developed a decision support tool to allow the client to visualize and communicate the long-term greenhouse gas mitigation potential realized through combinations of strategy choices made across all sectors.
- **PlaNYC, New York City's Plan for a Greener, Greater New York, NY:** senior policy advisor, member of team responsible for developing and implementing New York City's comprehensive long-term sustainability plan, PlaNYC. Developed climate change initiatives of PlaNYC. Advised top administration officials on all climate change policy issues. Provided oversight and coordination of City government's carbon mitigation efforts involving energy efficiency and carbon



JONATHAN DICKINSON

Practice Leader, Sustainability and Energy

mitigation projects for more than 5,000 buildings, 26,000 vehicles, and 14 wastewater treatment plants.

- **New York City Mayor's Task Force on Sustainability:** task force chair, directed an internal task force of government agency officials, beginning the development and implementation of a comprehensive environmental sustainability plan for New York City government operations and laying the groundwork for the development of PlaNYC's initiatives involving City government operations.
- **City of Bellevue, Washington Contribution Analysis of Changes to Community-wide Greenhouse Gas Emissions:** subject matter expert to ICLEI-Local Governments for Sustainability on U.S. Department Energy-funded project to develop tool to allow cities to report the drivers of change to inter-annual community-wide greenhouse gas emissions levels.
- **C40 Cities Climate Leadership Group Technical Assistance:** Consultant to C40 Cities Climate Leadership Group, provided technical support and training to 12 North American C40 cities in updating their greenhouse gas emissions inventories to meet Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) standards; developed calculation tools for C40's City Inventory Reporting and Information System (CIRIS), to be used internationally by cities reporting to the Global Covenant of Mayors for Climate & Energy.
- **World Bank Group City Climate Planner Certificate Program:** consultant to World Bank Group and subject matter expert, developed training curriculum for city-level greenhouse gas emissions inventory expert certificate program; delivered training to 20 cities from World Bank client countries and staff from UN-Habitat, ICLEI-Local Governments for Sustainability, C40 Cities Climate Leadership Group, and CDP Cities; provided advisory services as international subject matter expert in development of certificate examination.
- **New York-Presbyterian Hospital Sustainability Program:** director of sustainability, developed comprehensive sustainability program covering six New York City hospitals, aligning multiple existing and new initiatives involving energy efficiency, water conservation, new building construction and renovation, climate resiliency, food, employee wellness, solid waste, linen, hazardous materials, indoor air quality, transportation, and procurement.



JEREMY MOHR

Senior Project Director, Sustainability and Energy



Years with the firm

1

Years total

17

Education

M.S. Carbon Management,
University of Edinburgh,
Edinburgh, Scotland,
United Kingdom

M.S. Mechanical
Engineering, Joint Institute
for Advancement of Flight
Sciences, George
Washington University,
Washington D.C. &
National Aeronautics and
Space Administration
(NASA), Langley Research
Center, Hampton, VA

Professional memberships

Business Renewables
Center

Areas of practice

Sustainability Strategy;
GHG and Resources
Management; Sustainable
Energy; Climate
Preparedness

CAREER SUMMARY

Jeremy Mohr is responsible for the firm's Energy Strategy offering in the United States, including enterprise energy strategy and PPA advisory. Throughout his career, Jeremy has provided leadership and delivered successful results on a wide variety of large, complex projects for private and public clients. For the last decade, he has focused his efforts on carbon, energy, and climate change giving him the opportunity to work with several multinational Fortune 500 clients on enterprise carbon and energy management solutions.

Jeremy has supported dozens of organizations in the areas of energy analytics, energy auditing, greenhouse gas (GHG) inventories, setting reduction goals, and publicly reporting their efforts through CDP (formerly, Carbon Disclosure Project) responses and sustainability reports.

PROFESSIONAL EXPERIENCE

- Renewable energy investment strategy, Fortune 200, United States: project manager, leading large scale renewable energy investment strategy aimed at supporting carbon and renewable energy goals for global enterprise.
- Contract manufacturing energy management program development, United States: project manager, led development of integrated energy management program including international energy audits and measurement and verification processes for global manufacturing and fulfillment facilities providing guidance to achieve energy and carbon reduction targets. Client: Fortune 100 information technology company.
- Global energy efficiency and renewable energy assessment, Global: project manager, led development of global energy and carbon reduction strategy, including renewable energy opportunity identification, to achieve climate change science-based target goals. Client: confidential Fortune 200 hotelier.
- Energy efficiency and renewable energy assessment, United States: project director, provided energy analytics based on energy data from nearly 600 locations, including supplemental energy audit reporting, to illustrate energy reduction pathways to achieve carbon emission reductions by 2025 in-line with corporate goals. Client: confidential national retailer.
- From 2014 - 2017: Responsible for successful delivery of energy management and analytics and utility rebates services to over 200 clients across multiple business sectors, managing approximately 40 salaried team members.
- Carbon management program development, United States: project manager, led development of overarching carbon management program including setting next-generation GHG and energy goals, inventory management plan, (GHG) accounting processes and reporting, and public disclosure. Client: confidential national retailer.
- Energy analytics and carbon reporting, United States: project director, developed an approach for comprehensive, corporate-wide inventory of GHG emissions from thousands of facilities. Assisting in responding to the CDP and creation of new public disclosure of quarterly energy, water, waste, and GHG reporting. Client: confidential Fortune 100 financial institution.



JEFF IRVINE

Project Consultant



Years with the firm

2

Years total

12

Areas of practice

GHG and Resources Management;

Climate Preparedness;

Sustainability Strategy;

Sustainable Energy

Languages

English

CAREER SUMMARY

Jeff Irvine is a project consultant in the United States Sustainability and Energy practice, supporting clients with greenhouse gas (GHG) and water inventories, verification reviews, client benchmarking, policy and data analysis, and sustainable energy strategy. Jeff has extensive experience supporting city sustainability programs, including CDP reporting, greenhouse gas inventory development, climate hazard assessment, and clean energy program development.

For a recent public client, Jeff supported the city's compliance with the Global Covenant of Mayors by coordinating a climate hazard assessment and supporting a GPC community-wide greenhouse gas inventory. Prior to joining the firm, Jeff managed New York City's solar market development program leading to a tripling of NYC's solar capacity deployment.

EDUCATION

M.P.A., Environmental Science and Policy, School of International and Public Affairs, Columbia University, New York, New York 2013

B.S., Communications, summa cum laude, S.I. Newhouse School of Communications, Syracuse University, Syracuse, New York 2006

ADDITIONAL TRAINING

BPI Energy Auditor Level I / Building Analyst, Association for Energy Affordability, Inc. 2011

Data Science Specialization, Johns Hopkins University (online) 2017

PROFESSIONAL EXPERIENCE

GHG and Resources Management

- City of Easton, PA, Community GHG Inventory (2017): project consultant that developed data acquisition plan for city's communitywide electricity consumption, fuel consumption and other activity data. Supported data acquisition process, performed data quality assurance check, and compiled inventory following the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories. Supported client's submission to CDP Cities and compliance with the Global Covenant of Mayors.
- Confidential Municipalities, CDP Response Check (2017): project consultant that reviewed CDP Cities responses for two large U.S. cities and advised city managers on response modifications to improve or complete their CDP Cities questionnaires.
- Confidential Fortune 500 Chemical Company, Science-based Target (2017): project manager that led development of a corporate science-based GHG reduction target for approval by the Science Based Targets initiative (SBTi). Performed modeling of Scope 1 and 2 targets using seven SBTi-approved methodologies. Analyzed supplier data to develop Scope 3 target.
- Multiple Fortune 100 Companies, Limited Assurance of GHG and Water Inventory (2017): lead reviewer that supported Limited greenhouse gas and water verification for client's global corporate-wide Scope GHG and water inventories in accordance with the requirements of ISO14064-3.



JEFF IRVINE

Project Consultant

Climate Preparedness

- C40 Cities Climate Leadership Group (2017-2018): technical lead developing a tool to support cities in evaluating interactions between climate adaptation and mitigation strategies. Led review of literature on interaction classifications, including synergies, trade-offs, mal-investment risks, and financial piggybacking. Led technical design of tool and Excel VBA programming of tool functionality. Developed framework for quantitative analysis of individual adaptation and mitigation strategies along multiple dimensions.
- City of Easton, PA, Community Climate Hazards Assessment (2017): project consultant that engaged local stakeholders to perform city's climate hazards assessment following the requirements of the Global Covenant of Mayors. Developed response to CDP Cities climate hazards module based on assessment.

Sustainability Strategy

- Confidential Fortune 100 Financial Services Company, Carbon Reduction Strategy (2017): project manager that analyzed strategies, including internal carbon pricing, green bonds, and dedicated funds, for prioritizing and incentivizing carbon abatement projects to support client's GHG reduction goals.

Sustainable Energy

- Confidential Luxury Jewelry and Specialty Retailer, GHG Inventory (2017): project consultant that supported development of RFP for rooftop solar installations at facilities in multiple national markets. Performed remote site evaluation of multiple facilities and reviewed RFP bids.

Experience Prior to Current Firm

Solar Program Manager

- As manager of the New York City Solar Partnership, led New York City's solar market development program, including the implementation of two U.S. Department of Energy SunShot grants. Coordinated programs leading to a tripling of NYC's solar deployment along with a 21 percent reduction in installed costs. Oversaw development of the NY Solar Map, and led statewide working groups on permitting and interconnection, financing options, and planning and zoning.

Carbon Reduction Program Coordination

- Coordinated the NYC Mayor's Carbon Challenge to universities and hospitals, a voluntary carbon reduction program, on behalf of New York City, including the development of climate action plan templates and emission tracking tools. Led forums for sharing best practices and strategies.

Energy Efficiency and Renewable Energy Consultant

- As a consultant for the New York State Energy Research and Development Authority, advised residential and commercial customers on energy efficiency upgrades and renewable energy investments utilizing New York State's incentive programs.

PUBLICATIONS AND PRESENTATIONS

Presentations

- Irvine, Jeffrey (co-author). "Implementing Climate Action Plans by Tracking Data," presented on a webinar for CDP Cities. May, 2017